

Principles for Designing Residential Neighborhoods Using Rapoport's Ecological Approach in Combination with Maslow's Hierarchy of Needs (Case Study: Jahanshahr District, Karaj, Iran)

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ABSTRACT:

Introduction: Historically, the built environment and human worldviews have been mutually reinforcing, with cultural values embodied in spatial forms that, in turn, shape human behavior. Contemporary urban development, however, often prioritizes rapid housing production at the expense of cultural context and fundamental human values. A single dwelling cannot support holistic human development; therefore, culturally grounded and socially supportive neighborhoods are essential. Accordingly, built environments should enable rather than prescribe appropriate behavior by aligning spatial structures with human needs. **Research Method:** This research was conducted in the Jahanshahr District of Karaj, Iran, using a descriptive interpretive method grounded in behavioral sciences and environmental psychology. Relevant sub-disciplines such as the ecological approach and theories of human needs applied in environmental design—were examined in order to create an appropriate environment capable of meeting fundamental human needs. Residents' needs were identified based on Maslow's hierarchy of needs and their cultural background. Rapoport's principles were subsequently employed to guide the design process. Data collection methods included a literature review, field observations, and questionnaires. **Results and Discussion:** The analysis of traditional residential patterns and residents' responses led to the extraction of four key design principles: hierarchy of privacy, flexibility, personal open space, and responsiveness to different psychological states. These principles were applied across three spatial scales: the neighborhood, adjacent residential units, and individual houses. At the neighborhood level, the Woonerf model was proposed as an appropriate spatial solution. **Conclusion:** The findings indicate that effective environmental design must reflect users' cultural values, anticipate social transformations, and support behavioral patterns that gradually become internalized as part of human culture.

Keywords: Neighborhood, Culture, Human Values, Maslow, Rapoport, Design Principles

INTRODUCTION:

Housing has been one of the most fundamental human needs since the earliest stages of settled human life (Savab, Biti). The environment, houses, and buildings constructed within their context represent enduring innovations created by humans across different cultures and civilizations. These built forms remain complex, adaptive, and culturally meaningful. The house represents one of the most significant examples of indigenous architecture, shaped by the climate of the region, local materials, construction techniques, lifestyle, traditions, and cultural characteristics of each society (Rapoport, 2009).

Humans have historically mediated their relationship with nature through culture and have gradually transitioned from primitive social structures to modern civilized societies (Pourdehimi, 2011). However, as noted previously, a house alone cannot significantly

influence the culture or social life of individuals. Rather, a collection of built environments can shape social interactions and strengthen the relationship between environment and behavior (Rapoport, 2009). Therefore, the living environment including the city, neighborhood, and neighboring residential units must be considered in the housing design process.

The environment does not directly impose behavior on humans. Instead, environmental design provides opportunities that enable individuals to act in accordance with their cultural values and worldviews. In this context, the environment may function as a reminder, a guide, or sometimes a limitation. Ultimately, individuals retain the freedom to decide whether to conform to environmental cues. Consequently, designing an ideal environment without considering the cultural context of its users is inappropriate.

However, this does not imply that every behavior derived from cultural traditions should necessarily be preserved. Rather, the environment should be constructed based on the values and principles that shape and guide human behavior. When individuals enter an environment, they interpret its spatial cues and symbols and adjust their behavior accordingly. Through repeated interaction, a gradual adaptation occurs between behavior and environment, eventually becoming integrated into the internal cultural values of individuals. In this process, identifying human needs becomes essential.

To achieve this objective, the living environment of individuals must be examined, since housing and residential space clearly demonstrate the relationship between built form and lifestyle. Moreover, a house alone cannot influence the culture and social life of individuals; rather, a collection of built environments can shape social interaction and the understanding of behavior–environment relationships (Rapoport, 2009). According to Rapoport, form acquires meaning only within its context. Therefore, the living environment of individuals including neighborhoods and adjacent residential units must be examined in order to design houses that correspond to users’ needs. Accordingly, the design process in this study addresses both housing and neighborhood scales.

This research investigates theoretical foundations related to environmental design and integrates them with practical design strategies in order to create environments that support transcendent human values. At the neighborhood scale, factors such as environmental meaning, spatial hierarchy, social interaction, personal open space, and privacy were examined to design an environment capable of supporting human growth and self-actualization.

To achieve this goal, Maslow’s hierarchy of needs was analyzed and integrated with Rapoport’s ecological principles. Field studies conducted in the selected site ultimately led to the identification of four design principles and the proposal of a neighborhood-based design solution.

1.1. Literature Review:

With the expansion of human knowledge and improvements in quality of life during the twentieth century, designers increasingly sought to incorporate insights from the humanities into environmental studies and the design process. At the same time, scholars within the humanities particularly psychologists attempted to translate laboratory-based findings into practical knowledge applicable to everyday human life (Lang, 2011).

In response to criticisms directed toward architects particularly regarding their limited attention to the behavioral consequences of built environments a new interdisciplinary field emerged: environmental psychology. This discipline focuses on the study of human behavior in relation to environmental settings. A significant development within this field was the emergence of ecological psychology, which examines

human behavior in relation to environmental contexts while considering individuals’ mental, cultural, and social backgrounds.

It is generally assumed that one of the primary objectives of environmental design is the fulfillment of human needs. Therefore, defining the theoretical framework of design disciplines requires a clear model of human needs. When appropriately designed, the built environment can effectively address multiple dimensions of these needs (Lang, 2011). Drawing on Maslow’s hierarchy of needs, John Lang examined their influence on the quality of environmental design as follows:

Table 1. Application of Maslow’s Hierarchy of Needs in Design, Source: Golkar (1379/2000)

Maslow’s (Classification) of Human Needs	Level of	Quality of Design-Related Considerations
Physiological (food, shelter, hygiene)		• Housing quality, facilities and adequate equipment • Comfort (temperature, sunlight, rainfall, microclimate regulation, etc.) • Stability and balance based on ecological principles
Safety and Security (immunity from danger, Pollution, Privacy and overlooking)		• Structural safety and durability • Supervision and real Surveillance (security) • Privacy (access control to private domains) • Privacy and visual overlooking • Permeability, accessibility, and flexibility of space
Belongingness (sense of affiliation with place and group)		• Social facilities (local social interactions) • Sense of place and spatial identity • Legibility, and Visual coherence and harmony
Esteem (self-esteem and respect)		• Environmental quality and desirability of place • Creation of attachment to place and group, and the sense of individuality
Self-Actualization (creativity)		• Opportunities for personal initiative in construction and participation in design • Spatial diversity
Cognitive–Aesthetic (based on intellectual and perceptual needs)		• Provision of cultural and recreational activities

	• Creation of memorable and visually pleasing natural landscapes • Artistic expression and enhancement of environmental qualities
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The findings derived from examining the infrastructural approach in the research literature are as follows:

- **The Necessity of Employing Environmental Psychology and Behavioral Sciences:** The environment plays a decisive role in shaping human behavior, perception, and emotional experience. It also enables the emergence of specific behaviors. This relationship is not unidirectional; rather, environment and behavior maintain a reciprocal interaction. Environmental information is obtained through perceptual processes, which are triggered by mental schemas and can be acquired through learning. Moreover, motivation functions as the driving force behind behavior.
- **The Human Needs Model:** Human behaviors are formed in response to the fulfillment of human needs. Therefore, designing the environment based on the conceptual foundations of human needs is essential, as perceptions are guided by these needs. Conscious design of the physical environment is a response to the diversity of human needs. Creating environments that enhance human perception is one of the principals aims of design. Among the various models proposed for understanding human needs, Maslow’s hierarchy is the most widely applied in design. Accordingly, this model will be adopted in the design process of the present study.
- **The Ecological Approach:** Among the different approaches within environmental psychology, ecological psychology—which examines human behaviors in relation to environmental embeddedness as well as cultural and cognitive background—aligns most closely with the aims of this research. One of the prominent theorists of the ecological approach, Amos Rapoport, emphasizes architectural design and the study of the environment and its meanings in connection with culture.
- **Social and Cultural Sustainability:** Influenced by holistic ecological perspectives, the need for a comprehensive and balanced view toward the relationship between humans and both natural and built environments has led to the development of sustainable development theories. Based on full ecological thinking, sustainability is rooted in three key elements: nature, ethics, and tradition, alongside economic considerations. The second concept of sustainability (regionalism and vernacularism) highlights that societies exist within contextual systems, and future-oriented

technologies must operate in accordance with local and regional patterns. In this regard, sustainable architecture, in addition to responding to limited objectives such as harmonization with the natural environment, also draws upon forms and materials compatible with cultural context and local building traditions. Meanwhile, through the localization of technology, it employs the latest scientific advancements to enhance architectural sustainability.

1.2. Theoretical Framework of the Research:

1.2.1. Urban Scape:

Urban spaces are open and public parts of cities that reflect the character of collective life and represent the context in which citizens live. As Carr (1992) argues, urban space is a setting in which the narratives of collective life unfold, enabling all individuals to participate in social and everyday activities. Moreover, Lynch (1972:109) notes that urban public spaces offer opportunities to overcome certain social boundaries, reduce unintended or ambiguous interactions, and facilitate connections among people within a new social environment.

Accordingly, public space may be regarded as urban space when it involves meaningful social interaction and forms of social encounter. Urban space is not only artificially organized and managed; it also functions as a structured platform for human activities and behaviors. In this sense, human presence is essential to the production of meaning in space, as the significance of urban environments is shaped by individuals’ values and normative frameworks (Pakzad, 2006)

1.2.2. Human, human behavior, and environmental experience models

1.2.2.1 Maslow's hierarchy of needs

Functionalist architecture has not been as rational as modern architects have claimed. One reason for this assertion is the limited consideration given by modern architects to the diversity of human needs. In response, a new approach to functionalism has been proposed based on Maslow’s hierarchy of needs. This approach emphasizes the informed design of the physical environment to address the varying needs of individuals, thereby complementing the shortcomings of purely rationalist perspectives in modern architecture (Lang, 2011). It assumes that designers aim to create environments that fulfill human needs. Consequently, a model of human needs should underpin the theoretical frameworks of design disciplines. When the built environment is appropriately structured, it can satisfy several fundamental needs, including those related to survival, security, safety, a sense of belonging, esteem, learning, and aesthetic appreciation. Given the broad spectrum of aesthetic needs and activities, understanding and responding to them can be complex, as many needs are subconscious. Environmental design becomes necessary whenever there is a discrepancy between the current environmental conditions and the ideal set that fulfills individuals’ and groups’ needs. The

primary goal of such design is to create environments that enhance human perception and experience (Lang, 2011).



Figure 1. Maslow's hierarchy of needs, Source : Dwan Schultz, Theories of Personality, 2011

Maslow's hierarchy of needs includes: 1. Physiological needs; 2. Safety and security needs; 3. Belongingness and social needs; 4. Esteem and self-confidence; 5. Self-actualization; 6. Cognitive needs; 7. Aesthetic needs; 8. and the need to understand the surrounding environment (Golkar, 2000).

1.2.3. Rapoport's Ecological Approach

1.2.3.1. Urban space design principles:

- Creating spatial order through design elements, including spatial structure, conceptual organization, temporal order, and regulation of communication patterns, while considering the cultural context of the inhabitants.
- Creating identity through distinctive spatial characteristics that enable individuals to distinguish one urban space from another and differentiate neighborhoods from the broader urban environment.

1.2.3.2. Environmental design principles:

- Environmental design must consider appropriate spatial organization for users and their activities.
- Design should evolve gradually to allow creative adaptation and innovation while remaining integrated with the cultural system. Therefore, the environment should not impose behavior but rather provide freedom of choice.
- Design should be based on mechanisms that connect individuals and their environments, including physiological, perceptual, cognitive, and behavioral processes.
- Environmental cues should help users understand the meaning of the environment. These cues must correspond to the meanings attributed by users rather than those intended solely by designers.
- Different methods of meaning analysis should be applied to understand how residents interpret environmental cues and how these interpretations influence design decisions.

- Environmental design can guide behavior through spatial organization and environmental cues.
- Environmental readings must be seen, understood, and repeated. These readings cannot be perceived and interpreted individually but must be examined in a systematic framework.
- The criteria determined for environment quality depend on the environmental design based on the individuals' needs and demands. Therefore, a suitable design leads to a high-quality environment.

Environment design is based on its elements and environmental quality, including:

1. Organizing Space, Time, Meaning, and Communication

- **Space Organization:** Achieved by classifying individuals within a space and delimiting social interactions and communications.
- **Time Organization:** Established through the velocity, rhythm, and sequence of activities.
- **Meaning Organization:** Conveyed via form, materiality, structural components, signage, colors, shapes, and dimensions.
- **Communication Organization:** Facilitated by specializing environments to increase social homogeneity, utilizing recurring shared cues and symbols, and managing privacy through the selective exclusion of individuals from private spheres.

2. System of Configurations (Settlements)

- Defining distinct configurations for multi-functional and flexible spaces. Furthermore, these configurations and their associated behavioral norms are defined by physical cues and furnishing layouts, serving as environmental prompts to guide appropriate human behavior.

3. Cultural Landscape

- As cultural landscapes are not explicitly "designed" but emerge through the passage of time, the alignment of the built environment with the existing worldviews, culture, and values of its users is crucial to fostering their authentic development.

4. Fixed, Semi-fixed, and Non-fixed Elements

- **Semi-fixed elements:** Employed to facilitate the personalization of space by users, provided these elements are perceptible, intelligible, and socially acceptable.
- **Non-fixed elements:** Utilized to effectively regulate behavior within flexible and adaptable spaces, thereby enabling open-plan design strategies.

1.2.3.3. Neighborhood design principles

- Rapoport suggested designing a homogenous neighborhood based on the following principles:
- Classifying people into acquaintances and strangers to keep out strangers

- Specialization of public areas
- Neighborhood design as a mediator between city and man
- Creating neutral spaces to enhance communications in urban neighborhoods and interactions between individuals
- Creating a place for social interactions
- People can visit each other in a common social space where they are not strangers. This case requires creating privacies for the neighborhood and distinguishing it from outer space.
- Neighborhood design that is smaller than neighboring units
- Neighborhood design in a small frame of the limited population to allow people to be aware of each other

1.2.3.4. Principles obtained for home design

- lifestyle and its impact on the form of houses
- examining elements changing the building form, such as site, climate, and materials in the studied site
- examining social and cultural determinants by doing field studies in the considered site
- Investigating the most important lifestyle aspects affecting the building form, including basic needs, family, the position of women, privacy and personal realm, and social interactions.

1. Material & Methods

The study area is located in the Jahanshahr District of Karaj, characterized by a moderate socioeconomic structure and numerous historic open spaces. The research methodology is based on content analysis and descriptive–interpretive methods commonly applied in behavioral sciences. The purpose of the research was to identify the needs and expectations of residents for whom the neighborhood environment was designed. Their developmental and social conditions were examined according to Maslow’s hierarchy of needs and their indigenous cultural background.

In the next stage, Rapoport’s ecological principles were applied in order to design environments that respond to users’ needs while guiding them toward higher levels of personal development and self-actualization. The design approach aimed to create conditions in which individuals could freely select appropriate behaviors and gradually strengthen cultural values through spatial experience. Both bibliographic and field research methods were employed. Field studies included direct observation of environmental patterns and analysis of spatial cues used by residents to interpret and interact with their surroundings. Two samples of traditional houses were also examined in relation to neighborhood design patterns.

Questionnaires were used to compare Maslow’s hierarchy of needs with lifestyle patterns described by Rapoport. Separate questionnaires were designed for neighborhood-scale and house-scale analyses.

The statistical population for the neighborhood questionnaire consisted of residents selected randomly from the study area. The statistical population for the housing questionnaire included long-term and indigenous residents. A total of twenty houses were randomly selected and examined.

In the data analysis stage, previous studies were reviewed and compared with the characteristics of the study site. Four main design principles were subsequently identified and translated into spatial strategies. Three design scales were then developed: neighborhood and urban space design, adjacent residential units, and individual house design.

The identified principles were applied at each scale to develop appropriate design solutions. The Woonerf concept, for example, was used as a strategy for neighborhood street design. Initial design concepts were generated based on these strategies, after which spatial plans were analyzed and refined. Finally, the proposed design framework was presented.

2.1. Site Analysis

According to reviewed Mater Plan of Karaj and consultation with associated officials in District 8 of Karaj, the most appropriate land with a suitable area for residential use and construction of neighborhood, the site located in the northwest area of Jahanshahr was selected. The main access from Jahanshahr to the selected site was passed through Mahan Boulevard. This neighborhood reaches Motahari Avenue and Hassan Abad from the north, Shaheed Beheshti Avenue and Mehrvila Neighborhood from the south, Taleghani Crossroad and Bahar Neighborhood from the east, and Gohardasht Neighborhood from the west (Figure 2).

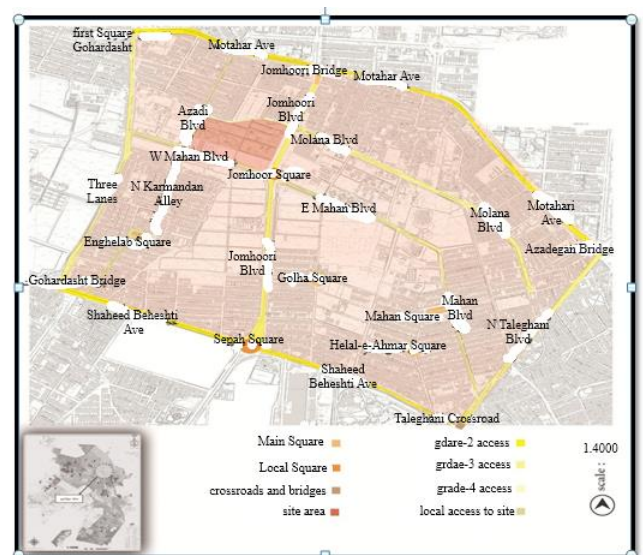


Figure 2. Site Surrounding Access, Source: Karaj Worn Fabric Improvement Project, Khodavand Consulting Engineers, 2008

According to site climate assessments, the prevailing wind blows from northwest to southeast of the studied area; hence buildings located in this direction have few openings to resist wind. On the other hand, the building

body can be aerodynamic to reduce wind intensity when in contact with walls. The north-south slope of land equals 3%. District 8 of Karaj and considered site has semiarid climate. The optimal direction for building deployment is towards the south or southwest.

Due to the relatively high-temperature difference between day and night, some parts of building used in the day are built using heavy materials with high thermal capacity, while those parts used at night are constructed using light materials with low thermal capacity. Bright-colored materials are used in building façade. The old trees, including Juniper, sycamore, cypress, walnut, and berry, can be seen in the studied area. Therefore, the trees existing on site are kept, and these species are cultivated to keep collective memories alive. Shrub plants, such as potentilla, Herbaceous plants such as Iranian grass and boxwood, as well as seasonal flowers (e.g., violate and rose), are seen in the area.

According to site analysis at regional and local scales, the gardens and old trees existing on the site

(Jahanshahr) have been kept and maintained. According to amenities in the neighborhood, there are few kindergartens regarding the area of the neighborhood. Hence, it is recommended to design a kindergarten and one elementary school. Moreover, there are few gyms and pools in the studied neighborhood. This site has suitable access to different areas of the city.

2. Discussion & Results

3–1. Alignment of Maslow’s Hierarchy of Needs with Lifestyle Dimensions from Rapoport’s Perspective

In this regard, Maslow’s hierarchy of needs and the spatial qualities identified by John Lang for these needs are employed as a conceptual framework. Subsequently, the determinants of house form proposed by Rapoport such as basic needs, family structure, privacy, the position and status of women, and social relations were aligned with Maslow’s hierarchy of needs. Based on this alignment, a set of questionnaires was developed to identify the needs of residents, and the analysis of the collected data led to the formulation of design strategies.

Table 2. Alignment of Needs, Spatial Dimensions, and Design Strategies (Source: Author)

Level of Needs (Maslow)	Subcategory of Need	Interpretation	Spatial requirements (Rapoport)	Influential Cultural–Lifestyle Patterns	Environmental Findings	Design Strategies
Physiological Needs	Suitable climate	Need for fresh air and sunlight	Spaces with sufficient light and ventilation	Use of light openings; provision of heating	Appropriate orientation	Use of natural ventilation and Contemporary climatic control systems
	Nutrition and hygiene	Eating; individual and group hygiene; importance of sanitation	Kitchen and sanitary spaces; hygienic facilities	Hospitality and religious customs	Reduction of spatial overlaps and disturbances	Kitchen design adapted to Iranian lifestyle
	Waste disposal	Collection and removal of waste; avoidance of unpleasant odors	Semi-open service spaces	Cultural emphasis on cleanliness	Wastebins	Waste collection and disposal systems
	Rest	Physical and mental comfort	Sleeping, resting, and lingering spaces	seating and sleeping Patterns	Elimination of courtyard	Creation of calm and private spaces
Psychological Needs	Psychological well-being	Need for greenery and vitality	Semi-open and green spaces	Family interaction	Removal of traditional courtyard spaces	Creation of green terraces
	Physical activity	Exercise and movement	Sports and play spaces	Group activities	Limited spatial capacity	Creation of shared recreational spaces
Safety	Individual and social security	Feeling of security; absence of threat	Definition of spatial territory	Gender relations; privacy of the entrance	Increase in building heights	Design of visual barriers, Inward-looking design

	Family privacy	Protection of family privacy	Separation of spaces	Family structure	Changes in neighborhood patterns	Control of views and visual intrusion
Social	Social relationships	Need for group belonging	Interactive spaces	Gender roles; cultural norms	Use of plants for privacy	Design of small-scale neighborhood gathering spaces
	Social interactions	Quality of encounters	Pedestrian-friendly spaces	Patterns of encounters	Ally as a social space	Preservation of spaces for neighborhood meetings
	Sense of belonging	Sense of ownership and identity	Differentiation of public and private spaces	Sense of territory	Reduced connection with alleys	Design of semi-private spaces
Esteem	Respect and status	Feeling of value and dignity	Spaces for representation	Social status	—	Consideration of spatial hierarchy
Self-actualization	Self-fulfillment	Realization of individual abilities	Quiet and calm spaces	Individual freedom	Green dividers	Design of spaces for solitude and reflection
Understanding	Understanding	Exploration and knowledge	Spaces with appropriate light	Intellectual activities	—	Strengthening local identity through environmental design
Aesthetic	Aesthetic perception	Pleasure, value, and meaning	Diverse environments	Culture and aesthetic perception	—	Spatial and color diversity, creative design
Cognitive	Knowledge and learning	Need for learning	Educational and social spaces	Age and experience	—	Spaces that encourage learning

Ultimately, four key principles were derived from the reviewed literature, analytical findings, and proposed design strategies:

1. **Establishing a Hierarchy of Privacy:** A clear transition between public, semi-private, and private spaces creates spatial order and supports cultural expectations of privacy and social interaction.
2. **Flexibility and Multifunctionality:** Spaces should be adaptable and capable of supporting different activities at different times. The Woonerf concept provides a useful model for achieving such flexibility within neighborhood streets.
3. **Provision of Personal Open Space:** Access to individualized outdoor space emerged as a key requirement for residents. Private gardens and courtyards allow families to gather, strengthen social relationships, and provide safe environments for children.
4. **Design for Diverse Psychological and Emotional Needs:** Neighborhood environments should accommodate individuals with different personalities and emotional states. Some residents prefer lively environments, while others require calm and quiet spaces. A successful design framework must support this diversity.

Table 3. Design solutions based on the obtained four principles, Source: Author

Principle	Objectives and Strategies	Key Features	Functional Spaces
1. Establishing a Hierarchy of Privacy	Ensuring privacy can effectively address needs related to safety, belonging, and esteem	Designing spaces according to a hierarchy of privacy: public, semi-private, and private.	Entrance areas, node, route, and residential units.

2.Flexibility	Flexibility of Woonerf enables the configuration of diverse spatial arrangements at different times and for varying activities, facilitating multifunctional use of space. It provides users with appropriate behavioral choices according to changing needs and supports the fulfillment of aesthetic and cognitive aspirations.	Woonerf flexible design allows spaces to accommodate multiple functions.	Neighborhood centers, local community hubs, Woonerf
3.Personal open space	In Iran, many household activities traditionally take place within the courtyard, serving as a setting for family gatherings. One of the primary needs expressed by residents is access to private open space, as such spaces enhance both quality of life and sense of ownership. The presence of green areas is an effective strategy for strengthening privacy within the neighborhood context.	Privacy hierarchy is crucial for open space.	Public green spaces, semi-public open space at the neighborhood scale, semi-private open spaces, roof gardens, and private open spaces within residential units.
4. Designing for Diverse Personality Types (Introverted and Extroverted)	Residents within a neighborhood exhibit diverse personality traits. Some prefer lively environments with higher levels of social interaction, while others seek calm and quiet surroundings. A successful environment should accommodate this diversity, ensuring the right of choice and responding to different behavioral preferences.	Classification of housing into three types: extroverted, semi-extroverted, and introverted.	Houses located on main streets (extroverted); houses located on alleys (semi-extroverted); houses oriented toward neighborhood centers or internal courtyards (introverted).

3.2. Woonerf Design Rules:

There is no single universal design standard for the implementation of the Woonerf concept. Rather, different countries and local contexts have interpreted its core principles and adapted them according to their specific social needs, cultural conditions, and urban characteristics. Consequently, each Woonerf project requires a context-sensitive approach to street design. Despite these variations, the fundamental concepts of Woonerf remain clear and adaptable and can generally be summarized in the following design guidelines:

1. **Clearly Defined and Recognizable Entrance:** A Woonerf should feature a clearly identifiable entrance to signal that the area functions differently from a conventional street. This can be achieved through gateway elements such as trees, planters, curb extensions that narrow the carriageway, or a slight ramp leading to the shared surface. These physical cues should be complemented by appropriate signage indicating the Woonerf designation.
2. **Removal of the Continuous Curb:** Pedestrian and vehicular areas should be designed at the same level to create a shared surface. Such spatial integration encourages drivers to move

more slowly and attentively. Variations in pavement color, texture, or material can be used to subtly guide street users while maintaining the continuity of the space. The absence of continuous curbs also allows residents—particularly children—to move freely and safely throughout the environment.

3. **Implementation of Traffic-Calming Measures:** Street layouts should incorporate gentle curves and visual interruptions that limit long sightlines for drivers. In addition, physical and visual elements—such as street furniture, planting, and surface variations—can help reduce vehicle speeds and encourage cautious driving behavior.
4. **Provision of Intermittent On-Street Parking:** Parking should be arranged intermittently rather than continuously along the street in order to prevent vehicles from dominating the public space. Designated parking areas can be defined through physical markers, paving variations, or landscape elements, ensuring that parking remains subordinate to pedestrian activity and social use of the street.

3.3. Design Strategies

Tab. 3- Design solutions based on the obtained four principles, Source: Author

Design Principle	Neighborhood Space	Fulfilled Need	Design Approach (Conceptual)	Implementation Strategies	Key Environmental Elements
Hierarchy of Privacy	Neighborhood Entrance	Safety; Belonging	Definition of boundaries and territories	controlled access; differentiation of levels of accessibility	Different pavings, setbacks, green space
	Alley	Safety	Separation of pedestrian and vehicular movement	Integration of building facades with boundary walls	Traffic calming elements
	Residential Unit	Belonging; Safety	Gradual increase of privacy	Organization of residential courtyards; defined entrances	Native vegetation; distinctive spatial markers
	Local Neighborhood Core	Belonging	Strengthening social identity	Creation of community-oriented spaces	Community green spaces, Local services
	Pathway	Safety	Pedestrian-oriented movement	Pedestrian friendly design	Shared pathways, Elimination of the central parking area
	Residential Complex	Safety	Definition of private domains	controlled permeable arrangement	Fence, platform, tree, hedge
Flexibility	Local square	Belonging	Multifunctional spaces	Spatial design supporting diverse activities and ages	Seating; shade trees, fountains
	Neighborhood Center	Belonging	Spatial adaptability	Canopies and shading structures	Urban furniture, Paving
	Woonerf Route	Safety; Belonging	Functional flexibility	Spaces designed for multiple activities	Bench, parking lot, light, and trees
	Pedestrian Walkway	Safety	Dynamic presence	Bicycle lanes and pedestrian paths	Seating areas; small landscape elements
Open Space	Open Space	Belonging	Maintaining spatial balance	Hierarchy of green spaces	Native vegetation, green walls,
	Semi-Private Space	Belonging	Semi-private spatial organization	Window setbacks	Hedges, climbing plants, and trees
	Private Space	Belonging	Creation of shared and controlled semiprivate areas	Design of shared courtyards, green roof	Enclosed courtyards flowers, boxwood
	Balkony	Belonging	Developing of private territory	stepped configuration	Vertical green space
Personality Based Design	Houses Facing main Streets	Safety	Balance between visibility and privacy	A controlled view of the public space	Active street frontage, curtains
	Houses within Neighborhood Units	Safety; Belonging	Diversity in residential patterns	Clustered housing arrangements	Urban edges
			Enhanced spatial interaction		

CONCLUSION:

Based on the reviewed and analyzed studies, environmental design must be conducted according to the cultures and values of users to play a vital role in teaching appropriate behavior. In this manner, repetitive behavior becomes an integral part of an individual's inner values and culture. Furthermore, it is suggested to consider upcoming changes and developments in cultural and social issues, as well as environmental changes or demographic economics, in the design of residential environments. It is also recommended to plan for culture formation over time, whether in the short or long term. As Rapoport explains, designers must identify and acquire the culture of the users of the space they intend to design. If we consider the environment as a canvas and architects as designers, then we must believe that architects are responsible for any design they draw on this canvas. Therefore, the appropriate design of environments plays a vital and effective role in improving culture and internalizing transcendent human values.

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