

Organizing the Urban Landscape with Emphasis on Legibility, Using Visual Preference Technique (V.P.T) (Case Study: Khayyam Street of Qazvin)

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ABSTRACT: Urban landscapes form the main parts of the city. One of these spaces is urban streets, in which social interactions and urban vitality reach its maximum quality and quantity. One of the principles and properties of urban landscape design is its intelligibility. A viewer who takes a look at an intelligible city and knows it can attract new emotional manifestations of city without damaging its original image. Orientation is also very easy for the viewer and he completely knows the environment he lives in. numerous characteristics influence the legibility of urban landscapes. The current research, which is a descriptive- analytic study, is designed to identify the factors influencing legibility of urban landscape and citizen participation as the main bases of visual preference technique. First we begin with concepts, ideas and attitudes of experts inside and outside the country about “landscape, legibility, urban streets” and identification of visual preference technique by investigating some foreign examples is done by collecting principles and characteristics to coordinate the components of city even more. Finally, considering the citizens (residents and non-residents) participation based on surveys and evaluations that have always carried thoughts and ideas about the environment, it was clarified that in different age groups, no fear should be held for the development of this technique. However, considering the new ideas of citizens, criteria are proposed to create and reinforce legible landscapes for the streets and urban landscapes.

Keywords: Urban landscape, Legibility, Urban Street, Visual preference

INTRODUCTION

The surrounding environment has always been exerting an influence on human behavior and culture. In general, a city as a “container” can provide all sorts of conditions for different contained things. (Habib, Khastou, 2014, 17) During the history, human interaction with the environment have been an answer to his needs and expectations, whose consequence is the spatial and physical shape it gives to the environment. In accordance with time and space, this spatial shape has a specific identity which is the urban landscape. In order to improve their impression of the environment, the primitive humans would reconcile it with another landscape. His influence on the environment was little and all defining components of urban landscape were limited to the houses and religious building. Due to the changes in lifestyle and contemporary political, cultural and economic relations, city has been attributed a

face influenced by the complexities of those relations. This entailed the need to control the shape of cities in terms of their landscape legibility.

Continuity of Edge or city facades, repetition of elements from the city's form of the whole form of the city to create the rhythm, the harmony of similar facades, intuitive understanding of the physical aspects of a city and can easily lead to identity for the city. Forms shall design so that the various components of the city linked together like a string constant. (Mouhebat, 2012, 56)

Urban landscape is one of the most important elements of legibility and probably the main pillar influencing the face of cities. It shapes the most important parts of Qazvin Province¹, such as facades, screens in urban streets, in which the social interactions and urban vitality maximizes in quality and

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quantity. Legibility can be considered as one of the principles and properties of landscape design. From a viewer's viewpoint who pays attention to a legible city and knows it, attracting new emotional manifestations of city by more attraction and public participation in designing and surveying as well as orientation would be easy since he is aware of the environment he lives. Public spaces shape the most important parts of Qazvin province. One of these spaces is Khayyam Street which due to illegibility of city components such as mismatching of driving and walking trails, pedestrian and bicycle lanes, lack of appropriate lighting and green space in streets, inconsistency between views and screens, unknown local parking lots, lack of appropriate place for residents' recreation and shopping malls, unknown permanent and temporary signs, etc. has faced problems in illegibility of urban landscape. Residents' interests about a number of images that represent the elements and characteristics of local community project can be collected using the visual preference technique in this region. The images used for consultation and participation should be tangible and comprehensible for different age groups. Visual preference techniques are valuable because they are transferors of emotions and feelings towards objective desires and preferences. In fact, these visual techniques allow the residents select their preferred options from among the images used to illustrate the choices and alternatives of the project and build their living environment the way they like and according to their mental images of the suitable and legible urban environment and by the help of the planners, urban designers and authorities.

MATERIALS AND METHODS

Concepts and Review

Townscape: Apart from being an old concept like the term "urban development", the term "townscape" has essentially existed for a long time with the emergence and development of cities. However, it was presented in late nineteenth century, with the designs and works of Frederick Law Olmsted, the father of landscape architecture, on American cities. The concepts of townscape were first presented by Gordon Cullen. According to Cullen (2003), a townscape is "the art of giving visual coherence and organization to the jumble of buildings, streets and space that make up the urban environment". He maintains that the landscape of any city is a response to human behavior, weather condition, security factors, in other words expert interventions in the framework of increasing the capabilities of the environment. Cullen believes that each person's impression of the townscape is influenced by his/her sense of seeing, location and the environmental content that person is in (Mahmoudi, 2006).

Urban Legibility: "Legibility" is a quality that makes a place understandable. Practically, a part of the degrees of choice that is provided by a place is related to the amount of its legibility. This means that how much people can reach the understanding of a place. Generally, a part of the degree of choice that is presented by a place is related to the amount of its legibility; that is, how much people can understand and percept it

(Bentley, et.al, 2003, 113). A city that is legible will look good, prominent and considerable. This kind of city will welcome the eyes and the ears to more attention and calls people towards itself. Understanding such a place by senses is not merely possible by the use of senses, but expands and becomes deeper (Lynch, 1960). Legibility refers to the easy readability of the environment and easy orientation to the desired points and addresses (Golkar, 2000, 12).

Visual Preference Technique

The "visual preference" technique is a tool for collecting public theories based on planned projects that are proposed to arrange environmental plans and guidelines related to future designs of the city. There are two different approaches for collecting data through this technique.

1- One of the approaches is to show two images of various designing elements and to ask the subjects to vote for the image they prefer.

2- The other approach is to use a variable (adjustable) scale, such that the subjects can vote for any special image. They can show their preference according to their needs from among a set of images that are selected to choose a possible, accurate and exceptional design to develop space (Nelessen, 2013, 1).

Visual preference technique is related to the result of a set of proposed designs and is often used when the instructions of designs are classified and designs development and urban design guidelines are investigatable. This evaluation constitutes a set of images that people should rate according to their preferences. Then, people's ideas will be used to make decisions about building an urban area for future. In fact, these visual techniques allow people to select their preferred choices from among the images used to illustrate the project choices and alternatives (Municipality of East Hants, 2014, 5). Peachtree, for example, is one of the cities in Hungary, located in south west of this country. It is a set of small villages that have fully synchronously turned into a whole city for its residents through this technique. The value of this technique lies in using public ideas, so that they will express whichever of their preferences they would like to observe in the society.

Finally, investigating the visual preferences is a technique that helps the general image of a society to determine the components of a design or project environment. As its name suggests, this technique is used to develop one or more visual concepts of a design or project proposal. When the developed visual concepts which present them in a general form or other specialized public gatherings are used to provide the public with an opportunity to review, study, and comment on their preferences for attributes depicted by the visual representation, the use of visual preference surveys include: "architecture, signs, building setbacks, landscaping, parking, transportation and etc." (Municipality of East Hants, 2014, 5).

Methodology

The methodology applied on this research was descriptive-



Fig. 1: Peachtree city, Hungary (Source: Wikipedia, 2013a)

analytic. In descriptive studies, the researcher looks at how the issue is or in other words, the current situation of the issue is investigated in such studies and makes use of public participation for better legibility of townscape. The main part of data collection was done through field studies, using questionnaires and the other part of data collection was done through the information and statistics available in libraries and documents. Data analysis of this study through descriptive-analytic approach on the investigation of townscape with an emphasis on legibility, using visual preference technique in Qazvin, Khayyam Street focused on general identification and elicitation of its influential causes and effects. Finally, the research questions are answered and results are presented through data analysis.

Literature Review

If the visual preference techniques or other remote techniques are collected via the Internet, they are very valuable. However, nothing can be replaced by face-to-face meetings, during which people themselves can see how their preferences leads to transformations of their local community.

Investigation of visual preference for the people who do not have access to the Internet or who feel uncomfortable using advanced technology like computer kiosk should be done in a way that is comfortable for them;

When working with a multicultural population, the investigations should be provided in different languages and then presented to the population;

The language of study plan should be taken into consideration, such that the wording of the problem does not influence the results;

Scales of visual preference can be time consuming and expensive. Therefore, it should be ensured that the selected techniques for scaling the visual preference is appropriate with general objectives and project budget of the study;

The alternative techniques for data input should be considered when the visual damages are probable.

The influence of mass media increases people's expectation about the quality of the images. People might not follow the visual content and might consider it undiscussable when they understand the quality is not comparable to their expectations. In contrast, detailed and careful images such as the image montages might provoke false expectations about the transformations of the area;

Visual preferences and the detected plans in any field should be applied in other local projects as well;

Visual preference technique was developed in the last days of (1970) by the urban designer, Anton Tony Nelessen and during (1990) it became a popular phenomenon and an acceptable and common method for public education about specific concepts of the design and for receiving feedback in the field of urban choices and designs. By this technique, people can express their approval or disapproval about a number of images that present the elements and characteristics of the local community. Visual preference techniques are valuable since they are transferors of emotions and feelings towards objective desires and preferences. This technique has been used in the following cities:

Denver;

Topeka;

New Castle;

Orlando. (Wikipedia, 2013b)

Kalivoda, et.al. (2014, 36-44), in a study Based upon an extensive perception-based investigation including more than 400 hikers as respondents, found that variance in respondents' judgments differed significantly among assessed landscape scenes. The main task of the study was to analyze consensus in relation to differences in VAQ (Visual aesthetic quality) for the landscape scenes, between the designated landscape types, and, in particular, among respondents. Consensus was measured as the variance in assessments of the landscape VAQ within the population under study. There is a negative relationship between variance and consensus, as high variance in assessments equates with low consensus, and vice

versa. They discovered a significant difference in judgment variances within each investigated respondent characteristic (gender, age, education level, occupational classification, and respondent's type of residence). Judgment variance was at the same time affected by landscape VAQ itself, the higher the VAQ, the better the consensus. While differences caused by characteristics indicate subjectivity of aesthetic values, the knowledge that people better find consensus for positively perceived landscapes provides a cogent argument for legal protection of valuable landscape scenes.

Deghati Najd, et.al. (2015, 115-125) in an article investigated Visual preference dimensions of historic urban areas. This paper outlines the findings of a study conducted to identify visual preferences of international tourists toward the historic centre of Kuala Lumpur as a way of passive participation. In this study, these dimensions are entitled visual chaos, urban greenery, roadside heritage, historic architecture, connectivity and modernity. Each one of these dimensions contains influential elements and features. "Content Identifying Method" carried out to identify the favorable and repulsive contents resulted in high or low preferability of each preference dimensions, respectively. It is concluded that, the surroundings of historic settings show the most neglect from conservation.

Valtchanov and Ellard (2015, 184-195), in a study, used a limited number of natural and urban environments due to the large number of image variants required for exploring the effects of low level visual properties. This paper used a simple slide-show presentation of various types of images on an nVisor SX60 head-mounted display (HMD) that featured an Arrington monocular eye-tracker and 44 degrees of horizontal field of

view (34_ vertical field of view). Images used in this study were collected from a free Internet computer wallpaper gallery that featured both natural and urban photography. All eight images were photographs from cities or natural scenery around the world. Selected photographs had similar perspectives for both natural and urban scene categories. For each category, there were two ground-level perspective photographs, one photograph with a perspective from a high vantage point, and one photograph with an aerial perspective. They concluded that not all environment types are represented in the image set and that the effects observed in the current study may be different for other environment types, such as deserts and oceans.

Application of Visual Preference Technique in Urban Designing

Research shows that there is a difference between public and expert perception about designing. Visual reference techniques are usually used in early stages of planning in order to help guide the urban and design choices (Nelessen, 2013, 2). As it is shown in Fig.2, Visual preference techniques can help urban planners and agencies of various activities of the public participation components, such as:

- Selection of characteristics or specifications of urban designing and local community;
- Transportation studies in the region or the required sub-region;
- Development of options or alternatives of transportation and analysis;
- Large-scale activities of regional planning;
- Matters related to the view development of supplementations known as shortlisted designs.

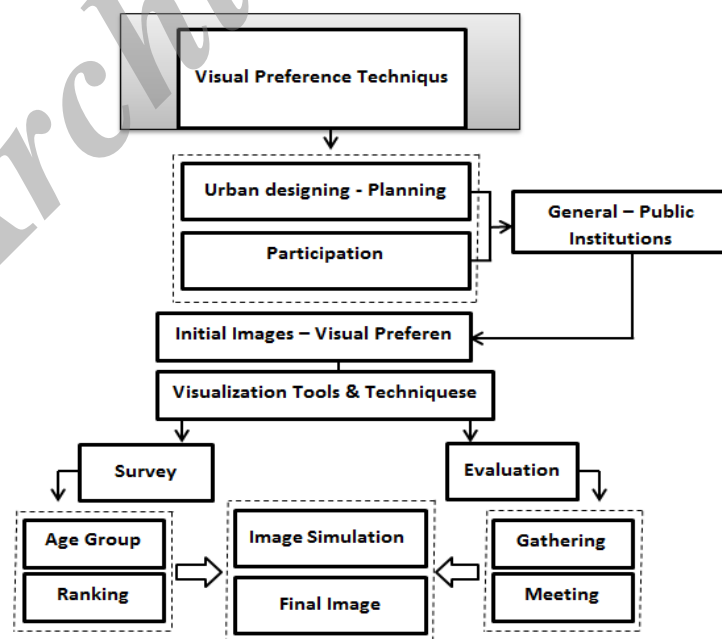


Fig. 2: Visual preference Forming Steps

Table 1: Design samples of visual preference survey for designing through public evaluation

Raw	City	Result
1	Sanford	The main objective is to investigate and conduct visual values by urban designers based on a wide range of ideas and demands of citizens about what they expect from their community, so that it can provide more opportunities for future development of the city.
2	Bellevue, East Gate area	
3	Hunts, East area	

Visual preference technique can be used in small scales like: choosing building height and sidewalk width or large scale urban designing projects such as detection of urban-specific strategy to redevelop the shopping center or transport corridor and etc. (Ghorbani, et.al, 2015, 6).

In order to reach the objective to organize townscape, using visual preference technique, the appropriate technique and planning should be adopted. In order to reach what is desirable in urban beautification, we should use the knowledge and experience of those who are active in the field, their desirable ideas and techniques, principles and criteria related to townscape and more legibility of it in accordance to citizen preference about whatever that exists in their living area and urban streets.

This evaluation includes images that people should rate according to their preferences. Then, their ideas are used to make decisions about building an urban environment for future. In fact, these visual techniques allow people to choose their preferred choices from among the images used to visualize the project choices and alternatives.

Similar Project Samples Similar Examples of Public Evaluation

Visual evaluation is one of the common techniques of investigating visual effects of the suggested elements and buildings in artificial and natural environment. Although there is no full consensus about the definition and how to conduct these evaluations, this is an acceptable technique of visual effects (Hernandez, et.al., 2004).

Visual preference survey is for designing through public evaluations and collecting public ideas about natural and man-made environments of citizens' living area, which often requires observing a set of images and collecting public ideas about the preference evaluation of special elements to design living areas for citizens (Transportation and Planning & Community development departments, 2011, 3).

In fact, it can be stated that the main objective is to investigate and conduct visual values by urban designers based on a wide range of ideas and demands of citizens about what they expect from their community, so that it can provide more opportunities for future development of the city. Citizens' participation in visual preference survey is a suitable solution to reach an appropriate objective, e.g. they provide the content of increasing plans for city center and future appearance of their city".

Similar Examples Performed Based on Public Participation

Lexically the term "participation" means involvement and gathering for a specific target. There have been lots of discussions about its idiomatic meaning. However, involvement, activity and effectiveness can be considered as the main essence of a gathering (Alavi Tabar, 2000, 27).

Participation depend on this basic idea that anyone has the right to feel responsible, think about the affairs that concern them and express their thoughts without fear and interfere in decisions that influence their life. The most fundamental thought underlying participation is accepting the principle of equality. When people in association with each other feel equal in importance and value, then the participation among them can lead to "rising and shining" and benefit everyone to a great amount (Toosi, 2000, 6).

It is noteworthy that participation is mutual. It can also be stated that participation is a process during which the participants cooperate to reach a specific goal which results in the division of authority. Participation is the mental and emotional engagement of participants in their groups that motivates them to help each other in order to reach the objectives of the group and shoulder its responsibility. Based on this definition, involvement, helping and responsibility are three characteristics of participation (salehi, 2001, 29).

Case Study

Khayyam Street is one of the most important commercial streets in Qazvin that is almost in the city center. In short it can be stated that it is considered as one of the most important and popular streets of the city. Khayyam Street is divided into three districts of "Northern Khayyam, Middle Khayyam and Southern Khayyam" (shown in fig. 3) (Charkhchian, 2013, 8). This study is focused on the Southern Khayyam (distance between BuAli Intersection and Southern Khayyam T-stop). According to the available studies, the "economic, social and cultural" properties and from a social ecology point of view, Qazvin can be divided into 4 different districts. This street was chosen based on an interview with Qazvin citizens, its high capacity for attracting various groups and being active throughout the day and the year.

Problems and Weaknesses of Khayyam Street

Although Khayyam Street is one of the most popular streets

Table 2: Design samples conducted based on public participation, using visual preference technique

Raw	City	Result
1	Denver	In fact, application of this technique in society leads to determining the positive part of the design or project for future designs of the city and generally a combination of expert and people-centered analysis in order to analyze the city as a mental image of the strong points and its visual problems. During this process, personal information is transformed into mutual perception, common and mutual understanding of aesthetic aspects and plan or design performance.
2	Topeka	
3	New Castle	
4	Orlando	
5	San Diego	
6	Imperial Beach	
7	El Cajon	
8	El Paso, Texas	
9	Mount Rainier, Maryland	
10	San Francisco	
11	Washington DC	



Fig. 3: Aerial Photo of a part of Qazvin Province, Southern Khayyam Street (Source: Municipality of Qazvin, 2015)

Table 3: Problems and Weaknesses of Khayyam Street

Raw	Problems and Weaknesses
1	Inconsistency between street constituents
2	Being narrow and causing traffic along the street
3	Unclear sidewalks and bicycle routes
4	Inappropriate design of permanent and temporary urban signs and elements, available furniture
5	Lack of convenient urban parking lots and parking motorcycles on the sidewalks
6	Lack of green space along the street
7	Not using public arts on parts of wall streets
8	Rough and inconsistent edges, creating a uniform skyline
9	Lack of awnings along the street for the convenience of the citizens
10	Lack of proper lighting and not considering the modern and traditional styles
11	Lack of appropriate architecture in accordance with the climate on the route
12	Lack of hallmarks in the region
13	Illegibility of "paths, signs, edges, nodes and districts"

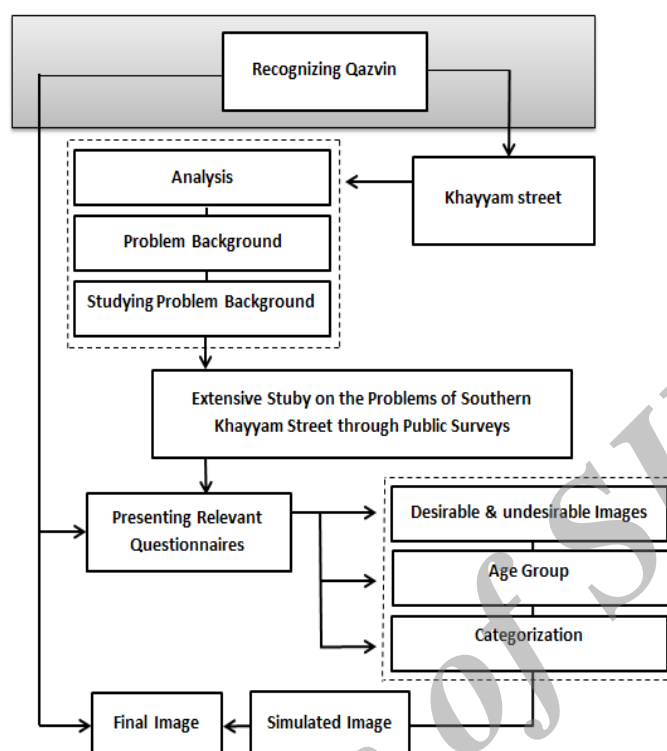


Fig. 4: Designing process

in Qazvin, its visual quality is not desirable. Especially from the townscape and legibility point of view, the visual elements of the city are the most important problems and weaknesses of this district, which is presented in table 3 based on visits and field studies. (fig.4)

How to Apply the Visual Preference Technique on This Urban Street to Organize the Townscape with an Emphasis on Legibility?

Resident and non-resident citizens should rate their visual preferences from among a set of images based; Visual preference surveys (VPS) are useful at assessing the public's perspective on images of natural and built environments. The process involves asking participants to view and rate a wide variety of images depicting on four choices of "very desirable, desirable, undesirable and neutral" (Transportation and Planning & community development departments, 2011, 1), along with a questionnaire in order to show different options to develop the open space in the form of an image. The survey is conducted on various age groups and then compared with each other; e.g. in age groups of (0-12), (13-17), (18-25), (26-35), (36-45), (46-55), (56-65), (66-80) and (+80) (Nelessen,

2013, 11). This way, citizens of this urban area can help urban designers and planners in designing Khayyam Street in Qazvin and participate in it based on the desirable preferences of each age group. After interviewing the citizens of this urban area, their responses to the survey were presented in a table to show each image is related to a specific question.

RESULTS AND DISCUSSION

Sample Size In order to determine the research sample size, the method applied was independent of the population because the number of population was not available. To this end, the book "Research Methodologies in Social Sciences" (Saroukhani, 2003, 120-135) was used and the following formula was applied.

n = estimated sample size

t = level of confidence

d = confidence interval

s^2 = variable variance

The level of confidence was chosen to be (95%); that is, errors of (5%) are accepted. Therefore, (t) is equal to (1/96) and the confidence interval (d) was equal to (0.245) and the variable variance (s^2) estimated to be (3.06). Therefore, the sample

size was calculated to be (199/88). Since the sample size is indeed (%5) fewer than the population, it does not require any corrections and the final result, that is (199/88) is the final sample.

Public Evaluation of Khayyam Street, the Southern Area

As a part of public attempts to help and participate in urban development and providing appropriate and legible space in each project and finally a more desirable use of urban streets in each urban area, the general ideas of the respondents were evaluated and the urban designing and planning process was informed. A total number of 200 responses were recorded by the system based on the sample size (see Sample Size) from different subjects. As an example, the resident and non-resident citizens of different age groups rated their responses about what they think is desirable and undesirable for the development of Southern Khayyam Street in Qazvin based on multiple choice questionnaire with the choices of a) very desirable, b) desirable,

c) undesirable and d) neutral. After the investigation, according to table 4 and fig. 5, the rating of each image was determined based on public surveys and evaluations.

After studying the participants clarifying their visual preferences about Southern Khayyam Street in Qazvin for townscape legibility it was specified that out of 200 participants of resident and non-resident, a total amount of %27 were women and %73 were men. (Fig. 6)

Investigating the forms of the participants, it was clarified that the highest rate of visits to Khayyam Street in Qazvin was in order for these age groups: (26-35), (18-25) and (36-45). (Fig. 7)

After studying the participants clarifying their visual preferences about Southern Khayyam Street in Qazvin for townscape legibility it was specified that out of 200 participants of resident and non-resident, a total amount of %65 participants live in Khayyam district, %63 in city center, %46 in suburbs and %28 outside the city and they had come to visit the area. (Fig. 8)

Table 4.: Points survey of ranking each image Khayam Street, South Region

Raw	Images	A				B				C				D			
		A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
1	Local street	37	21	6	10	15	12	15	4	11	6	4	16	20	12	3	8
2	Intersection	35	18	7	2	14	22	9	5	12	15	10	6	10	8	7	20
3	Alley	50	9	14	19	2	7	31	10	12	20	3	7	33	31	6	11
4	Side walk	7	5	10	22	29	18	6	9	2	4	25	15	14	21	9	4
5	Bike Lanes	3	7	18	6	15	25	6	5	36	25	4	7	8	4	11	20
6	Pedestrian path	17	20	11	5	34	18	5	7	6	2	17	3	9	7	14	25
7	Place Comfort	13	21	6	8	4	3	25	15	6	4	11	19	31	18	5	11
8	Lighting	40	16	2	2	4	8	20	10	12	24	5	2	4	10	14	25
9	Architectural style	4	5	30	3	31	20	3	4	16	25	4	8	11	9	7	20
10	business development	9	13	6	23	18	22	14	3	4	6	21	10	27	17	3	4
11	street art	30	19	4	7	16	27	2	4	5	3	22	11	5	11	8	26
12	Urban parking	4	5	21	8	18	29	7	4	5	7	13	19	35	19	4	2
13	Temporary signs	13	38	5	8	2	6	23	12	34	37	2	5	7	7	11	19
14	Permanent signs	28	17	3	5	2	6	14	30	17	24	9	4	3	4	23	19
15	Garden furniture	5	6	21	8	4	7	9	15	41	23	2	7	16	26	7	3



1. Rank each image of a Local street.



8. Rank each image of Lighting.



2. Rank each image of an Intersection.



9. Rank each image of an Architectural style.



3. Rank each image of an Alley.



10. Rank each image of a business development.



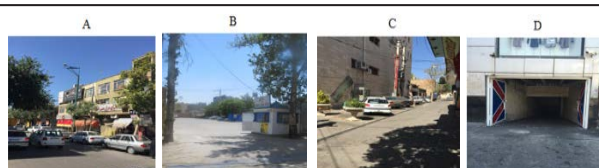
4. Rank each image of a Side walk.



11. Rank each image of a street art.



5. Rank each image of a Bike Lanes.



12. Rank each image of an urban parking.



6. Rank each image of a Pedestrian path.



13. Rank each image of a Temporary signs.



7. Rank each image of a Place Comfort.

14. Rank each image of a Permanent signs.



15. Rank each image of a Garden Furniture.



Fig. 6: Total rating of the survey based on citizens sex

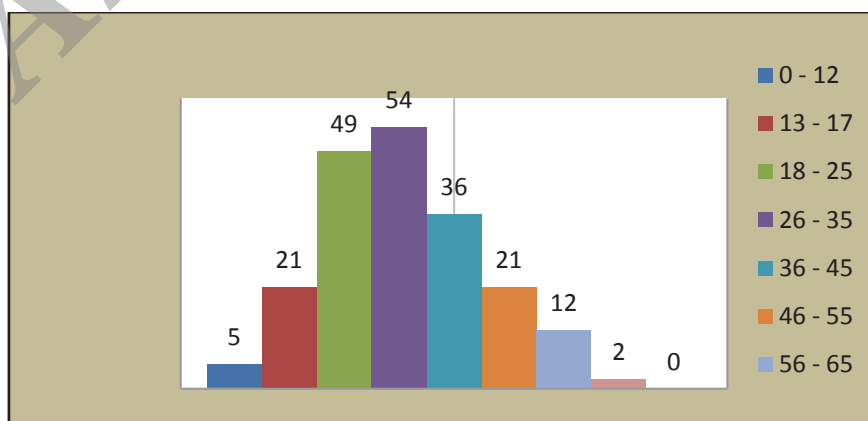


Fig. 7: Total rating of the survey based on citizens' age group

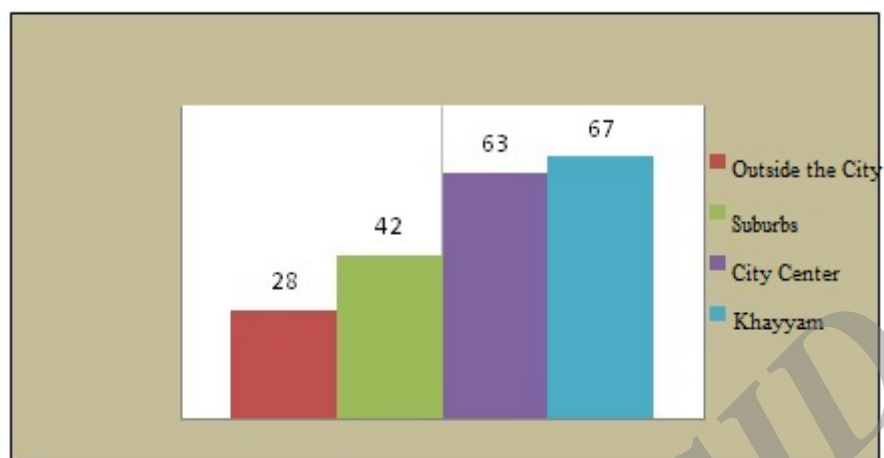


Fig. 8: Total rating of the survey based on citizens' living area

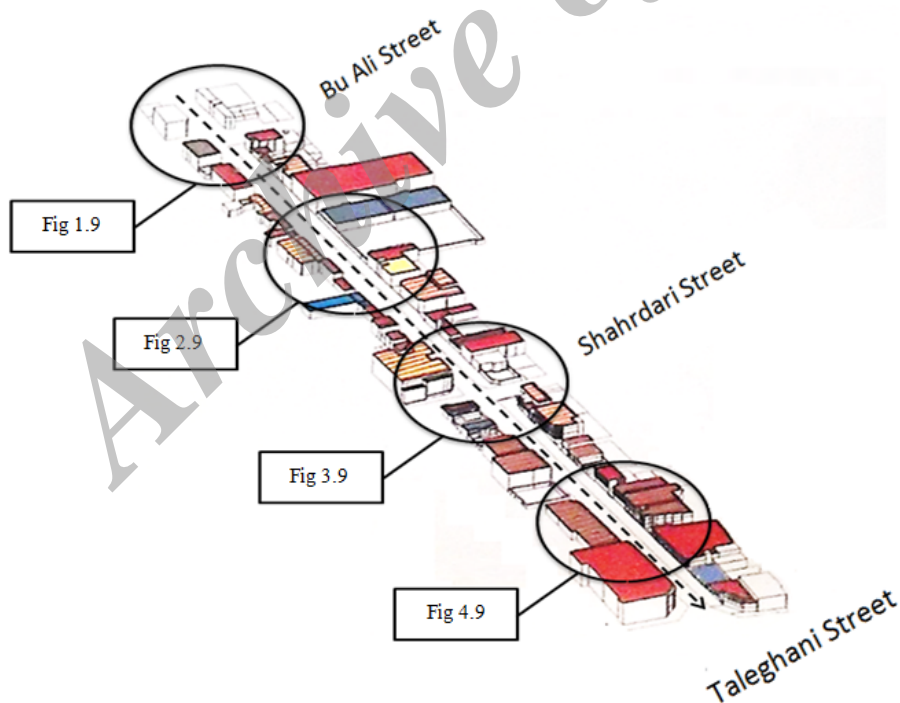


Fig. 9: Four sequences of the investigation

Fig. (1.9):



Fig. (2.9):



Fig. (3.9):



Fig. (4.9):



Fig 10. The final plan based on citizen participation (simulated image)

CONCLUSION

Nowadays the aim of visual preference evaluation of landscape is identifying and detecting indices and criteria through which the landscape can be protected, revived and reconstructed. This way, in fact, the landscapes that are aesthetically appropriate can be maintained and other landscapes can be repaired or revived, if necessary. The analysis of the relationships between visual preference and structural properties of the landscape is an effective method for conducting perceptual studies. Generally, the studies that are conducted based on the aesthetic criteria in landscape are not seeking to find its beauty or excellence, but are trying to extract the aesthetical preferences of the landscape users.

Investigating visual preference technique, it was clarified that visual preference techniques are different based on five basic variables of "scale, approach, objective, research instrument and evaluation method". The first variable is related to the visual analysis scale. For example, the scale of analysis in methods of analyzing visual organization of the city and method of analyzing its visual form is the whole city. View analysis in smaller scales of methods such as the visibility method, evaluation analysis of the visual effects, modeling visual quality is applicable in three aspects.

The approach used in visual analysis is another variable that has brought variety to this technique. In visibility method, for example, the physical approach is more taken into consideration. However, in modeling visual quality or visual effect, the focus is more on qualitative aspects of the visual effects. Another factor that leads to the differences between visual techniques is that the aim of evaluation in some cases of visual techniques is to investigate the current situation. However, in other cases, the objective is to investigate suggestions for future constructions or transformations. In fig. 9, four sequences of the investigation are indicated.

The Final Plan Based on Citizen Participation (Simulated Image)

The results indicate, Resident and non-resident citizens in comparison with other examined indicators; only users Participation level had significant relation with the place attachment degree and its emotional dimension that in addition, Different age groups reported more behavioral attachment to the place. (Fig.10)

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