

## Article

# Perception of Urban Leftover Spaces: A Comparative Study of Built Environment and Non-Built Environment Participants

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**Abstract:** The built environment, urban processes, and experience all work together to create the spatial environment of a city. Many urban spaces, especially those that appear to be ‘leftover’, do not reflect a set concept but are constantly questioned and recreated. Recognizing leftover spaces in an urban environment is an important aspect of the urban redevelopment process. Researchers have highlighted the difficulties, circumstances, and relevance of making good use of leftover space. To accomplish environmental and social benefits, these places can be created, changed, and incorporated into the main urban fabric; however, there is a scarcity of knowledge on how to go about constructing such environments. This study explores the visual perception of two groups of people, those with knowledge of the built environment and those with other educational backgrounds regarding leftover spaces in Wellington City. The research, which employs a mixed approach, consists of three studies, beginning with a visual preference study to better understand human perceptions, which might lead to better design solutions. The second study looked at differences in design preferences across the built environment and non-built environment participants. Finally, individuals from the built and non-built environments participants were invited to a focus group discussion for study three. To summarize, the findings demonstrated that adding vegetation is a crucial design feature. The findings refute the hypotheses of non-built environment specialists have different design perceptions for a built environment.

**Keywords:** urban leftover spaces; aesthetic assessment; visual preferences

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## 1. Introduction

Even though urban areas are 6% of the Earth’s surface, their large “ecological footprints”, create a significant environmental impact (Rees and Wackemagel, 1994) [1]. The main problem in cities is the increasing size of the population; this results in urban sprawl, which in turn contributes to severe environmental impacts. Some of these adverse impacts include loss of productive land, air pollution, high traffic, exhaustion of resources, poverty, and spiraling infrastructure costs. Human life is facing critical threats in the shape of poor air quality, global warming, availability of resources, flows of energy, food, and water. Further urban growth will impact the quality of life by raising serious global concerns related to resource availability and sustainability.

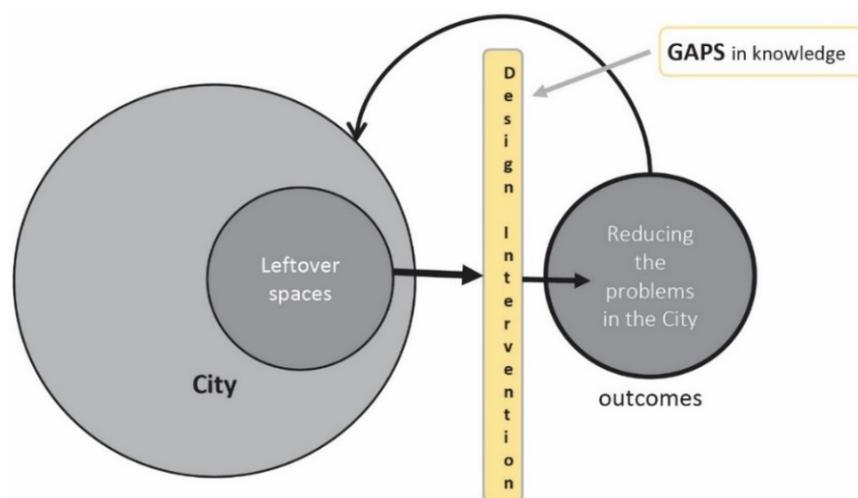
A key solution is to allow sustainable growth of cities to minimize the impact of human population growth on the natural ecosystem and to ensure proper utilization of agricultural land. Shochat et al., (2006) [2] assert the urban environment as a compelling force, which can influence the behaviors, physiologies, and morphologies of city-dwelling organisms. In an attempt to create a paradigm shift to cope with the environmental challenges that adhere to urbanization, identifying the role and potential of urban leftover spaces and their aesthetic significance is needed.

### *Significance of Urban Leftover Spaces and Aesthetics*

According to Turok and McGranahan (2013) [3], urban growth does not have one uniform development model and includes multiple reasons such as the political stability for growth management, financial resources, the institutional scope for planning, and topography, current infrastructure, traditions, and culture. As the urban population grows, more and more productive agricultural land is occupied in cities; it is thus important to explore the potential value of unused land and spaces, that have been overlooked during the development of the city. Sousa (2009) [4] explains that such spaces are indicative of economic, social, and environmental tension due to their lack of proper usage and visual attractiveness. New York State Department (2009) [5] highlights their value by defining them as opportunities waiting to happen. On the contrary, Wilkinson (2011) [6] identifies that these spaces pose a threat to public safety, economic opportunities, environment, housing, and neighborhood development. Evan (2003) [7] further explains that claustrophobia, a sense of terror, and a feeling of being lost are representative of a built environment that affects mental health adversely.

Even though leftover spaces are characterized by deprived human activity, they can be utilized for urban regeneration for supporting sustainable urban living. It is important for spaces to be designed with attributes that the community is attracted to, for their aesthetic value and perceptions. The urban experience, visions, and perceptions in a community are linked to its aesthetic engagement with the built environment. Individuals perceive and interpret an environment differently and react to it accordingly. The role of the aesthetic environment is to provide full meaning to the urban environment by ensuring the use of visual information to understand the natural, emotional, and physical aspects. Visual attributes of and 'human evaluative responses' to a built environment are of crucial importance for assessing it (Nasar, 1998) [8]. The visual aesthetics of a built environment can influence human well-being, the usability of space, and even fall in property values if not appropriately managed.

In the current times, there is a need to value the existence of surplus land, and identify the potential of leftover spaces (see Figure 1), as if designed in an aesthetically appealing manner, these can become a source of generating economic revenue (considering the variety of urban activities that can be carried out here). This study seeks to understand the potential of different urban leftover spaces to be used more effectively than they appear to be at present based on people's preferences.



**Figure 1.** The gap in Knowledge (Source: Author).

## **2. Materials and Methods**

This section explores the existing literature and details the methodology applied in the study.

### 2.1. The Urban Leftover Spaces

For avoiding further urban expansion, urban planners have been finding out ways to ensure better usage of existing areas. One such solution is intensification, which implies the redevelopment of already present areas for more intensive usage. Concise urban settlements promote reduced dependence on cars and more sustainable transport solutions (Williams et al., 2000) [9]. Another benefit of compact cities brought forward with denser settlements is the time people may save by living nearer to their workplaces. One concern regarding this however is, that no such schemes for denser settlements have explained the role of food supply and the land where it will be grown, and the mechanism of returning sewage nutrients back into the soil (Vale and Vale, 2010) [10]. For constructing sustainable, resource-efficient cities, balancing the compact city concept with transforming infrastructure and eco-friendly systems is acknowledged to be vital (Bolton and Foxon, 2011) [11]. In most compact cities, the potential of leftover spaces has been underestimated. Such unused space could help cities respond more effectively to environmental challenges and the need to transition to more sustainable living.

Roger Trancik did analytical studies of unused spaces over 30 years ago (1986); he investigated the concept of leftover spaces, referring to them as “lost spaces” because they appeared to have no major positive impact on the environment. These spaces, he maintained, were ill-defined, lacked definable bounds, and were not able to connect elements logically. As land values in city centers have risen since the 1990s, the number of scattered unutilized parcels of land with varying sizes and shapes found in valuable inner-city land has increased. These abandoned lands were defined as Temporarily Obsolete Abandoned Derelict Sites (TOADS) by Greenberg et al., (1990) [12].

Leftover areas in cities can be found next to planned developments, along with and under highways and railways, sometimes unnoticed, and they either have no ownership or are publicly owned, or land set aside for development or greening but not developed. Policy and planning implementation is crucial for urban leftover areas. Such spaces are often missed out and yet depicted as unfavorable within the fields of planning, architecture, design, and urban theory; as a result, they frequently fade away over time or escape the attention of the main urban actors, leaving them with no discernible purpose, and such leftover spaces vary in size and shape, and without effective strategic action, they could be dangerous. Due to a lack of suitable use identification, they have been exploited as a garbage dumping area or a shortcut to a back lane. Not having been assigned a proper function, leftover spaces end up being used as an area for garbage disposal or a shortcut to the back lane. An urban planner, Sola-Morales (1995) [13], claimed that leftover spaces are essential to the city’s evocative potential and are concealed locations where the lack of use can create a sense of freedom and expectation.

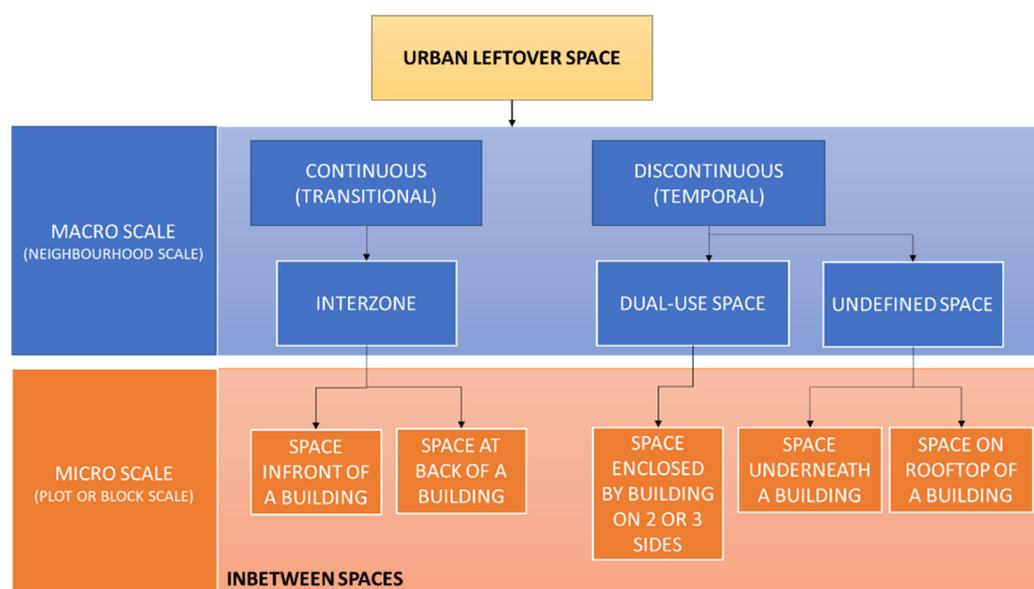
The question of urban residual spaces has spawned taxonomic interpretations over time (Auge, 1995) [14]. Different interpretations and terminology have been used to investigate the topic, including loose, unoccupied, liminal, transitional, derelict, neglected, indeterminate, and lost (Azhar, 2021) [15]. In most cases, these definitions have merely added to the uncertainty regarding the subject by focusing on one form of space rather than their larger relationships by introducing minor semantic discrepancies (De-Girolamo, 2013) [16]. Leftover areas have been classified mostly on the basis of their aesthetic value and other qualitative characteristics (Azhar et al., 2020) [17]. Throughout history, leftover spaces have been given several titles, but their spatial quality, space, and utility remain the real parameters by which to identify them.

#### ‘In-between’ as Leftover Space

Leftover space is an empty, shapeless, solitary space that lacks any spatial interaction with its surroundings and is incapable of creating a state of transition. In-between spaces, on the other hand, are in a transitional state. Such gaps in the figure-ground are primarily caused by existing building boundaries at the micro-scale. In-between spaces have no identity that acts as an interspace and serve as a third space (Lefebvre, 1991) [18], whereas

leftover spaces persist as remains (Alexander et al., 1977) [19]. In the built environment, in-between spaces are bounded by the boundaries of surrounding structures and infrastructure, which define the shape and configuration that allows a given function to occupy such a space. In-between spaces are situated inside a location's functional setting and can be used to connect neighboring buildings to the environment and establish interconnections within the city's fabric. By emphasizing the value and variety of between-ness from a spatial and temporal perspective, being in-between becomes a spatial category. The desire to emphasize its major trait of between-ness, both spatially and temporally, led to the naming of this spatial category in-between. Between-ness also indicates overlapping, juxtaposition, and concurrence, specifically between things, for example, the abstract space between private and public places is, in fact, a genuine area that is both public and private, it often has 'semi-' attached behind, leading to an inter-situation or midway location (Luz, 2001) [20].

The categorization of macro and micro scale for urban leftover space is primarily derived from the literature that meets the qualitative description of leftovers and a thorough site observation was conducted to compile a list of micro spaces within the built environment. In literature, the urban leftover spaces at the macro scale are divided into two qualitative categories of continuous and discontinuous spaces. The continuous spaces are those in transition whereby time, space, and other circumstances become essential. Discontinuous space is temporal, having various physical circumstances, and which do not relate well to the setting; however, at the micro-scale, the site observation discovered that urban leftover spaces can be divided further into six primary types (i.e., enclosed by buildings on two and three sides, underneath a building, the rooftop, and in front and at the back of a building, Figure 2) that can be driven from continuous and discontinuous spaces (Azhar and Gjerde, 2016) [21]. These spaces have been found in-between buildings or structures, as well as at their edges and within them, based on field observations. These spaces, which frequently take the shape of informal and underutilized parking spots, spread across the bounds of open/closed, private/public, and interior/exterior, and have no official purpose (Doron, 2006) [22]. In-between places have their own terminologies, which are distinguished by their function, scale, and size.



**Figure 2.** Spatial classification of leftover spaces as 'in-between spaces' (Source: Author).

The leftover places can be viewed as both being capable and dangerous. The conceptual ambiguity of many labels has made it difficult to comprehend the problem of urban leftover spaces. Literature uses several labels for leftover spaces, often on different scales, no writers have addressed or explored potential options for future regeneration

from within. These locations appear ambiguous and unloved, as some of the titles suggest; however, revitalizing such locations on a micro-level could increase the city's potential. The challenging task of urban design is to rethink in between (leftover) spaces at the micro scale in terms of altering the interaction between open and closed spaces through aesthetic design interventions.

## 2.2. Aesthetic Assessment and Visual Preferences

Human behavior is influenced by how the environment is perceived and whether it is loved or despised. In the history of aesthetic studies, this has been a significant area. Bell (1999) [23] defines perception as a method of acquiring and interpreting information through several senses. Even though some senses, such as touch, vision, and to some extent, smell, are more important than others, all senses are intertwined and never used in isolation. Lynch (1960) [24] stated that city design is a work of art for a wide range of individuals, with many uses and connotations. Furthermore, the image of a city is generated by senses that are linked to a variety of different aspects of space utilization. People associate a mental image of space with their prior experiences and associations, and this shapes their actions. Cognition is a process of organizing and categorizing information in order to make decisions. According to Tversky et al., (2006) [25], the visual aspects of an environment exist in human cognition that can be as important as real expressions. Perception and cognition, according to Nasar (1998) [8], generate an evaluative response to an environment. The evaluative response is engaged with the constant interaction of humans and the environment, and it can result in a negative or good positive perception of the environment. Lynch (1960) [24] proposes a mental or cognitive map technique based on residents' psychological data about urban shape and its transformation.

The aesthetic assessment is the process of appraising sentiments based on the pleasure associated with a particular thing. A person's feeling, though it is a subjective part, is the most important characteristic of aesthetic judgment (Stamp III, 2000) [26]. According to Ulrich (1983) [27], the aesthetic reaction is about a person's liking for something that makes them happy or sad, and it operates through cognitive activity and visual encounter. A viewer's visual perception and reactivity to a natural or built environment is measured by its aesthetic quality (Cerosaletti and Loui, 2009) [28]. An aesthetic space, according to Garcia-Domenech (2015) [29], might inspire people to utilize it, but there must be a good balance between practicalities and perceptions. Nasar (1998) [8] adds to this argument by noting that meanings and appearances are not independent of usability, but rather are integral to it.

Understanding preferences is an important step in determining how individuals assess an environment, as well as how they characterize and represent it. This assessment varies from person to person depending on their individual preferences. Habe (1989) [30] proved that aesthetic aspects of a building play an important role in establishing spatial preferences. Multi-dimensional scaling responsiveness and photographs were all shown to be important in determining the dimensions of perception, according to his research. Nasar (1998) [8] argued that a space's visual quality influences its experience and sentiments. According to Nasar (1994) [31], the visual study method is an effective tool for evaluating how individuals feel about environmental situations. The imageability of a constructed environment, according to Nasar (1998) [8], is linked to the viewer's perspective of how items are related, appraised, and finally how the viewer reacts to them. Kaplan and Kaplan (1989) [32] and Sanoff (1991) [33] were among the first to investigate the reliability of the visual study technique for obtaining visual answers. According to Nasar (1994) [31], displaying photographs of a situation or place elicits the same response in individuals as if the images were actual. Photos or slides were used by Hartig and Staats (2006) [34] to elicit people's preferences. As a result, this study probes people's preferences by using images of various remaining areas.

### Difference of Opinions in Perceived Value

According to Maron and Spreckelmeyer (1982) [35], consensus judgement on the quality of architecture may be reached if consumers' preferences are given weight and attention by designers. Groat (1988) [36] claimed that the architect prioritizes the site's organization and massing. An architect's sense of style, meaning, and selection differ from that of laypeople (Nasar and Devlin, 1989; Montana et al., 2013) [37,38]. Janssens (2001) [39] discovered that architects had a better level of consistency or coherence when it comes to preferring color patterns than other participants who picked a wide range of color schemes. Gjerde (2010) [40] observed that ordinary participants with no professional expertise in the built environment had similar perspectives and aesthetic judgments to architects and planners, however, professional participants were more confident and vocal in voicing their concerns. Brown and Gifford (2001) [41] concluded that the conceptual qualities (formal or physical) of a structure should be investigated in order to uncover disparities in preference between architects and the general public. The literature shows that built environment participants and others hold opposing views on preferences, highlighting the necessity to investigate people's aesthetic perceptions further. As a result, this research examines the differences in design preferences between Built Environment (BE) and Non-Built Environment (NBE) participants (NBE). This research will help to create the built environment of the future and provide design guidelines.

This research focuses on the prospective design solutions for six public-private leftover (in between) spaces located between buildings (1) enclosed by two, (2) three sides, as well as their surrounding facades (3) in front and (4) back, (5) underneath and (6) rooftops, which have yet to be thoroughly explored for urban growth. It became clear from the literature that there is a need to investigate people's aesthetic responses to various leftover spaces in both their original and redesigned states. This study intends to design leftover areas according to people's preferences, so that design experts may use them as a model for improving design quality and promoting sustainable solutions from inside the city. Simultaneously, designing such spaces might improve the city's aesthetic qualities. This study thus investigates design features for various leftover areas in order to improve Wellington City's aesthetic quality by examining the visual perceptions of BE and NBE participants, while understanding their difference of opinion.

#### 2.3. Study Method

The study applies a mixed methodology to understand the perceptions of people regarding six types and designs of urban leftover spaces. The mixed-use approach used has the potential for being used as a tool to promote participatory urban design and planning consultations with the users. Participatory research depends heavily on the variety of new data from both professionals and non-experts (Krueger and King, 1998; Veale, 2005) [42,43]. A mixed-method approach has often been used in prior research to study psychological characteristics (Creswell and Clark, 2007) [44] in which qualitative and quantitative methods of data collection, both are used. Data is gathered individually for both, examined separately, and then analyzed for final interpretation collectively. The study consists of three separate studies that use pictures and photomontages to explore BE and NBE participants' perceptions of urban leftover areas and their design.

- Study One investigates preferences regarding six types of leftover spaces and takes suggestions on design attributes for their enhancement. The data from Study One feed into Study Two, where the most important suggestions are photomontaged into three different options for each type of space.
- Study two looks into people's aesthetic preferences for the various redesigned images based on the suggestions in Study one to shed light on any change in people's attitudes.
- Study Three is divided into two parts of design charrette and focus group discussions. To familiarize individuals with the subject and have a more open discussion, this study is done separately with the built environment and non-built environment participants.

### 2.3.1. Study One: Visual Preference Study (VPS) of Existing Leftover Spaces

The aim of the VPS was to measure the preferences of participants regarding attributes of different types of urban leftover spaces. Using colored photographs, Study One employed descriptive, quantitative methods to understand the perceptions of the participants. Photographs of leftover spaces with no specific usage were shown to the participants, and the expected outcome of the study was the proposed changes that would improve the usage of the subject spaces, and enhance their perceived significance and appreciation. Results from Study One were used in Study Two to develop photomontages portraying how the spaces could be improved. Data were received from 119 participants, out of which 57% were those who had knowledge of the built environment, while the remaining 43% had a different field of study. The critical existing aspects of existing spaces were tested based on vegetation, cleanliness, the openness of the space, seating spaces, openings in a wall, having a clear thoroughfare, parking spaces, surface materials, graffiti, and maintenance of evidence of lack of maintenance. The study was divided into two stages, the first stage concluded the results on a 5-point Likert scale and the second stage analyzed the design suggestions for further improvement.

In the first stage, the study asked the participants to rate six different leftover spaces on a 5-point Likert Scale ( $-2 =$  Disliked to  $+2 =$  Liked) and provide reasons for their choice. The 5-point Likert scale was based on Stem's and Noazin's (1985) [45] conclusion that a 5-point scale ensures maximum validity and reliability for bipolar adjective scales which was later converted to a new 3-point Likert scale to make understand the preferences of participants regarding different attributes. In the second stage, the participants were asked to select a photo from a pair of two that they believe needed more overall improvement; they were also given a list of suggestions, either adding to or changing some attributes, from which they had to select three suggestions for each selected photo.

### 2.3.2. Study Two: Visual Preference Study (VPS) of Design Proposal

For the Second Study, like Study One a questionnaire based on images was circulated via an online survey. The aim of Study Two was to see before and after design transformations of the six different types of leftover spaces, what the participants liked and what they did not like. To provoke responses in Study Two, the responses from Study One were utilized to develop photomontages of the leftover spaces, considering specific attributes. Data for Study Two was collected from 121 individuals, out of which 96 completed the survey, 15 partially completed it whereas 10 did not complete the survey. The data collected were analyzed on the SPSS software. Participants for this study who had knowledge of the built environment formed 35% of the sample, the remaining 65% of the participants were those who had a different field of study.

Study Two had three parts, the first part covered demographic information, the same that was covered in Study One. The section part further had three subsections, in the first one there were three redesigned photos of each of the six types of leftover spaces, and a 5-point Likert scale (1 = Dislike, 5 = Like) was provided to rate each photograph. The semantic differential measures were used in the second subject to determine each participant's reaction to the transformed space using a series of stimulus concepts. A 5-point bipolar rating scale was used to assess the concepts (adjectives). This section looked at how people felt in terms of beauty, satisfaction, buildable, usefulness, and mood. In the third sub-section, the participants were asked for their suggestions for improving the spaces in the photographs.

In the third part of Study Two, the participants were asked to associate a function with the leftover space in the given photograph, they had a list of functions to choose from, and there were multiple-choice questions. The data were separated into two subgroups in SPSS for this stage of Study Two, and preferences were determined using the regrouped 3-point Likert scale. Reliability test Cronbach's alpha ( $\alpha$ ) and *T*-tests were employed to analyze the findings of Study Two. A high internal consistency was indicated by a Cronbach's alpha ( $\alpha$ )

value of 0.86. The T revealed that there was no statistically significant difference between the preferences of BE and NBE groups relating to all six types of leftover spaces.

### 2.3.3. Study Three: Design Charette and Focus Group Discussions

To understand the aesthetic preferences of built environment professionals and other participants for different types of leftover spaces, in Study Three, focus group discussions were held. Photographs from the outcome of Study One were shown to participants in Study three. This study was carried out in two parts, the participants were engaged by conducting a mini design charette and then doing focus group interviews.

The mini design charrette session was conducted at the beginning of study three to extract possible design solutions through a collaborative decision-making approach. Lennertz and Lutzenhiser (2006) [46] explain that a mini-design charrette aims to provide solutions for a particular issue by conducting a planning and design workshop. Participants were requested to provide input in the form of design concepts. The BE design team worked in pairs of two and one group of three was made for NBE participants. The participants were asked a specific question in the mini design charette to modify the space by sketching or to create a doodle for six leftover spaces that could enhance the usability and aesthetics of a particular space. After, each participant was given time to present their ideas visually. The respondents spent approximately five to seven minutes on each photograph and created realistic design schemes. It was noted that participants spent more time inward understanding and elaborating on their diverse opinions for the first two photographs but spent little time on the other four pictures. The discussion was audio-recorded and later transcribed to analyze the pattern by assigning different codes. Once all the participants finished presenting their design schemes, the focus group discussions were held to learn about the importance and effectiveness of various design attributes for designing leftover spaces.

Two Focus Group Discussion (FGD) sessions were held separately for BE and NBE. Researchers like Calder (1977), Carnaghi (1992), and Brown (1999) [47–49] suggest that decision-making is based on acquiring knowledge about an individual's experience, emotions, and beliefs, and that a focus group is a great way to learn how people are thinking and feeling. According to Krueger (1994) [50], this method of data collection is widely adopted because the results quickly emerge and are easy to understand. Moreover, Krueger (1994) [50] highlights the benefits of focus group discussions, such as it is more dynamic, refreshing, appealing, revealing a range of experiences even while collecting information. The results are simple to comprehend, and participants generally appreciate the opportunity to participate and be a part of the discussion with their peers. Each of the FGD had two stages and lasted for 60–70 min, as mentioned above, a design charrette (20–30 min) and then a discussion phase (30–40 min). There were five participants in the NBE group and four participants in the BE group. According to King and Horrocks (2010) [51], there are no fixed standards regarding group size because it depends on the individuals involved and the study's goal. Other studies (Kitzinger, 1995; Krueger and Casey, 2009) [52,53] believe that a focus group with four to six members is sufficient.

The design charette session began by handing over six different photographs to the participants in a sequence, this being from underneath a building, in front of a building, at the back of a building, space enclosed by buildings on three sides, space enclosed by buildings on two sides, and lastly the rooftop of a building. All of the participants were enthusiastic about the notion of drawing with various colors (see Figure 3). The results suggested that participants preferred to add or subtract attributes related to the specific type of leftover space. All of the participants were at ease, yet it was clear that BE participants were more passionate and confident in delivering their ideas than NBE participants.



**Figure 3.** Example of a sketched image and doodled done by focus group participants (Source: Author).

The transcription of the focus group was analyzed by giving labels to the most frequently recurring topics in the data. Coding is the term for this procedure. The researcher in Study Three transcribed the data before reading and re-reading. The next step was to code the data's characteristics. The final step was looking for repeating themes and positioning the keywords together with codes. In stage one, the mini design charrette, both groups of participants were asked as "If they were to become the owner of these different urban leftover spaces shown in the pictures, what things would you want to add or subtract in order to improve or increase the usability and visual aesthetics of these spaces?" In stage two the following questions were asked:

1. How could such spaces enhance usability and visual aesthetics?
2. Would it be easy to apply these suggested modifications or to implement the designs?
3. What are the most critical aspects that the participants can draw out of the discussion, which could improve the urban leftover spaces?

### 3. Results

#### 3.1. Findings of Study One

The results of the overall preferences and suggestions for improvement in stage 2 for the BE and NBE groups were quite similar (see Figure 4). BE participants wanted to see changes related to providing vegetation, changing surface materials/colors, and allowing graffiti on walls more than NBE participants. NBE participants were more definite about removing car parks, creating seating space, creating clear pathways, and providing more shade. Other suggestions for improving the spaces related to installing wind turbines and solar panels for the space on the rooftop of a building, providing more cleanliness and maintenance for the space underneath a building, and removing boundary walls for space in front of a building.

#### 3.2. Findings of Study Two

Three modifications presented in part one of Study Two were option A regarding change of surface material, option B as creating a clear pathway, and option C as providing more vegetation. Comparing only the most liked option for six types of leftover space, Table 1 and Figure 5 validate the statistical results for study two by showing that the preferences of BE and NBE group are similar.

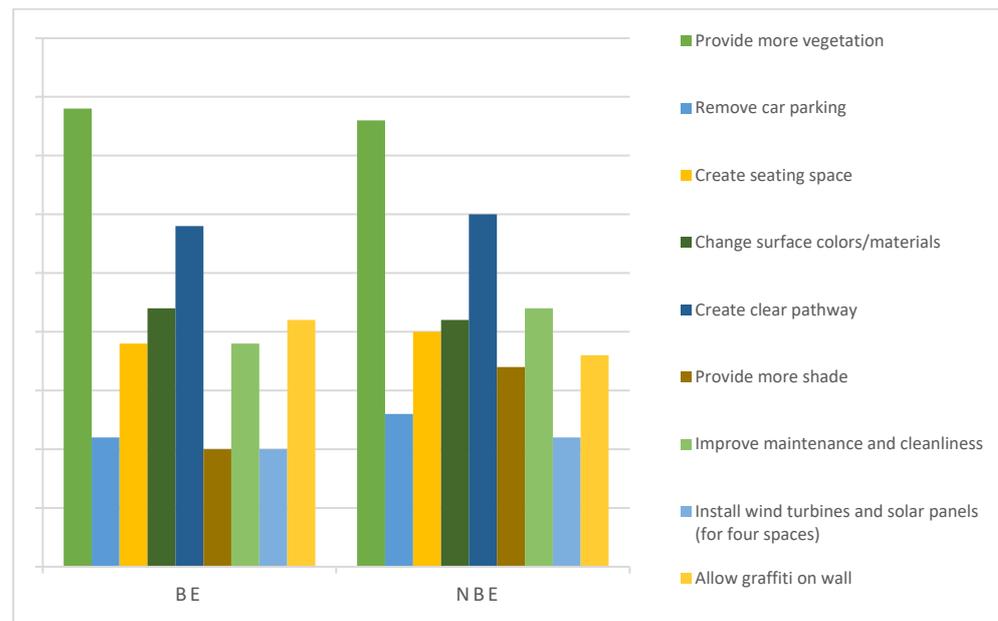


Figure 4. Overall modifications were suggested by BE and NBE participants (Source: Author).

Table 1. Comparison of Preferences between BE and NBE Groups (Study Two).

Type of Leftover Space	Image Options *	BE Participants			NBE Participants		
		Liked	Neutral	Disliked	Liked	Neutral	Disliked
Space underneath a building	Option A	63%	25%	13%	83%	9%	8%
	Option B	13%	32%	55%	28%	40%	32%
	Option C	18%	32%	50%	31%	43%	26%
Space in front of a building	Option A	71%	24%	5%	81%	16%	3%
	Option B	68%	14%	19%	71%	19%	10%
	Option C	55%	35%	10%	59%	33%	7%
Space at the back of a building	Option A	45%	40%	15%	56%	33%	11%
	Option B	0%	50%	50%	22%	27%	50%
	Option C	89%	11%	0%	88%	6%	6%
Space enclosed by buildings on three sides	Option A	42%	53%	5%	43%	40%	17%
	Option B	0%	47%	53%	29%	38%	33%
	Option C	89%	5%	6%	85%	8%	8%
Space enclosed by buildings on two sides	Option A	37%	37%	26%	35%	38%	27%
	Option B	95%	5%	0%	88%	6%	6%
	Option C	26%	47%	26%	39%	35%	26%
Space on the rooftop of a building	Option A	89%	5%	6%	88%	11%	1%
	Option B	21%	53%	26%	34%	37%	29%
	Option C	44%	33%	22%	46%	31%	23%

(\* Option A = Change of surface material, Option B = Create clear pathway, Option C = Provide more vegetation).

For leftover spaces located underneath, in front of, and on top of a building, the most liked option by both groups of participants was option A (change of surface material). Option C (providing more vegetation) was most preferred by both groups for spaces at the back of a building and enclosed by three sides. Lastly, for a space enclosed by two sides, option B (provide a clear pathway) was chosen as the most liked design transformation.

This section may be divided into subheadings. It should provide a concise and precise description of the experimental results, their interpretation, as well as the experimental conclusions that can be drawn.

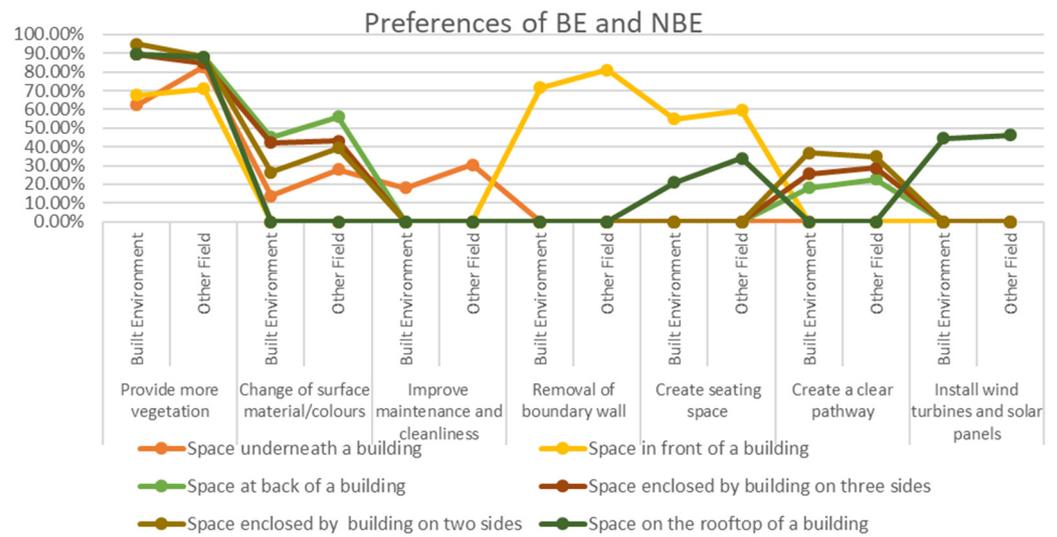


Figure 5. Design Preferences of BE and NBE participants (Source: Author).

### 3.3. Findings of Study Three

Both groups had comparable general preferences for upgrading the remaining areas as a result of the focus group talks. More greenery, different surface materials, screens, reducing automobile parking, adding a café or restaurant, creating seating areas, removing boundary walls, enhancing sanitation, and placing murals/sculptures were among the suggestions. The solutions varied depending on the sort of urban type of leftover space, but the general consensus was that plants and modifying the surface material should be prioritized.

The mini-design charrette revealed that BE participants were more concerned with total space, and their drawings were more dynamic and bolder than NBE replies. Furthermore, BE participants sought to modify the entire environment rather than simply one or two features in a given location. Even while day-to-day maintenance appeared to be an issue, NBE respondents expressed optimism about the implementation of their vegetation plans. BE respondents placed a higher value on design than on space usage. These people brought fresh ideas to the table, but vegetation still won out over the other notions for them. The participants believed that visual quality may be enhanced by establishing minor interventions or tiny steps that are simple to adopt and have an impact on usability, such as adding more greenery or setting up a pop-up cafe. Changing the surface material or colors was the second most popular option among all participants. BE participants placed a greater priority on the makeover of leftover areas than on their utility. This group believed that parking spaces were underutilized land that might be put to better use. Participants in the NBE were less concerned about completely changing the design. It should be emphasized, however, that these findings were based on small sample size, and that the results of such analyses should be viewed with care.

## 4. Analysis and Discussion

Providing more vegetation and changing the surface materials/colors were the most requested solutions for remodeling leftover spaces. The feature of providing more vegetation was liked by BE participants more than NBE participants but changing the surface materials/colors was equally preferred.

BE participants favored bright colors, but NBE individuals selected milder, more soothing tones. The findings also suggested that BE participants preferred enclosed spaces to ensure their productive usage, as well as modern building structures with high-quality materials and appropriate colors. The features of putting graffiti on walls and eliminating boundary barriers to make areas more inviting were equally appreciated by BE participants.

NBE participants, on the other hand, preferred well-managed, maintained, and organized areas. Other design elements that the NBE group rated higher included improving the cleanliness and maintenance by putting up screens, creating clear pathways, providing more shade, removing the car parks, and creating seating spaces. The NBE participants also gave a higher rating to the attribute of placing more vertical axis wind turbines and solar panels in open spaces and on the building's rooftop.

Architects, according to Gifford et al., (2000) [54], perceive and differentiate the physical world differently from NBE experts. Similarly, Nasar and Devlin (1989) [37] discovered that when it comes to loving the design of houses, architects and other experts had differing opinions; however, the outcomes of this study revealed that participants in both the BE and NBE groups have similar preferences for designing urban leftover areas. Similarly, Gjerde (2015) [40] discovered that laypeople's and BE professionals' perceptions of the built environment overlapped. Whereas there were disparities in their design goals in this study, with BE participants being more enthused about redesigning the entire space. BE participants were concerned with the room's suitable use and aesthetics, but NBE participants desired to add or remove tiny things from the space and were concerned about making it more aesthetically appealing. It was also discovered that both groups desired to integrate more than one feature in order to get a better design solution and, as a result, the space's aesthetics.

Providing more vegetation, creating seating space, changing the surface material or colors, and improving the maintenance and cleanliness of leftover spaces were among the design aspects favored by participants, according to this study. These were the most chosen features for five of the six leftover spaces, whereas eliminating the boundary walls was the most preferred attribute for the space in front of a building; however, it is necessary to overcome the barrier of user rights, as someone must own these unused spaces, and to reference the context to develop acceptable design solutions. If the city intends to move towards a "green" future, ownership and maintenance of public-private leftover spaces may become critical considerations, and easements may give a possibility.

The fact that people want more vegetation is an opportunity to develop restorative environments in cities, according to the findings of this study. The value of vegetation may be traced back to ancient times, with horticulture being used to soothe human senses and garden walks being utilized to recuperate from mental illness (Kohlleppel, et al., 2002) [55]. Instead of being regarded as abandoned and neglected, leftover spaces may be utilized properly and contribute positively to the city's 'image'. They have the potential to be utilized by the general public in a variety of ways. As a result, analyzing and capturing the complex spatial state of places, as well as the spatial link between them and their surroundings, is critical. Enabling 'grow-in' initiatives might help cities make better use of unused space. Energy generation and community gardening in leftover spaces are two examples of ways to improve urban productivity as a method of promoting sustainability, but they are unlikely to succeed unless the public sees them as beneficial initiatives. According to the tactical urbanism movement, cities become more sustainable when individuals enhance the urban design and make good changes in their surroundings (Planning Tank, 2016) [56]. Small adjustments to abandoned urban places might be the initial step in this direction. This method, which is low risk but potentially high reward, might become a planned, phased approach to inspiring change by delivering local suggestions for local planning concerns, a short-term commitment, and achievable objectives (Pfeifer, 2013) [57].

## 5. Conclusions

The importance of providing more green spaces cannot be overstated that can enhance people's mental and physical wellness. According to Kaplan et al., (1972) [58], the quality of a space has a link with an individual's feelings, making it more enjoyable for them to be there. The quality of a space can affect the behavior of those who use it (Ulrich, 1983) [27]. This study discovered, via the use of semantic differentials, that people have emotional reactions to urban leftover spaces, which has never been studied previously. The research

supports the idea of transforming leftover spaces into places that people want to visit. The visual preference study uncovered the design flaws for leftover spaces and elicited feedback from potential users, allowing for a bottom-up rather than top-down approach. The findings of this study might be used to transform leftover urban places and can assist BE specialists in designing or developing leftover spaces in line with the preferences of people who do not have any background in the built environment.

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