



## Behavior-Oriented Design in Neighborhoods with Rural Origins (Case Study: Saber Street in Noh-Dareh, Mashhad)

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### Abstract

**Purpose-** With the physical expansion of cities, some surrounding villages are incorporated into the city as new neighborhoods. These areas, due to their rural backgrounds, differ from newly developed urban neighborhoods in physical, social, economic, and cultural aspects. Social issues, particularly behavioral problems, are one of the challenges in these areas. The neighborhood of Noh-Dareh in Mashhad (with a rural background) faces such a challenge. The Saber Street (located in Noh-Dareh) is the intersection of formal and informal settlements and has a strategic location due to its proximity to the Kuh Park. However, the occurrence of certain inappropriate behaviors has led to a decline in its efficiency and attractiveness for residents. This study aims to propose design recommendations for Saber Street to improve user behavior patterns.

**Design/methodology/approach-** This research is mixed-method (quantitative and qualitative). After collecting library resources (behavior, environment, and perception), user behaviors were identified by using qualitative techniques (observation, behavioral mapping, and interviews). The obtained data were then categorized into conditions, actions, and consequences through qualitative analysis using MaxQDA. Subsequently, based on the typology of existing micro spaces, design recommendations were proposed based on behavioral patterns.

**Findings-** Behaviors in the micro spaces of the mentioned street are often solitary, involving short and unconventional pauses due to the lack of diverse activities, psychological insecurity, inappropriate lighting furniture, and inconvenient climatic conditions. These results are reduced identity and increased insecurity, social damages, and inefficiency of activities.

**Practical implications-** To improve these conditions, it is suggested to enhance urban management control, adopt supervisory policies through the design of frontages, allocate collective activities in the space, organize various events, and provide welfare and comfort infrastructure and equipment.

**Originality/Value-** Considering the presence of social conflicts in neighborhoods with rural backgrounds, such as social damages, activity inefficiency, and ultimately resident dissatisfaction, the innovation of this study lies in identifying the context and causes of inappropriate behavioral patterns in these neighborhoods.

**Keywords-** Behavioral design, Behavioral sciences, Rural-based neighborhoods, Saber Street, Noh-Dareh neighborhood Mashhad.

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### How to cite this article:

Ganjeali, F. & Ghalandarian, I. (2024). Behavior-oriented design in neighborhoods with rural origins (Case study: Saber Street in Noh-Dareh, Mashhad). *Journal of Research & Rural Planning*, 13(1), 119-140.

<http://dx.doi.org/10.22067/jrpp.v13i1.2404-1100>

### Date:

Received: 21-02-2024

Revised: 27-03-2024

Accepted: 21-04-2024

Available Online: 25-04-2024

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## 1. Introduction

The integration of villages into cities is a significant topic in urbanization and urban development, leading to the formation of rural-based neighborhoods. This process generates various interactions and conflicts (Shaykh Beygloo & Akbarian Rounizi, 2018; Mohammadi, 2021). Villages, while physically located within the city, often exhibit social and cultural conflicts. This results in issues such as low quality of life, poverty, lack of social welfare and sense of belonging, and inadequate urban services and infrastructure. These problems frequently emerge in these newly formed urban neighborhoods due to the absence of comprehensive planning and design, creating a foundation for conflicting interactions and behaviors among users. These behaviors reflect the diverse needs of individuals, mental imagery, and environmental characteristics, manifesting individually or collectively (Mohammadi et al., 2018; Esfandiari & Nabieian, 2018; Sepahi et al., 2017).

Examining users' behaviors for space design is a prominent topic in urban design and can influence the interaction between humans and their environment (whether rural or urban). Essentially, behavior is a product of both internal and external factors perceived by individuals. The individual, as an internal factor (with personal, cultural, and social characteristics), and the environment, as an external factor (Dimension of the Built Environment), provide the necessary context for creating behavioral patterns and social interactions. Thus, studying environmental behaviors can reveal how citizens' daily lives are influenced by their surroundings and social events (Sholeh et al., 2017; Dalakeh et al., 2017; Shirazi, 2018). Research in this field typically depends on various parameters such as age, gender, physical and environmental conditions, requiring considerable time, human resources, and financial investment. Therefore, the discussion of behavior is often overlooked in the urban design process (Shirazi, 2018). The failure to consider behavioral patterns in the design process leads to the deterioration of environmental and social qualities in urban spaces, undermining the human-centered nature of cities (Paknezhad et al., 2021). In Iran, there has been insufficient attention to the interactions among people within the environment, particularly in rural-based neighborhoods. As new developments occur in

other areas, urban neighborhoods with rural characteristics struggle to adapt to new functions which results in reduced connections between the residents of these neighborhoods and their surroundings (Bahreini & Agha Karimi, 2016).

The Noh-Dareh neighborhood in Mashhad is one of the inefficient rural-based settlements. This neighborhood has a rural background and has undergone various physical changes over recent decades due to the city's expansion towards the south and the lack of proper urban design and planning control. These changes have led to the division of the neighborhood into formal and informal settlements.

Saber Street (the main street of Noh-Dareh) is the intersection of these settlements, hosting most of the neighborhood's functions (residential, commercial, recreational, etc.) and events (behavioral patterns). This street accommodates users of diverse ages and genders throughout the day, pursuing different activities within the area. Therefore, it plays a significant role in the daily lives of the street's users. However, it currently faces issues that exacerbate the neighborhood's social conditions and diminish its social status. These issues include the deterioration of environmental quality due to neglect of design principles, illegal constructions because of the absence of urban planning regulations and standards, a lack of sense of belonging following widespread migration of various groups and ethnicities, insecurity due to the presence of addicts, criminals, and delinquents, and the decline of social values due to the prevalence of non-conforming behaviors.

The introduction and development of ubiquitous urban design and behavioral considerations in the planning of such spaces are crucial to addressing these challenges and fostering a more cohesive and functional built environment.

The present study addresses the following question while outlining the theoretical framework of the research. After understanding the environment through the dimensions of urban design according to Carmona and analyzing user behaviors, the findings are discussed and analyzed:

How can design proposals for Saber Street in the Noh-Dareh neighborhood of Mashhad (with a rural background) be used to improve behavioral patterns?

## 2. Research Theoretical Literature

Understanding the relationship between humans and their environment and how they interact is a crucial topic in the study of behavior. Humans are rational, social, and progressive beings who constantly change and experience different needs throughout their lives. As a result, each person has various needs depending on their circumstances. These needs lead to their behaviors and can be categorized into three levels: Physiological, Psychological, and Spiritual and Emotional needs. Each person seeks to fulfill their needs within their environment and exhibits different behaviors based on their perception of the built environment dimensions (Shahcheraghi & Bandarabad, 2016, p.33; Saghatoleslami & Rohi Mirabadi, 2020, p.206; Paikan & Rafieian, 2019).

Behavior is the most observable reaction of humans to their environment. In addition, behavior is a product of an individual's needs, environmental characteristics, and mental imagery, which they acquire through environmental perception and express individually or collectively (Baek et al., 2015; De Cantis et al., 2016; Shirazi, 2018). Consequently, behavior can be seen as resulting from two factors: the environment (built environment dimensions) and the individual (personal, cultural, and social characteristics) (Pakzad & Bozorg, 2014; Carmona, 2014a).

Furthermore, behavior is a tool through which individuals can communicate and interact with others in the environment without using verbal language (Pakzad, 2007). So, behavior has a well-known nature and a complex mechanism. Predicting behavior in the environment is one of the questions many researchers have sought to answer. Some believe that this field, along with other sciences such as anthropology, sociology, and political science, forms the basis of environmental psychology (Shahcheraghi & Bandarabad, 2016). Behaviors in the environment can be categorized into three types based on their nature: High-level activities, Low-level activities, and Sedentary activities. High-level activities include a range of behaviors in the environment that involve the most movement and are constantly changing, leading to various behaviors being exhibited. Low-level activities involve short movement, and the range of behavioral changes is not significant. In sedentary activities, the duration of an individual's presence at a specific point is longer. In this context, the range of behaviors formed within each of these three categories can be classified into a general framework (Carmona, 2014b; McGrath et al., 2015; Baek et al., 2015; Li et al., 2019; Onojeghuo et al., 2019; Foweather et al., 2021). Figure 1 shows the behaviors formed in the environment based on their nature.

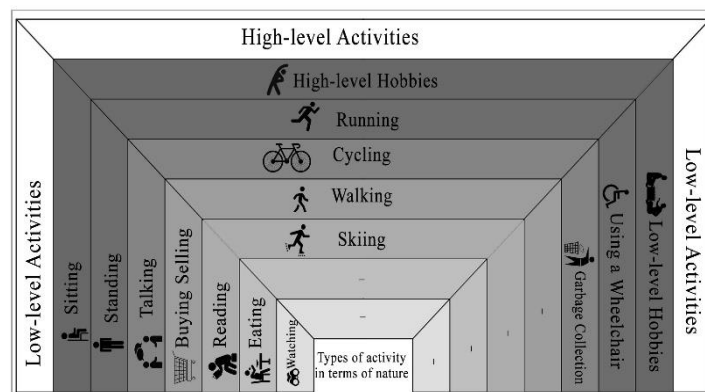


Figure 1. Environmental Behaviors Categorized by Nature

Everything that surrounds humans and can potentially interact with an individual and influence their behaviors is referred to as the environment. The environment, depending on its nature (natural or built environment), provides services. In this context, the richer the quality of an environment, the more users it attracts (Baek et al., 2015; Hahm et al.,

2017; Carmona 2014a; Carmona 2014b). According to Carmona and colleagues (2011) the quality of each built environment can be identified through six dimensions: Morphological, Functional, Social, Perceptual, Visual, and Temporal. These dimensions are interconnected due to the continuous process of urban design, and each

dimension influences the others. So, to formulate a specific framework of influential factors in the built

environment, these dimensions are examined separately (see Table 1).

**Table 1. Dimensions and Components of the built environment. Source: Carmona et al., 2011**

Dimensions	Components of Dimensions	Subcomponents of Dimensions
Morphological	Network Penetration	Level of Access, Physical Permeability, and Visual Permeability
	Quality Level of Communication Network	Narrowing of Roadways and Widening of Sidewalks, Activity Mixing in Streets, Passages, and Intersection Design, Increasing Environmental Legibility and Adequate Facilities such as Lighting Furniture
	Physical Form	Type of Building Form and Use of Various Materials in Defining Form
	Block Pattern	Large-scale Blocks, Small-scale Blocks
Functional	Performance Scale	Macro, Meso, Micro Scale
	Mixed used	Ensuring Security and Surveillance of People, Optimal Access and Distance Reduction, having more choice, Achieving More Urban Services and Economic Enterprises, Opportunities for Social Interactions
	Functional Density	Type of Horizontal and Vertical Density of Blocks
	Functional Specificity	Change of Height for External Monitoring of Buildings, Defining Soft or Hard Edges and Borders for Buildings
	Microclimate Conditions in Space	Wind Direction, Sun, Type of Vegetation Cover, Orientation of Blocks and Streets, Shading Elements
Social	Environment-People Interaction	Presence of Various Facilities in the Environment, Existence of Possibilities in the Environment
	Type of Engagement in Space	Active Engagement, Passive Engagement
	Public Realm in Space	Free Access to Space at Night, No Membership Required for Space Presence, Recreational Atmosphere, Providing Comfort and Convenience, Dignified and Glorious Spaces Politically Among People, Informal Spaces and Having Various Personal Choices
	Security in Space	Space Control, Space Surveillance, Activity in Space
	Accessibility in Space	Free Access for Individuals with Different Physical Conditions
Visual	Aesthetic Qualities	Naturalness of Space, Civility and Controllability of Space, Historical/Content Meaning, Spatial Order, Spatial Qualities - Quality of Elements, Qualities Between Elements, Quality of Relationship of a Specific Element with Other Elements
	Spatial Movement Experience	Sequencing, Point and Wide View
	Building Architecture	Form, Function, Meaning
	Hard and Soft Landscaping	Hard Landscape (Physical Elements), Soft Landscape (Green Elements)
Perceptual	Legibility in Space	Pathway, Signage, Edge, Node, Zone
	Sense of Place	Sense of Belonging, Sensory Richness (Eight Senses)
Temporal	Time Management in Space	Single-time Activities, 24-hour Activities
	Conservation Values in Space	Aesthetic Values, Architecture, Values Arising from Mixed Land Use, Economic and Commercial Values, Natural Resource Values, and Cultural Values, and Heritage Preservation

Once humans are present in an environment, the process of perception begins. Perception involves three stages: sensation, perception, and cognition. This process is active, and purposeful, and serves as a link between cognition and reality. Furthermore, perception is influenced by culture, attitudes, and societal values. “Sensation” Sensation is an external mechanism formed in the environment and received through the senses. “Perception” Perception is an

internal mechanism shaped by the individual. The individual categorizes and analyzes information received from the environment. “Cognition” This stage is an external-internal mechanism that classifies and analyzes information received from the environment in the mind, establishing a connection between sensation and cognition. The subject of behavioral sciences has garnered the interest of researchers, leading to diverse research in

various scientific domains such as urban planning, design, health, psychology, and environmental psychology. Each of these research endeavors

defines its objectives and adopts various methods, employing suitable tools for data collection and analysis. Table 2 elucidates these research efforts.

**Table 2. Background of Research in the Field of Behavioral Sciences. Source: Authors**

Researchers	Scale	Method	Data-Collection	Data-Analysis	Research Domains
Sun et al.,2014	Micro	Quantitative	Behavior Mapping Using	GPS, Quantitative Tool	Evaluating the Hong Kong University campus in two time periods before and after changes in the environment and behaviors. Results of the study indicated that changes in the built human environment influence the type of movement of individuals in space and lead to the emergence of various behaviors such as sitting or changing direction in the long term.
De Cantis et al.,2016	Macro	Quantitative	Questionnaire and GPS	GPS, Quantitative Tool	Investigating the popularity of tourist areas in the city. This research was conducted in two phases. In the first phase, general information from travelers was extracted through a questionnaire, then using GPS tools, the information and movement paths of travelers during the trip were collected, and finally, after analyzing the data, popular areas were identified.
Onojeghuo et al.,2019	Micro	Mixed	Observation	GPS, Quantitative Tool	Identifying children's behavior in educational spaces - using GIS tools to identify behaviors. Creating a grid network and determining the size of each square based on the nature of the environment and its activities. Utilizing CCTV cameras to identify behaviors in the environment and ultimately determining the type and level of activities, the gender, and age of users in each section with charts in each of the squares in the grid network.
Motomura et al.,2022	-	Quantitative	Study of Document Analysis	GPS, Quantitative Tool	Investigating the relationship between public open space characteristics and active and sedentary behaviors in densely populated urban areas. This research selected and analyzed 18 studies related to this topic, mostly from East Asian countries. The results of this study showed that with the increase in public space characteristics, more physical recreational activities take place.
Lotfi et al., 2013	Meso	Mixed	Observational and Document Analysis Study	Qualitative Tools	Explaining the role of factors influencing the enhancement of interactions on Molla Sadra Street in Shiraz. The output of this research is a framework of strategies based on three components: functional, experiential-aesthetic, and environmental. This framework can serve as a model for enhancing social interactions on recreational and tourist streets.
Paknezhad et al., 2021	Meso	Mixed	Document Analysis Study	Space Syntax, O Graph, GPS	Discovering changes in behaviors across different urban fabrics to provide a basis for planning in line with planners' objectives. Creating behavioral patterns in various urban spaces is the product of existing human relationships. A regular pattern in pathways increases accessibility and integration, facilitating access and strengthening pedestrian and movement patterns.
Foroutanrad and Zamani, 2021	Micro	Qualitative	Observational and Behavioral	Qualitative Tools	Assessing behavioral settings in urban squares at three time periods (morning, noon, and night) over three-months in two squares, Imam Ali and Naqsh-e Jahan. Comparing the syntactic relationships in these two squares showed that

Researchers	Scale	Method	Data-Collection	Data-Analysis	Research Domains
			Mapping Study		each square accommodates a range of behaviors. Specifically, Naqsh-e Jahan Square, due to its environmental features, encompasses optional and social activities, whereas Imam Ali Square includes compulsory activities

Given that the process of perception is influenced by factors such as needs and prior experiences, which themselves are influenced by the environment, the influential factors in perception formation can be classified into two categories: External (tangible) factors and Internal (intangible) factors.

External factors include the environment and its dimensions, as well as the individual's position relative to them. Among these, two elements that consistently simplify environmental perception are form (everything potentially present in the environment, including physical, social, economic, cultural, and climatic features) and urban landscape (information consciously or subconsciously received and selected by humans, perceived through perceptual action).

Internal factors encompass personal characteristics (values, norms, mental meanings, memories, and self-identity), collective characteristics (ethnic

culture, social values, and norms, sensory experiences), and general characteristics (age, gender, education, occupation, language) acquired through mental imagery (individual perception). These factors are integral to the human-environment perception process and lead to various behaviors in the environment. Therefore, they can be broadly categorized into two parts: stable elements, characteristics that are difficult to change, and dynamic elements, characteristics that are subject to change in the short term. Figure 2 illustrates a conceptual framework of the interaction between humans, perception, and behavior in the environment.

This theoretical framework will guide the study in understanding how design proposals for Saber Street in the Noh-Dareh neighborhood of Mashhad can improve behavioral patterns, considering the unique rural background of the area and its impact on user behavior and interactions.

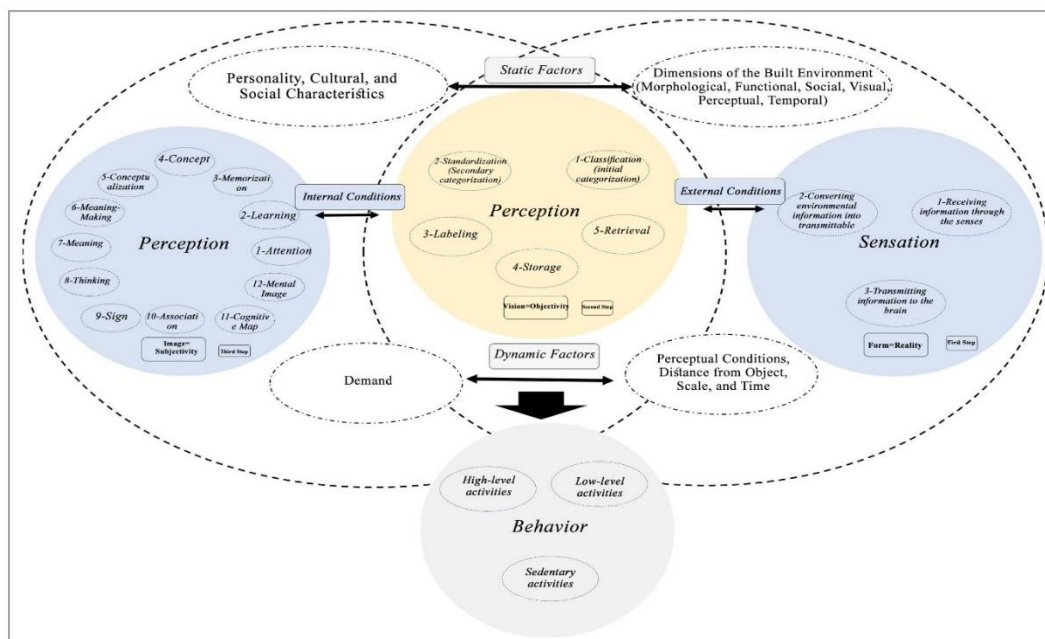


Figure 2. A Conceptual Framework of the Interaction between Humans, Perception, and Behavior in the Environment

### 3. Research Methodology

#### 3.1. Geographic Scope of the Research

The focal point of the study is Saber Street in the Noh-Dareh neighborhood, situated at the intersection of rural and urban areas. This street spans from the east to Shaghayegh Street, west to Ladan Street, north to Fakouri Street, and south to the southern mountain of Mashhad. Saber This street divides the neighborhood into two sections: formal and informal settlements, shaping the spatial organization of the neighborhood. The highest density of activities occurs alongside this street,

with a diverse range of activities, ranging from small-scale businesses like retails to large-scale infrastructure such as the water and sewage company and the seismology center. Additionally, Saber Street plays a significant role not only in facilitating movement but also in fostering social interactions, serving as a meeting point for residents from various cultural backgrounds, including those from other parts of Mashhad, neighboring cities, rural areas, and migrant populations (e.g., Afghanistan). Figure 3 illustrates the position of Saber Street within the Noh-Dareh neighborhood of Mashhad.

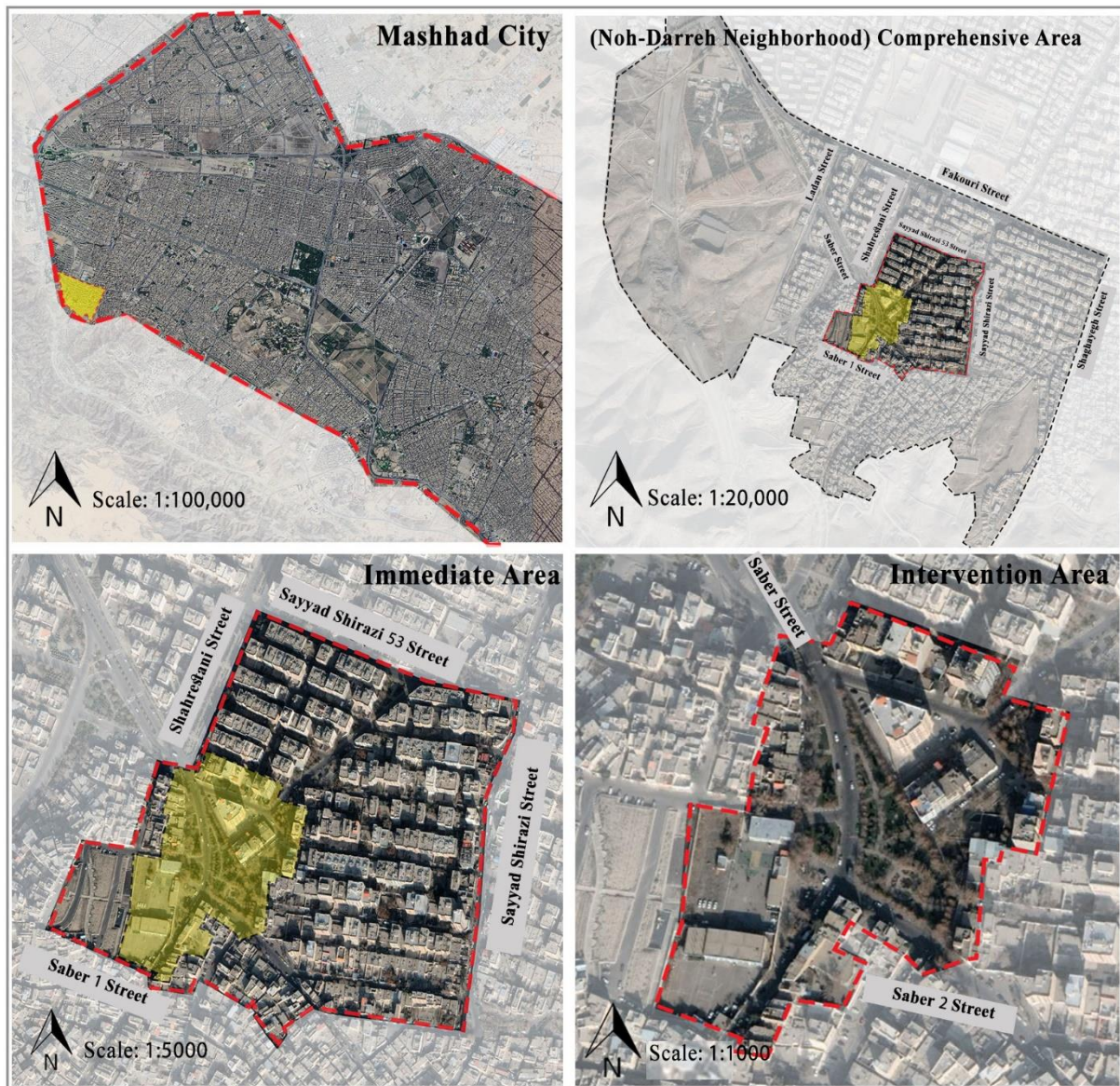


Figure 3. Location of Saber Street in the Noh-Dareh Neighborhood in the City of Mashhad. Source: Authors.

### 3.2. Methodology

The present study adopts a pragmatism paradigm and falls within the category of developmental research. Utilizing a deductive-interpretative approach, the study initially extracts relevant foundations related to behavior, environment, and perception from library sources. Subsequently, through a mixed-methods strategy incorporating techniques such as observation, behavioral mapping, and semi-structured interviews, behavioral information is gathered from the environmental context. Then, using the qualitative analysis tool (MaxQDA) and the coding technique in the data-driven approach, the collected data are analyzed. Unlike quantitative theoretical approaches, the data-driven method aims to generate and discover theories. In this approach, sampling is not initially conducted; instead, individuals who strengthen the theorization process are identified concurrently with conceptual identification and clarification. The data-driven approach extracts concepts (conditions, behaviors or actions, and consequences) from the core of the research, categorizing them into the mentioned concepts. Conditions encompass a set of events and incidents that create situations and issues related to a phenomenon, explaining how and why individuals and groups respond to these conditions. Behavior or action indicates behavioral patterns of individuals in response to issues and consequences resulting from conditions (Ghalandarian, 88, p.2022; Ghalandarian and Ghaemmaghami Farahani, 89, p.2023).

In the first step of this research, a systematic review of various sources was conducted to

examine concepts related to theoretical foundations (environment, perception, and behavior) in the field of urban design. Then, the identification of the environment and its issues was performed through observation and behavioral mapping. Next, considering the dimensions of built environment, the focal street evaluated by the researchers was assessed to gain general knowledge about the study area. Subsequently, to complete the understanding and achieve comprehensive insight into the issues within the area, interviews were conducted with all age groups (children, youth, middle-aged, elderly) and genders (men and women). The number of interviews (20 cases) was repeated to a certain extent to acquire theoretical saturation. Figure 4 illustrates the research process.

### 4. Research Findings

For a comprehensive and precise evaluation, the focal street under study was divided into six micro spaces based on visibility, communications, visual access, and the spectrum of behavioral placement. Subsequently, behavioral patterns were observed over three different days, including regular days, Public Holidays, and Festive holidays. Figure 5 illustrates this division to facilitate the extraction of behavioral patterns, while Figure 6 depicts the distribution of behavioral patterns during morning and evening sessions over the course of three different days.



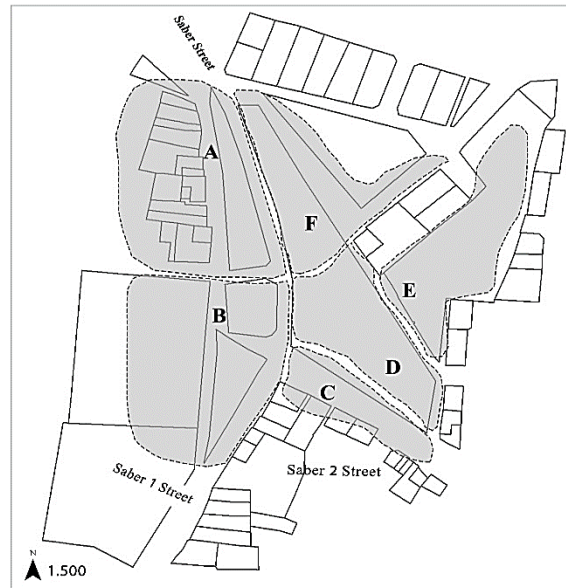


Figure 4. Research Process

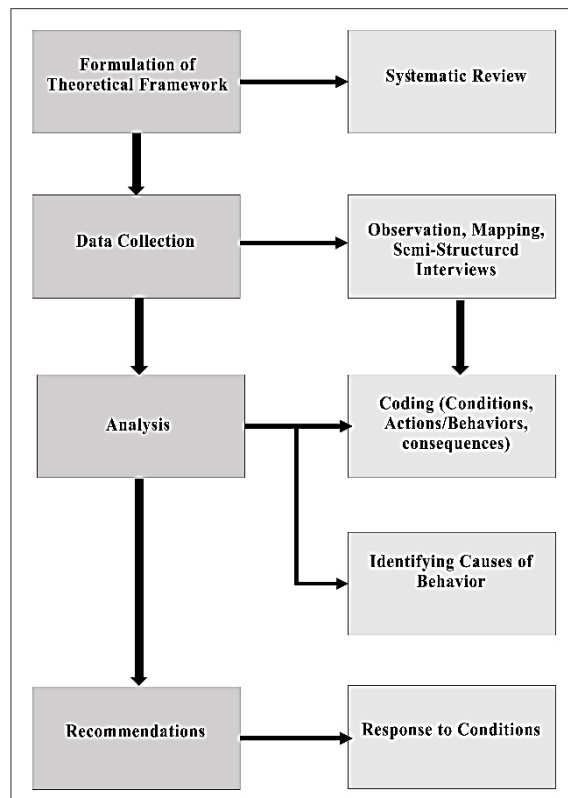


Figure 5. Division of Space into Six Subspaces for Behavioral Pattern Extraction

**4.1. Analysis of Present Behavioral Patterns in the Space**

According to the distribution of behavioral patterns (Figure 6), in both morning and evening sessions,

walking constitutes the majority of behaviors (over 50%). This could be attributed to the presence of places such as schools, green spaces, cafes, supermarkets, and bakeries. Additionally, behaviors

like observing (more than 10%) are among the other prevalent behaviors in the area.

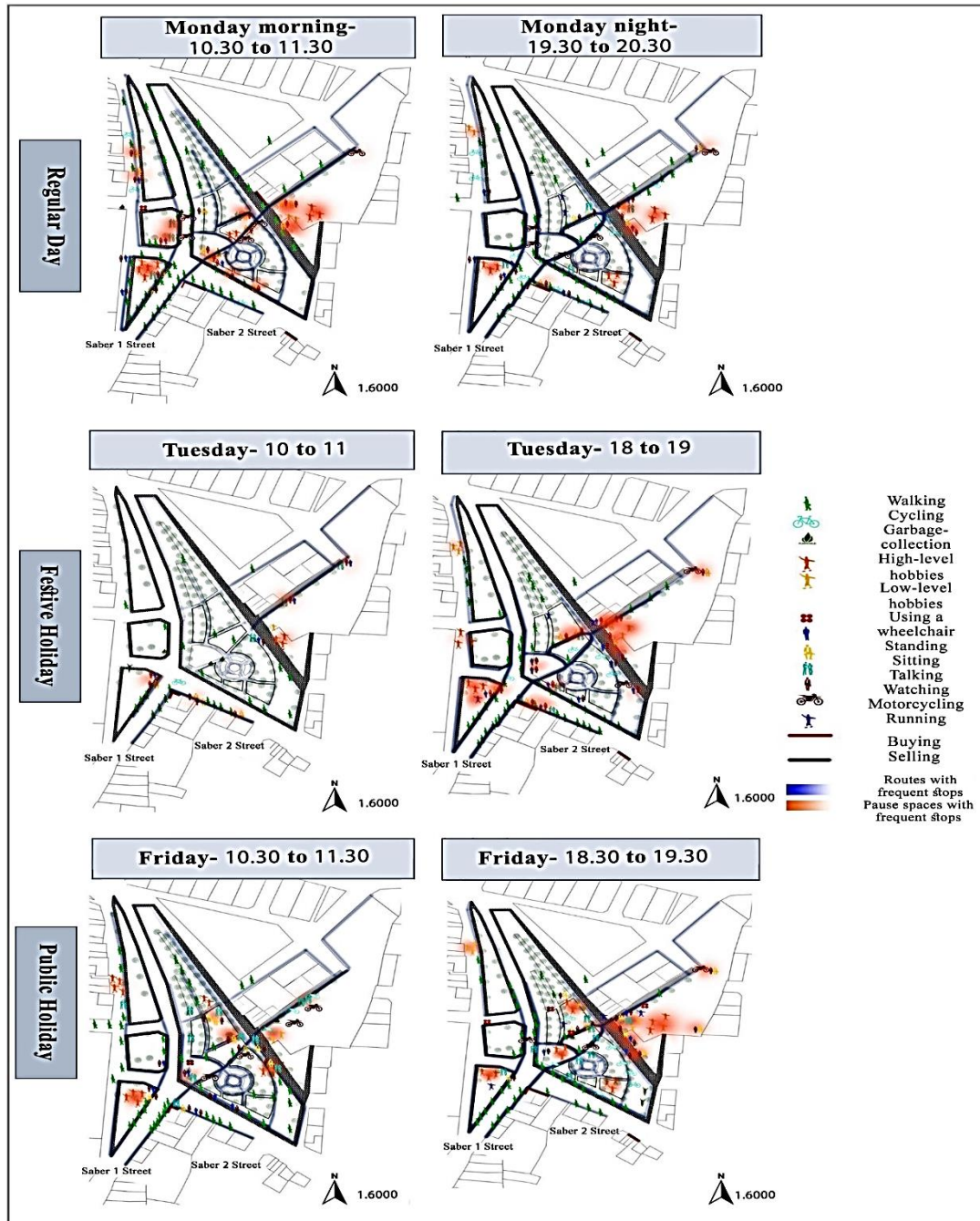


Figure 6. Distribution of Behavioral Patterns in Morning and Evening Sessions Over Three Different Days

The behavior, which is often combined with other behaviors such as sitting and standing, mostly occurs in the area of Bahamin Park (micro-space D), the stone edge of space E, space C, and sometimes in micro-space A as low-level hobbies. It should be considered that the users of these spaces are mostly local women and neighbors who, along with

activities such as cleaning vegetables, shaking fruit trees, etc., enjoy watching the environment. high-level and low-level activities, such as playing behaviors, occur due to weather conditions and the day of the week. These behaviors are welcomed in micro spaces E and B due to the presence of children's play areas and sports equipment by the

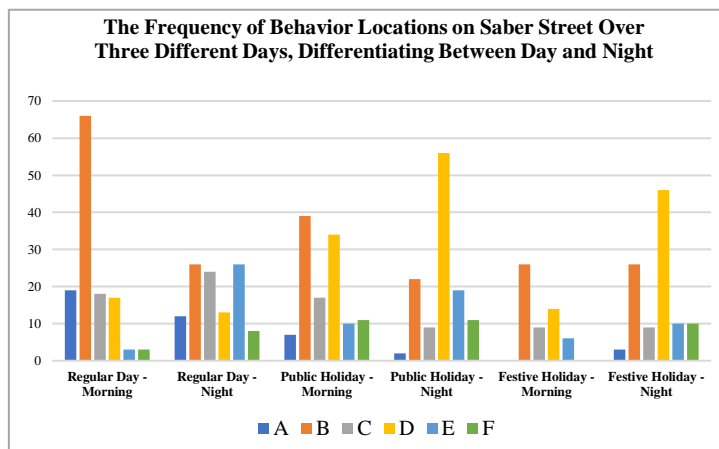
elderly group in micro-space D. These behaviors peak on public holidays, especially in the evening shift, leading to increased vitality.

Talking behaviors combined with actions such as sitting and standing occur sporadically in various spaces. These behaviors mostly occur at the edges of micro-space E, benches, or green spaces in micro spaces D and B, and behaviors such as *smoking* in public spaces and behaviors such as these, which are outside the norm of the city, are highlighted. These points have gradually turned into small territories over time, which improve social interactions and are available to different age and gender groups at different times of the day. Motor vehicle traffic inside pedestrian spaces, especially in micro spaces D and E, has reduced safety for pedestrians, especially specific age groups. This behavior decreases the efficiency of the space, especially due to the presence of youth in the evening shift.

Other behaviors, mostly seasonal, rarely occur within the study area due to its rural-base nature, such as spreading tents and shaking trees to eat

fruits, which are observed mainly in the eastern part of micro-space D.

The analyses indicate that most of the formed behaviors in the study area occur in micro spaces D, B, and E. For example, in micro-space D, the presence of equipment such as benches, and recreational facilities, and the age conditions of the groups present (children, youth) are among the main reasons for the presence of more people on holidays and in the evening shift (more than 40% of individuals). In contrast, due to the location of micro-space B and its adjacency to local uses like the bakery, supermarket, and school, walking is mostly favored by individuals in the morning and more. Micro-space C, due to its linear nature, is mostly receptive to walking or standing conversations. The percentage of space use is the same day and night, less than 15%, with the least use belonging to micro-space F, which is probably due to the lack of elements or relevant activities. [Figure 7](#) illustrates this issue.



**Figure 7. Frequency of behaviors categorized by space, during day and night, across three regular, public, and festive days**

The analysis of findings in the aforementioned street indicated that 72.3% of behaviors occurred individually, while 27.7% were group behaviors (two or more individuals), predominantly observed in spaces B and C. In terms of gender distribution, the street had fewer female participants, with the highest frequency of female presence in spaces B and C on a regular day, accounting for 34.9%, nearly half of the male presence (65.1%).

The results of the investigations indicate that in the mentioned area, the presence of men is almost evenly distributed, while women are more present

in spaces A (semi-public space), D, and E. However, it's essential to note that the presence of women in these spaces is heavily dependent on environmental conditions such as weather, lighting, comfort, and convenience. [Figure 8](#), (a) displays the frequency of men and women in the small spaces, while (b) illustrates the frequency of individual versus group behaviors.

Furthermore, the six micro spaces were evaluated based on the dimensions of built environment (components of Table 3). Accordingly, micro spaces with more than 4 subcomponents were

considered suitable, those with two to three subcomponents were rated as moderate, and those

with fewer than two subcomponents were deemed unsuitable.

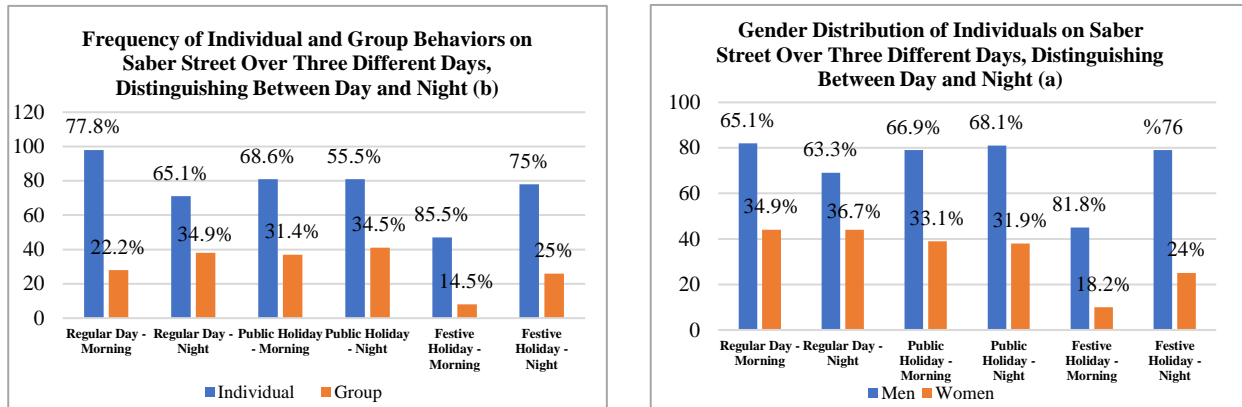


Figure 8. (a) The frequency of men’s and women's presence on each of the sampling days, and (b) the frequency of individual and group behaviors on each of the sampling days

Table 3. Criteria for evaluating the conditions of micro spaces within the dimensions of built environment

Dimensions	Components	Subcomponents
Morphological	Safety	1-Soft and Hard Separator Edges,2-Steps and Ramps,3-Slopes and Gradients,4-Slip-resistant Surfaces,5-Durable Pavements,6-Crosswalks and Pedestrian Zones,7-Traffic Signals and Markings,8-Dedicated Bike Lanes,9-Separate Pedestrian Walkways,10-Public Transit Lanes
	Hangout space form	-
	Physical permeability	1- Separator Edges 2- Pathway Integration 3- Transport Mode Separation 4- Easy and Short Access 5- Accommodation for Sensitive Groups
Social	Security	1- Suitable Capacity for People 2- Presence of Lighting Elements 3- Passive Activities 4- Accessibility for Sensitive Age and Gender Groups 5- Space Monitoring by Police Force or Design-Based Monitoring
	The Relationship between the environment and people	1- Presence of Lighting Elements 2- Active Activities 3- Absence of Unhealthy Behaviors 4- Presence of Indicative Elements for Interactions
	Type of engagement in space	-
Functional	Mixed Used	1- Diversity of Compatible Functions 2- Externalization of Activities 3- Integration of Activities with Surrounding Space 4- Fine-grained Nature of Activities 5- Richness of Sensory Experiences due to Activities
	Comfort and Convenience	1- Number of Benches 2- Suitable Vegetation Coverage 3- Absence of Air and Noise Pollution 4- Quality of Paving Materials 5- Presence of Shelter
Perceptual	Sense of Place	1- Legibility 2- Physical Signs 3- Mental Signs 4- Urban Landmarks 5- Decorative Elements
Visual	Aesthetic qualities	1- Utilization of Design Principles 2- Landscaping 3- Physical Environment's Connection with Space 4- Integration of Soft and Hard Elements 5- Human Scale
	Visual Aesthetics	1- Attractive Facades 2- Visual Corridors 3- Transparent Walls 4- Sequential Views 5- Combination of Hard and Soft Design Elements
Temporal	Space Management	1- Eventful Space Circulation 2- Daytime Liveliness 3- Accessibility for Sensitive Groups at Various Times 4- Space Preservation Values 5- Presence of 12 to 24-hour Activities
Values and Priorities		More than 4 subcomponents = Suitable, Between 2 to 3 subcomponents = Moderate, Less than 2 subcomponents = Unsuitable

The results indicate that users of micro-space A are often middle-aged and elderly women who engage in talking. Sitting, standing, and talking behaviors occur in micro-space B, predominantly by youths and middle-aged individuals, often in a group setting without a specific location. Micro spaces C and F are primarily visited by middle-aged individuals, but due to unfavorable environmental conditions such as the lack of urban furniture and incompatible or absent activities, only intermittent behaviors occur in these spaces. In contrast, micro spaces D and E are more organized due to their spatial layout. These spaces have suitable environmental conditions and comprehensive facilities, accommodating a diverse range of behaviors from children, youths, and middle-aged individuals. However, due to the excessive presence of children during midday and addicts during late hours, they are less comfortable. Table 4 illustrates this phenomenon.

While these micro spaces serve as platforms for various behaviors, they do not necessarily influence the formation of these behaviors themselves but rather provide the groundwork for new inquiries.

Therefore, interviews were conducted to complement the understanding and analyze behavioral patterns. Given the extensive and voluminous nature of the topics, manual analysis of interviews was time-consuming, irreversible, and prone to high error rates. Hence, MaxQDA 2020 software was utilized to code the interviews, enabling efficient analysis. Finally, conditions, behaviors, or actions, and consequences were identified and spatially mapped to propose location-specific recommendations. Figure 9 provides an example of the findings obtained from behavioral observations and mapping, indicating that in some cases, the observed behaviors are not strongly correlated with the spatial context. Indeed, some of these micro spaces have potentials that accommodate behaviors observed in others. Furthermore, Table 5 presents the analysis of interviews based on the Strauss and Corbin model, illustrating conditions, behaviors, consequences, and central coding in the dimensions of built environment in Saber Street of Noh-Dareh, Mashhad.

**Table 4. Evaluation of the Conditions of micro spaces in Each Domain in the Context of built environmental dimensions**

Predominant Behavior	Age Groups of Users	Space Perception	Environmental Conditions of Micro Spaces										Micro Space			
			Temporal		Visual		Perc eptu al	Functional		Social				Morphological		
			Space managem ent		Visual aesthetics	Aesthetic qualities	Sense of Place	Cornfort and Convenience	Mixed Used	Type of engagement in space	Relationship between the environment and people	Security		Physical permeability	Hangout space form	Safety
			Night	Day												
Talking	Elderly, Middle-aged	Sustainable	Inappropriate	Moderate	appropriate	Inappropriate	appropriate	Moderate	Inappropriate	Active	Moderate	Moderate	appropriate	Linear	appropriate	A



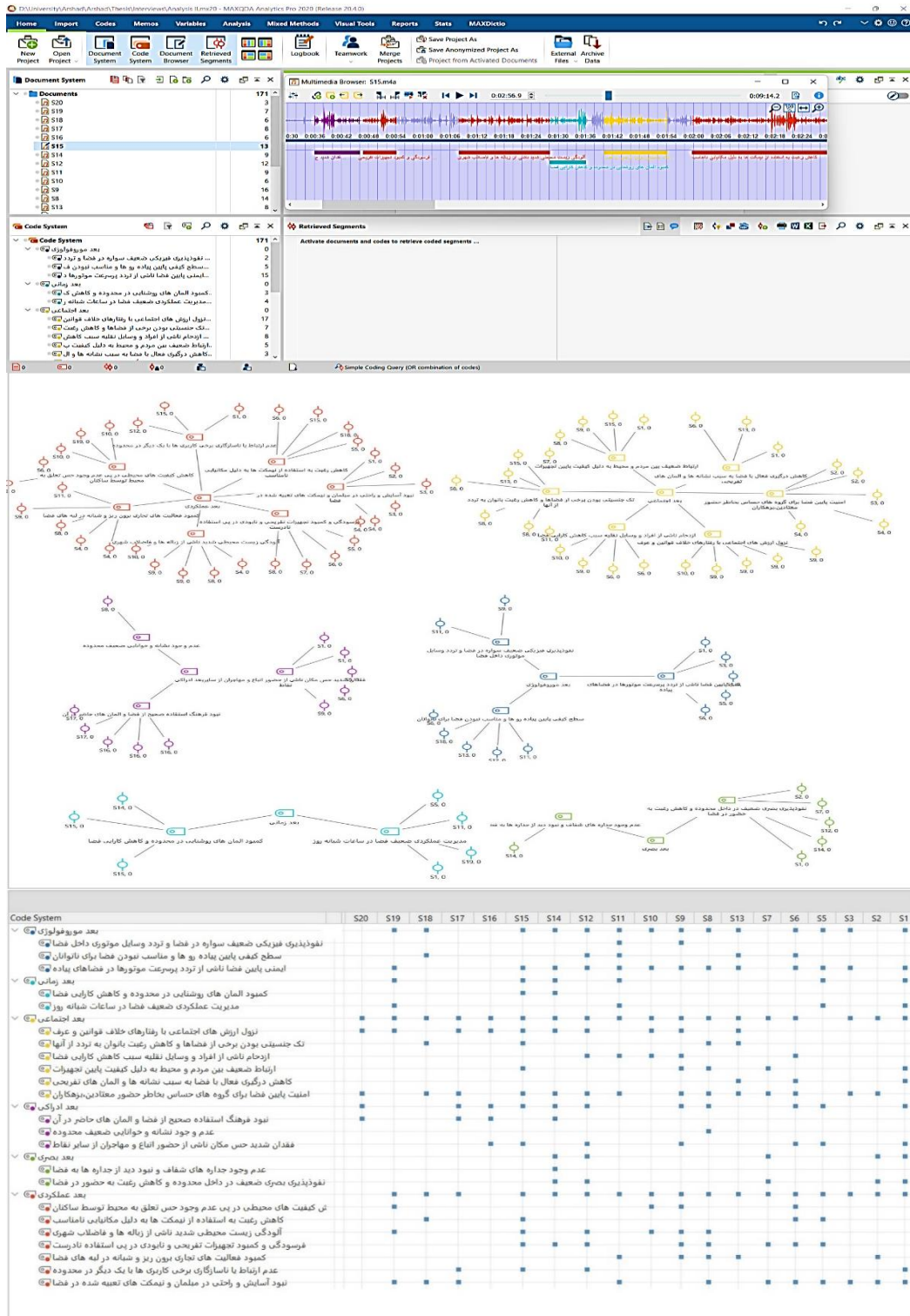


Figure 9. An example of the analysis derived from interviews with people using the qualitative analysis tool MaxQDA

**Table 5. Examination of conditions, actions (behavior), consequences, and core coding in the context of built environmental dimensions. Source: Authors.**

Axis Coding	Conditions	Actions (behavior)	Consequences
Inappropriate qualitative level and uncontrolled traffic flow within the area. (1)	Lack of control over motor vehicle traffic into pedestrian spaces / Absence of pedestrian crossings in streets / Absence of sitting spaces along main thoroughfares / Absence of barriers to control motor vehicle traffic in pedestrian areas.	Pedestrian routes between destinations (mandatory), lack of inclination to stay and linger in the space due to the absence of comfortable furniture.	Lack of reception by sensitive age groups and individuals with disabilities in micro spaces / Imbalance in traffic flow on thoroughfares / Increase in accidents due to disregard for guidance signs and driving regulations.
Lack of responsiveness to functional needs and uniformity of activities within the area. (2)	Lack of connection between open spaces and surrounding activities / Inadequate outward flow of activities due to narrow street widths and unclear external boundaries of parcels / Inappropriate placement of benches in the space.	The intermittent presence of individuals in the space and the creation of transient behaviors such as walking, short-term standing, or sitting on edges aimed at alleviating fatigue.	Lack of presence of age and gender groups in the space due to the absence of elements for lingering / Inefficiency of urban barriers due to lack of appropriate functional connectivity between them / Noise pollution due to non-compliance with functional compatibility / Absence of active and passive interactions and encounters between individuals.
Inappropriate climatic conditions and absence of comfort within the area.	Noise pollution resulting from drivers' non-compliance on Saber Street / Presence of remnants of incompatible activities in the space / Absence of sitting furniture and suitable vegetation cover in small spaces.	The reluctance of users to be present in certain spaces and their emptiness of any type of behavior and activity at different times of the day - presence of groups with destructive behaviors such as littering, homeless individuals, and addicts.	Increase in environmental pollution due to people's negligence and municipal management of municipal waste / Decreased efficiency of micro spaces during early and midday hours in hot seasons and neglect of people's comfort in the space / Decreased interactions between individuals in neighborhoods due to the lack of space for various age and gender groups / Increase in social tensions due to users' dissatisfaction with the space.
Lack of short-term and long-term spatial management. (4)	Low security in the open spaces in the northern section due to the lack of diverse activities / Absence of 24-hour and 12-hour activities / Failure to hold local events within the area.	Creation of negative behaviors such as addiction and alcohol consumption.	Decreased hospitality and increased undefended spaces / Some points becoming monotonous in micro spaces and lack of mental security during late hours of the night.
Inadequate connection between humans and the environment. (5)	Lack of suitable physical infrastructure to create quality and attractive social hubs / Absence of urban furniture for the presence of various age and gender groups / Lack of a prominent element for establishing social interactions.	Continuous activity of children in micro spaces and their play and recreation / Creation of neutral and uniform behaviors such as standing, sitting, and watching.	Creation of unhealthy behavioral knots in the late hours of the day / Children's presence on street beds and thoroughfares leading to increased accidents / Noise pollution resulting from children's continuous presence in the space.



Axis Coding	Conditions	Actions (behavior)	Consequences
Insecurity, lack of supervision, and spatial control. (6)	Absence of suitable lighting furniture in local secondary streets and open spaces / High rates of drug addiction and gathering in blind corners / Absence of outward activities that help foster social interactions / The presence of indefensible spaces due to lack of supervision / Decline in social values due to the presence of unconventional behaviors.	Creation of behaviors such as sitting or standing on the edges of spaces, decreased inclination to linger, and traffic flow in some points of small spaces, leading to solely transit behaviors.	Increase in theft, addiction, and criminal activities, leading to social tensions between negative groups / Decrease in individuals' social status / Positive behavioral hubs in the space being influenced by negative behaviors stemming from inappropriate behavioral hubs, causing a decline in social safety and user dissatisfaction / Feeling of belonging to the living area being affected
Neglect of aesthetic qualities and absence of suitable movement experience within the space. (7)	Absence of sufficient lighting infrastructure in green spaces / High visual clutter in commercial areas / Lack of defined scenes appropriate for the functions of each space / Lack of visual transparency due to the predominance of residential areas.	Pedestrian walkways between destinations (mandatory), lack of lingering and standing or sitting in the space due to the absence of outward activities or attractive visual views on urban barriers.	Increase in crime and insecurity due to lack of appropriate visual permeability into corners / Decreased efficiency of space due to uniformity and users' reluctance to move in defined scenes / Increased insecurity during late hours of the night due to lack of lighting and sufficient visual supervision.
Lack of readability and sense of place within the area. (8)	Absence of defined entrance in the neighborhood / Confusion of pedestrians due to the lack of clear signage for guidance and driving / Decreased readability in existing barriers due to the absence of shop signs / Lack of sense of belonging due to the presence of immigrants and foreigners.	Creation of uniform behaviors resulting from the absence of attractive amenities and identity elements in the space.	Loss of identity and decreased sense of place among residents due to increased internal migration / Neglect of their residence and the emergence of vandalism among users / Confusion and disorientation of transient users during their presence in the space as well as increased accidents due to disregard for traffic guidance and regulations.

## 5. Discussion and Conclusion

This study aimed to investigate the behavioral patterns of users present on Saber Street in the rural-base neighborhood of Noh-Dareh Mashhad to identify conditions, behaviors, and consequences, and to provide design recommendations to improve behaviors in this street.

The results of this study confirm the findings of Soun and others (2014) and [Motomura and others \(2022\)](#), which showed that the lack of correlation between morphology, space, and activities, and the non-extrication of activities due to narrowness of the streets in such urban neighborhoods, leads to a decrease in pedestrian presence in the environment. Furthermore, as [Foroutanrad and Zamani \(2021\)](#) and [Lotfi and colleagues \(2013\)](#) demonstrated, insufficient urban amenities (such as urban furniture and greenery for comfort and convenience in spaces), lack of connection between open spaces and surrounding activities, lack of 24 and 12 hours activities, inappropriate physical environment for

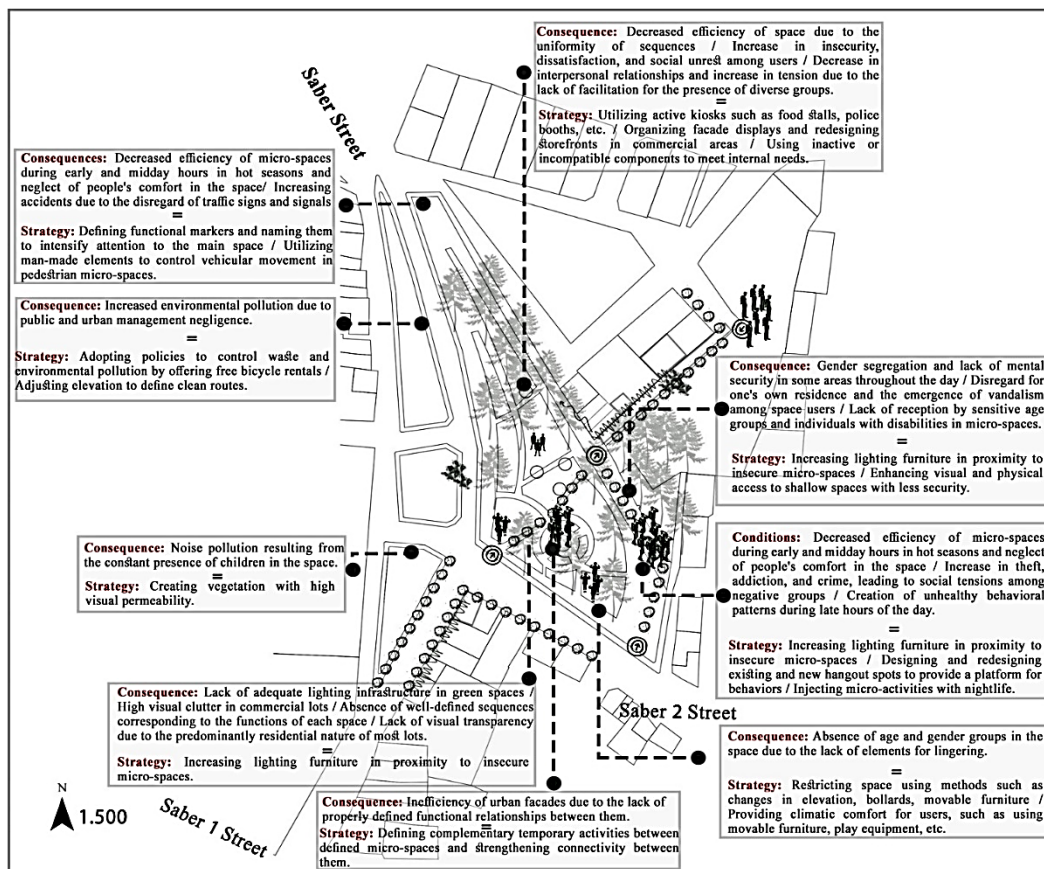
creating quality and attractive social gathering places, and weariness of walls lead to the formation of transient behaviors such as walking, short-term pauses in standing or sitting on the edges of micro spaces (to alleviate fatigue). In other words, the occurrence of security-promoting behaviors such as prolonged sitting of residents, conversations, and environmental supervision is not supported.

With the decrease in residents' supervision of the environment, opportunities for some deviant behaviors such as alcohol consumption, drug use, conflict, etc., are created, leading to irreparable damages such as loss of identity, decrease in residents' sense of belonging, increase in crime, and insecurity.

This issue has received less attention in behavioral studies. On the other hand, given the nature and scope of urban research and the breadth of behavioral sciences, it can be said that comprehensive understanding, analysis, and intervention in the sample under study are not possible due to time, financial, and human

limitations. Therefore, as often observed, some studies such as [De Cantis et al. \(2016\)](#) and [Onojeghuo et al. \(2019\)](#) have only used quantitative methods by using questionnaire and observation methods at specific times of the day to count and examine a specific range of behaviors and crowd density in the environmental context. While the discussion of behavioral patterns requires a detailed examination and direct, unmediated interaction with users (qualitative methods) in the environment to better understand and analyze the findings. Some studies, like [Pakzad and colleagues \(2019\)](#), and [Paknezhad and colleagues \(2021\)](#), to overcome the breadth of the subject, have only intervened in the morphological dimension. This research examined the target context in the seven dimensions of built environment (morphological, functional, perceptual, visual, social, cognitive, and temporal). Therefore, the innovation of the present research can be called a mutual interaction discussion of

behavioral patterns with built environmental dimensions in rural-based neighborhoods. Furthermore, to amend the behavioral patterns of users in Saber Street in the rural-base neighborhood of Noh-Dare Mashhad, design recommendations are provided. Due to the findings of the study, by evaluating the conditions of gathering places in Table 4 and analyzing and coding the interviews in the form of conditions, behaviors, and consequences in Table 5 and [Figure 10](#), recommendations can be made for each of the micro spaces. Recommendations such as institutional control by urban management and adoption of control policies on space, scheduling time planning to create various events, increasing equipment and comprehensiveness of micro spaces, etc., can be proposed. [Figure 10](#) presents design recommendations to address the consequences of existing behaviors in Saber Street.



**Figure 10. Proposed suggestions to address the consequences of existing behaviors in the micro spaces of Saber Street**

**Acknowledgments:** The current paper is extracted from the Master thesis of the First author (Farid

Ganjeali) in Urban Design, Ferdowsi University of Mashhad, Mashhad, Iran.

**Authors' contributions:** The authors equally contributed to the preparation of this article.

**Conflict of interest:** The authors declare no conflict of interest.

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## طراحی رفتار گرا در محلات روستا-پایه (مورد مطالعه: خیابان صابر در محله نه دره مشهد)

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### چکیده مبسوط

#### ۱. مقدمه

با گسترش کالبدی شهرها برخی از روستاهای پیرامونی به عنوان محلات جدید، به شهر الحاق می شوند. این بافت‌ها به علت پیشینه روستایی خود، از منظر کالبدی، اجتماعی، اقتصادی و فرهنگی با محلات نوین شهری متفاوت هستند. مسائل اجتماعی و خصوصاً رفتاری یکی از چالش‌های این بافت‌هاست که خود را در قالب بی هویتی و بدنمایی آن محدود شده نشان می دهد. نتیجه این موضوع تشدید نارضایتی ساکنان و کاهش حس تعلق می باشد. محله نه دره مشهد (به علت سابقه روستایی) با چنین مساله ای روبه روست. محور صابر (واقع در نه دره) محل تلاقی دو بخش از سکونتگاه‌های رسمی و غیررسمی بوده و به واسطه همجواری با کوه پارک جایگاه مناسبی دارد. با این حال بروز برخی رفتارهای ناهنجار (به دلیل نوع کالبد و فرم)، باعث تنزل کارایی و جذابیت فضاهای موجود برای ساکنان شده است. بنابراین پژوهش حاضر با هدف اصلاح الگوهای رفتاری کاربران به طراحی این محور می پردازد.

#### ۲. روش تحقیق

این پژوهش از نوع آمیخته کمی و کیفی است. پس از گردآوری و مطالعه منابع کتابخانه‌ای در خصوص رفتار، محیط و ادراک با استفاده از تکنیک‌های کیفی مانند مشاهده، نقشه برداری رفتاری و مصاحبه، رفتار کاربران شناسایی شد. سپس رفتارهای شناسایی شده با استفاده از ابزار MaxQDA مبتنی بر ملاحظات تحلیل کیفی در قالب شرایط، عمل و پیامد دسته بندی شد. در ادامه با گونه شناسی خرد فضا های موجود بر اساس الگوهای رفتاری، پیشنهادات طراحی ارائه شد.

#### ۳. یافته های تحقیق

به منظور ارزیابی دقیق و همه جانبه، محور مورد مطالعه بر مبنای میزان دید، ارتباطات، دسترسی بصری و همچنین طیف قرارگیری رفتارها به شش خرد فضا تقسیم شد و در ادامه الگوهای رفتاری در سه روز متفاوت شامل (عادی، جمعه و تعطیل مناسبتی) برداشت شد. یافته های حاصل از برداشت و نقشه برداری رفتاری مویده آن است که در برخی موارد رفتارهای شکل گرفته چندان با بستر فضا ارتباطی ندارند. در واقع، برخی از این خرد فضاهای پتانسیل‌هایی دارند که پذیرای رفتارهای شکل گرفته در سایر خرد فضاهای نیز می باشند. با این حال، این رفتارها در بستر خود شکل نمی گیرند و زمینه ساز تعریف سوالات جدید می باشند. در این راستا، به منظور تکمیل فهم و بررسی الگوهای رفتاری از مصاحبه باز استفاده شد. با توجه به گستردگی و حجم بالای موضوعات، تحلیل مصاحبه ها به روش دستی بسیار زمان بر، برگشت ناپذیر و با احتمال خطای بالایی همراه بود. لذا جهت صرفه جویی در وقت و هزینه و امکان اصلاحات احتمالی، از نرم افزار MaxQDA نسخه ۲۰۲۰ استفاده و با کمک آن، کدگذاری صورت گرفت. در انتها شرایط، رفتار یا اعمال و پیامدها شناسایی و بر روی نقشه مکانی شدند. نتایج حاصل از تحلیل نشان داد، رفتارها در خرد فضاهای محور مذکور به دلیل نبود فعالیت های متنوع، امنیت روانی، مبلمان روشنایی و شرایط اقلیمی مناسب، اغلب به صورت انفرادی، مکث های کوتاه و نامتعارف است که نتیجه این امر کاهش هویت، ناامنی، آسیب های اجتماعی و ناکارآمدی فعالیت‌ها می باشد.

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#### ۴. بحث و نتیجه‌گیری

برای بهبود شرایط مذکور، افزایش کنترل مدیریت شهری، اتخاذ سیاست‌های نظارتی بوسیله طراحی بدنه‌ها، تخصیص فعالیت‌های جمعی در فضا، تنظیم رویدادهای مختلف، تامین تجهیزات و زیرساخت‌های رفاهی و آسایشی و غیره پیشنهاد می‌شود. با توجه به وجود تعارضات اجتماعی در محلات با سابقه روستایی همچون آسیب‌های اجتماعی، ناکارآمدی فعالیت‌ها و در نهایت نارضایتی ساکنان، نوآوری پژوهش حاضر در شناسایی زمینه و علت به وقوع پیوستن الگوهای رفتاری ناهنجار در این محلات است.

با توجه به ماهیت و مقیاس پژوهش‌های طراحی شهری و وسعت علوم رفتاری می‌توان گفت، عملاً شناخت، تحلیل و مداخله در محدوده مورد نظر (محله روستا-پایه نه دره) به دلیل محدودیت‌های زمانی، مالی و انسانی مقدور نمی‌باشد. پژوهش‌هایی با مبانی نظری علوم رفتاری، احتیاج به تجهیزات پیشرفته همچون دوربین‌های عکسبرداری، فیلم برداری پ تا بتوانند در بستری کلان‌تر موضوع مورد نظر را مورد پایش قرار دهد. با توجه به گستره‌ی نظری موجود، یافته‌ها و محدودیت‌های حاضر، می‌توان پیشنهادها


و جهت‌گیری‌های پژوهشی زیر را ارائه نمود که فراهم‌کننده زمینه‌های پژوهشی جدید می‌باشند:

۱- با توجه به اینکه علوم رفتاری مفهومی متکثر است بررسی و تبارشناسی الگوهای رفتاری در بستر محیط‌های مختلف (محلات داخل شهر، شهرک‌ها، روستا شهرها را می‌توان به عنوان یک موضوع پژوهش در نظر گرفت.

۲- در پژوهش‌های آینده، عوامل مداخله‌گری همچون وضعیت اقتصادی، تاهل، جنسیت و مقدار تحصیلات سنج‌های محیطی مورد بررسی قرار گیرد تا بتوان به صورت دقیق‌تر مسائل را استخراج و متناسب با ماهیت فعالیت‌های آن‌ها پیشنهادهای مطرح کرد.

۳- پیشنهاد می‌شود که انجام پژوهش با حجم نمونه بزرگ‌تر و محدوده جغرافیایی وسیع‌تر انجام گیرد تا بتوان محیط را از دید کاربران بیشتری مورد فهم قرار داد و مطابق با نیاز آن‌ها عمل کرد. **کلیدواژه‌ها:** طراحی رفتارگرا، علوم رفتاری، محلات روستا پایه، محور صابر، محله نه دره مشهد.

**تشکر و قدردانی:** پژوهش حاضر برگرفته از پایان‌نامه کارشناسی ارشد نویسنده اول (فرید گنجعلی)، گروه شهرسازی، دانشگاه فردوسی مشهد، مشهد، ایران است.

<p>Use your device to scan and read the article online</p> 	<p><b>How to cite this article:</b>                  Ganjeali, F. &amp; Ghalandarian, I. (2024). Behavior-oriented design in neighborhoods with rural origins (Case study: Saber Street in Noh-Dareh, Mashhad). <i>Journal of Research &amp; Rural Planning</i>, 13(1), 119-140.   <a href="http://dx.doi.org/10.22067/jrrp.v13i1.2404-1100">http://dx.doi.org/10.22067/jrrp.v13i1.2404-1100</a></p>	<p><b>Date:</b>                  Received: 21-02-2024                  Revised: 27-03-2024                  Accepted: 21-04-2024                  Available Online: 25-04-2024</p>
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