Introducing Effective Factors on Urban Furniture Designing, Emphasizing on Color and Aesthetic Dimension (Bu-Ali Sina Street as a Case of Study)

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Abstract: *City is a public space where people every day are there and faced with different issues such as environmental, social and visual ones. Environmental graphic is one of the most effective tools for creating visual balance and simultaneously enhancing cultural aspects among citizens. Urban furniture is one of environmental graphic components which with different colors and materials cannot be separated from urban spaces. Humans are in touch with color of urban spaces. In addition to visual views and its esthetic aspect, the effects of color is very important in people' mental relaxation. So, it is essential to use principles of using color in urban spaces and about urban furniture. A beautiful city is the one that makes logical and desired relationship between logical system of the city and city physic which is related to people' culture and thinking. In today's cities, we witness that there are colorful components while their designing is accidental and without enough study regarding residents' cultural, and social backgrounds. This can lead to visual disturbances in current cities which has inappropriate effects on citizens' spiritual situations in cities. In this research, existing urban furniture in Bu-Ali street were recognized and their role in enhancing the quality of urban landscape was assessed. Also this street is considered mainly as one of the most active streets in Hamedan adjacent to historical context of the city. Finally, suggestions about visual beauty of the city were offered. Also qualitative methodology was used and data were analyzed by AMOS V.18 software. Used colors in panels and billboards have not been selected appropriately. Overall, it can be said that there have not been specific studies for selecting used colors and this has led to visual disturbance in this street.*

Keywords: *Urban Furniture, Color, Esthetic*

INTRODUCTION

Image of the city has its affection in human spiritual situation as well as economic, social and hygienic relationships and quality of life. Attending aesthetic issue and the concept of aesthetic is one the most important fields in urban studies (Behzadfar, 2009). Regarding this fact that for visual landscape, components such as regular visual data and development related information are needed, so one of the major aims in landscape development is attending to visual qualities (Feimer et al., 1981). Urban furniture is considered as one of the urban facilities which facilitates' efficiency in cities. For eliminating depression, we can use some colors which lead to comfortability being somehow nostalgic. Lack of appropriate urban furniture can cause disorder and inefficiency within urban operational systems (Ageshteh, 1991). Human mind is influenced by landscape and simultaneously has its effects on landscape, so urban landscape is an objective which is considered as a symbol for cultural and idealistic values physically (Habib, 2006). Color is one of the most important components of our environment and imagination of our world without color seems impossible; so, having a precise decision for

using colors in our cities seems to some extend necessary. Color as an emotional reaction can create comfortability in urban spaces. There are many urban furniture by different colors and kinds in Bu-Ali street in Hamedan city which have been selected as a case study, while there is no specific regulation for their designing and their colors and this has created undesired view. This somehow leads to enhancing the level of stress and tension among citizens. In this paper, we have tried to review the role of color in urban furniture aesthetic which is one the important components of urban landscape. The main concept in this research is aesthetic, so methodology can be specified as qualitative methodology. This paper tries to assess expressed hypotheses. Also the relationship between aesthetic and urban furniture regarding the role of color will be examined.

Theoretical Basics

Aesthetic is a Greece world which means emotional perception. In 18s, Boomgarten used this word for aesthetic. This word was used commonly from 19s by English people. In some philosophical debates the idiom of aesthetic was used as a broader concept in a holistic approach (Mehdi Zadeh, 2006). Aesthetic is one of the philosophical fields which is defined as a deliberation theory in aesthetic judgments (Rejinald, 2006). Bell divides aesthetic criteria into three categories; first is a factor which cause motivating emotions, imagination, enthusiasm and enjoyment. Second, composition is considered as one of the aesthetic creators both in nature and artistic works. Third is ambiguity which is one of the perception features in nature and artistic works while creates diversity in emotions as metaphor, symbol or ambiguity (Bell, 2003). Jeorg Santayana, divided aesthetic into emotional, formed and symbolic aesthetics which has been valid until now (Lang, 2009). Herbert defined esthetic in his book titled "Art Meaning" as: a kind of harmony related to visual movements in human emotional perceptions (Rid, 1992).

Facial Aesthetic

This kind of aesthetic which has been suggested by Geshtalt, is about shapes values and environment constructs. This attention to shape forms is a kind of luxury. The sense of enjoyment from perception of some patterns, proportions and shapes is considered as one the formic aesthetic issues (Lang, 2009).

Symbolic Aesthetic

The existence of meanings and concepts increases the life of a phenomenon. As these meanings influence into our minds more and more, the life duration of esthetic also increase and finally extends to deepest mental layers and turns into a symbol in our minds (Tahbaz, 2003).
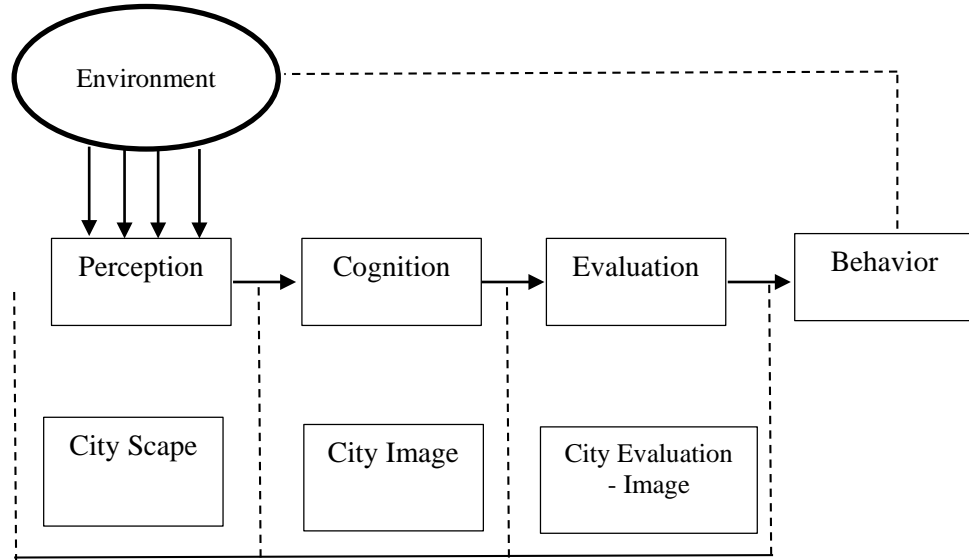
Urban Landscape

Urban landscape idiom was first developed by Gordon Colon in his book "Urban Landscape". He suggested to create visual enjoyment in an urban scale while this can be effective on residents and visitors' emotional senses (Kalen, 2003). So, urban landscape describes three dimensional urban physic in which there are volume, surface, line, dot and these components configuration in space (natural basis). On the other hand, landscape can be considered as a sender which sends different information to people in two categories of physical and humanistic paths. Physical paths mean all artificial components which include walls, floors, urban furniture and plants; this is while human behaviors are of the attached urban space components (Pakzad, 2006). Headman suggests that the role of squares, traffic flows, trees and urban furniture should not be ignored in street landscapes (Headman & Yazooski, 2002). Urban landscape is formed from the relationship between humans and cities and in this regard, human behaviors both have some effects on the urban environment and are influenced by that (Crow et al., 2006). Urban landscape has been formed considering three views:

1-   View by eyes which creates urban objective landscape
2-   View by mind eye which creates urban subjective landscape
3-   View by heart eye which creates subjective landscape-urban evaluation

None of these mentioned urban landscape layers can be studied lonely due to their internal relationships and this requires specific urban design studies in urban landscape domains (Golkar, 2008).

Visual attraction of urban landscape is one of the most important factors which increases the amount of perception and the level of enjoyment from the environment. All of these alleviate the level of stress and increase citizens' sense of vitality while leading to more presence in space.

Figure 1. Urban landscape system in the process of people and environment interaction
Source: Golkar, 2008
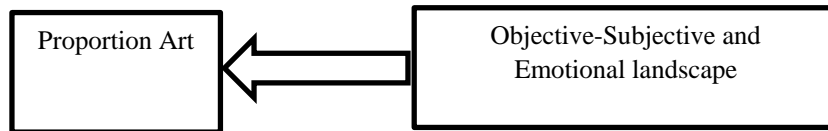
Figure 2. Merging different kinds of landscape (Golkar) and urban landscape (Colon)

Aesthetic in urban landscape

The concept of esthetic in urbanism science was for the first time used before the evolvement of urban design science which was before 19s in Europe especially in Paris and has been known as beautiful city movement (Maleki, 2013). Between 1983 and 1986, many scholars tried to assess many schools and different theories for finding a unique theory for evaluating visual quality of landscape. Firstly, they developed five models including ecological methods, formal aesthetic, physical mind, psychological, and phenomenology as a tool for organizing specific methods. Zeb, Daniel and Wining are of among the pioneer scholars (Zube et al., 1982; Daniel & Vining, 1983). The meaning of urban spaces, is not only the effect of urban physic and spaces esthetic. An environment is beautiful which has desired effects on humans, creates pleasant spatial experience and reinforces bilateral emotional relationships. Facilitating appropriate social relationships between individual and a group is of the esthetic values, so one of the major urban design and planning aims should be preservation and development of urban environment beauties (Pakzad, 2006). According to the suggested theories, aesthetic can be reviewed from physical and subjective points of view:

Physical aesthetic: decision making about environment structure and geometry is related to physical aesthetic. In physical aesthetic, some factors are related such as designing, volumes and shapes' compositions, order, disorder and proportions. In this approach, visual attractiveness is considered on the basis of accessible landscapes and changes which for its study some components are assessed such as form, material, designing order, and the number of constructive components (Karimi, 2010).

Subjective aesthetic: there are two views about subjective aesthetic in urban spaces: 1- Pleasant experience, without concepts and functional concept. 2- In subjective aesthetic knowledge, culture and determined patterns are important in addition to emotional factors (Karimi, 2007).
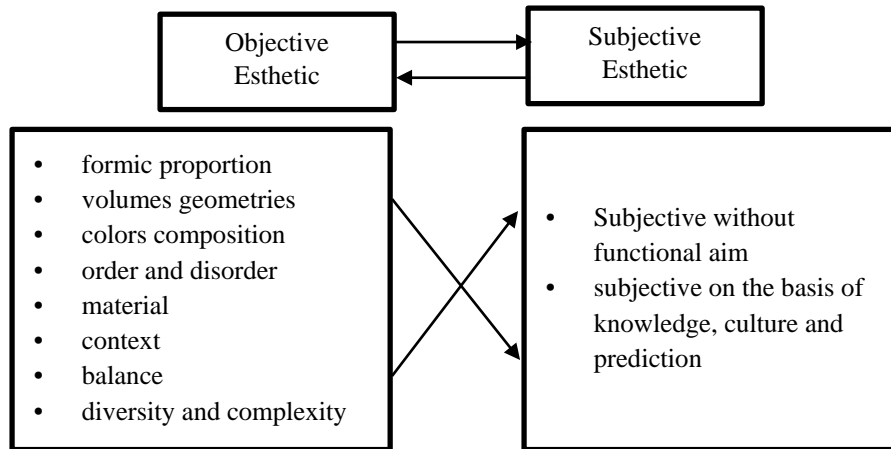
Chart 1. Types of urban landscape, Source: Karimi, 2010

Jack Nasar, specifies five features for lovely environments. According to him, unpleasant environments are contradictory to these features. In every case, those features which are important for visitors are as follow (Nasar, 1997):

1- Clearness and good preservation
2- Having historical originality
3- Having order
4- Having natural color
5- Open and defined spaces

Table 1. Aesthetic definition according to theorists

Aesthetic related to individual emotions and subjective background	Kaplan& Kaplan, 1991
Beauty on the basis of visual aspects such as balance, clarity, compatibility, proportion, and diversity	Green ,1992
Emphasizing on art and visual aspects such as plurality and diversity, human scale, naturalism and order in form and color	Gibberd, 1995; Halprin, 1996; Sitte, 1954
Measuring beauty on the basis of mathematical calculations	Schmidhuber, 1997
Beauty is a perceptual process about feelings and behaviors	Nohl, 2001
In Bell' conceptual categorizing, esthetic criteria are divided into three sections by structural components, spatial patterns and visual aim.	Bell, 2004
Variables such as visual richness, brightness, place history and spatial wideness, effective variables on place beauty and meaning	Galindo, 2005
Dependent esthetic on individual minds and visitor' individual characteristics	Solmon, & Holm, 2006
Esthetic which is related to visitor' characteristic, visiting location, socio-economic features, composition and landscape complexity	Chen et al., 2009

Kaplans have divided aesthetic criteria into three categories (Kaplan & Kaplan, 1989; Bell, 2004). First, diversity and complexity; second, configuration; and third, ambiguity (which is one of the perceptual features).

In Bell' perceptual categorizing, aesthetic criteria are divided into three categories of structural, spatial patterns and visual aim. Balance, is as equipoise in all landscape sections. If created visual forces disrupt environment configurations such as color, context, shape and dimensions, landscape balance also would be disrupted. Attractiveness is a feature that increases landscape beautifulness and visitors' expectations suddenly (Bell, 2004).

Urban Furniture

Urban furniture is defined as some tools such as objectives, means, symbols, buildings, spaces and all components which are existed on streets, cities and open spaces (Jennie et al., 2013). According to expressed definition, facilities which are attached to walls and urban spaces, should be considered as some parts of urban furniture. By this definition, many components would be considered as urban furniture such as bus stop facilities, street signs and trash bins. Also the role of urban furniture can be considered within servicing to citizens like religious concepts, social traditions, human needs, social happiness, urban landscape, innovation, color psychology, form and color (Salehi, 2000). Urban furniture components have two features: being functional and beautifulness while by having both of these they can provide citizens' visual and functional needs. However, this requires many aspects in designing urban furniture components other than color, compatibility with the environment, durability, safety and being economic; they should be located in an appropriate place in the city due to responding to citizens' needs. In designing urban spaces, there are many components that in case of being considered all together, they will represent common concepts. Urban furniture is defined as those components which are existed between buildings and spaces as complementary devices (Zangi-Abadi & Tabrizi, 2004).
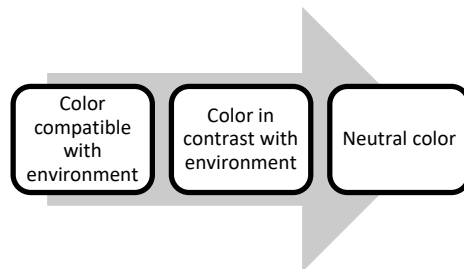
Color in Urban Furniture

Color is one of the most important features of each phenomenon which recognizing it can lead to better usage of that phenomenon. Color is created by reflection of light from surface of objectives and received by eyes and creates different feelings in people. Light colors are vital and create happiness in contrast dark colors can lead to depression in individuals (Saeeidnia, 2004). Humans show different reactions by confronting with different colors and perceive different means from colorful components. Hotness, coldness, perceptual weight of colors, closeness and farness, largeness and smallness are all of the features which can be changed with colors; for example, we understand hot colors closer and this make us to feel space narrower. We can also change space features by colors for example if we use orange color for opposite wall and blue color for side walls, the path appears shorter and its width seems wider (Groter, 2004).

Visual features of colors are affected by other adjacent colors, their amount, their shapes and their area. Each color has a relationship as a meaning with adjacent colors and they act as a symbol. Art in each country has its mysticism which is related to that country's culture and language like China. Black on red shows happiness, and black on yellow represents religious color. Experience shows that colors' consequences can be effective on their meanings. Holtzschue (2002), suggested that location of colors is one of the important designing aspects. In addition to this, we can use colors as a tool for creating visual errors (in dimension or from distance), and special views (harsh or smooth). For example, a grey square in orange color seems as blue color but that grey square in in blue color seems warmer and seems more orange- grey.
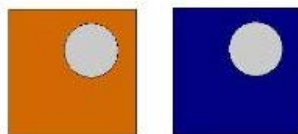
Figure 3. The concept of major color from Holtzschue, 2002.

Freiling and his colleagues showed about color psychology that color is our reaction to biological and psychological situations. Color also can be used for reminding space or esthetic point of view in designing. We know also that the spatial imagination of a color can lead to have interaction with that color while is also influenced by adjacent colors (Nemcsics, 1993). A sense which is created while we enter to a space depends on our expected function from that place. We act according to predicted aim in the environment and behave in specific way. Some parts of our knowledge is defined through space function and to some extend creating our sense by the environment (ibid.). Urban furniture color is considered as a part of city color and we should note to that. Also we should know furniture and paint it according to surrounding area. Meaning, composition, and color contrast are among the colors' main concepts. In the past, using colors was influenced by two factors of believers and customs. Materials were also used compatible with geographical location, climate conditions, aboriginal plants and other limitations in the area (Bahreini, 2003).

| Color compatible with environment | Color in contrast with environment | Neutral color |

Figure 4. Situations of color in urban furniture

Bu-Ali Sina Street as a Case of Study

This city has been situated in Hamedan between Imam and Bu-Ali squares. It can be said that this street is one of the most vital and busy streets in the city where commercial land-uses have mainly situated there. This is while, there mixed land-uses such as cultural land-use (Cinema), commercial (stores and passages), banks and doctors' building are all existed on this street. This is worth to notice that presence of pedestrians on this path is noticeable and this street is considered as a historic street. Also due to its therapeutic situation many, people from close cities come to there and different ages and genders are existed there.

Figure 5. Bu-Ali street between Imam and Bu-Ali

Analyzing research findings

Questionnaire includes two variables of objective and subjective. For assessing their effects on city beauty from citizens' point of view, questions were designed using Likert' scale. In one part of questionnaire, some pictures were asked for specifying beauty criteria. Subjective indexes include mental relaxation of color, conceptualism, meaningfulness, creativity, unity, balance, contrast, sense of place, originality, spirituality, visibility and objective indexes include material, order, proportions, designs, clarity and darkness, form, diversity, balance, color density, area of the surface were all been asked. As mentioned in theoretical consideration, research

conceptual model includes two main latent variables. In this regard, 15 questions were designed on the basis of mentioned items. Determination of at least required sample volume for distributing questionnaire and gathering related data using structural equation model is important. In spite of lack of agreement about standard volume for determining sample volume for factor analysis and structural equation models, many scholars agree that standard volume should be 200. Clain believes that exploratory factor analysis requires at least 10 to 20 samples for each variable, however, at least 200 cases are necessary overall (Hooman, 2005). For this purpose, 200 questionnaires were filled in completely by study community and we have used structural equation model method for determination of each of the effects as follow.

For confirmation of reliability and validity of the proposed model on the basis of theoretical framework and research background, we used goodness of fitness indexes. On the other word, acceptable scientific criteria form the main issue about goodness of fitness indexes for confirmation of proposed theoretical model. When fitness of goodness indexes increases, this shows that these indexes support proposed model more and the inverse is true of these indexes (Zhan Pir, 1994).

Table 2. Proposed indexes by some scholars

| Proposed Index								Scholar
R2	SRMR	PNFI	NNFI	NFI	CFI	RMSEA	X2	
			*	*	*		*	McDonald ,R.P.& Ho,R.M.2002
	*		*		*	*		Hu, L.T & bentler,P.M.1999
*	*				*	*	*	Kline,R.B.2005
*	*				*	*	*	Boomsma,A.2000
	*	*			*	*	*	Hooper et al ,2008

Hooman suggests below amounts for above indexes which have been used for designing this research model (Hooman, 2005). In this case, the amount of Chi-square with 85 degree of freedom is 134.077 which is insignificant statistically since its meaningful level is rather high (more than 0.05). So, we can conclude that the test of Chi-square about goodness of fitness confirms model through observed data. On the other hand, the proportion of Chi-sqaure to degree of freedom is 1.211. In addition, RSEM is 0.048 and confidence interval by 90% is between 0.028 and 0.071 because this amount's low limitation is less than 0.05. So, we can conclude that approximate degree of model in study community is not large. RMR also is 0.067 which is negligible that shows very low amount of model error and acceptable goodness of fitness.

Table 3. Model goodness of fitness

Indices	Acceptable Range	Calculated
Chi square (X2)	Smaller is better	134.077
Chi square / degree of freedom	Below 2.0	1.24
Root Mean Square Error of Approximation (RMSEA)	Below 0.05	0.031
Root mean residual (RMR)	Below 0.07	0.067
CFI	More than 0.9	0.84
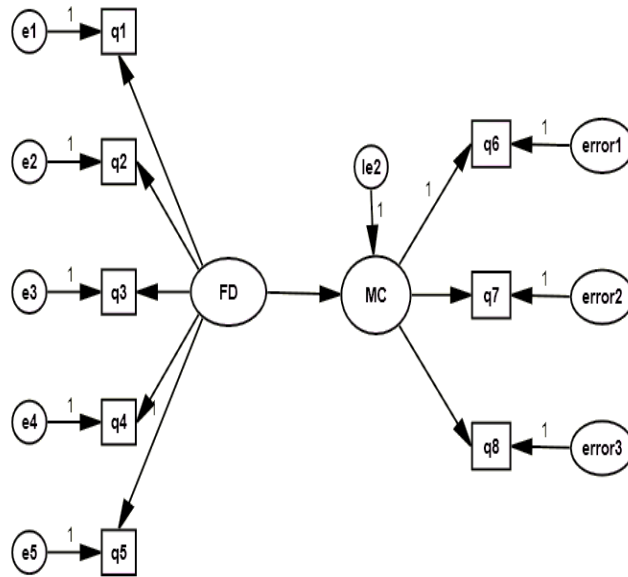
Figure 6. Theoretical model for relationship between urban furniture design (FD) and city beauty (MC) in AMOS software
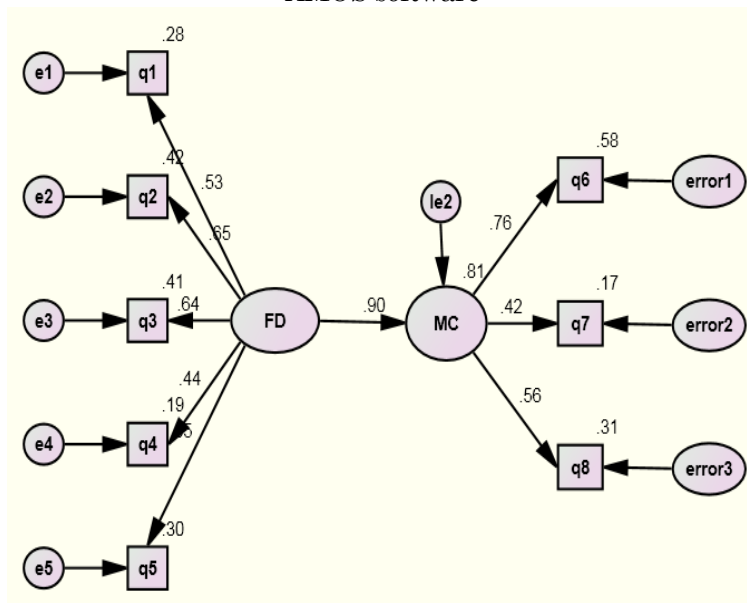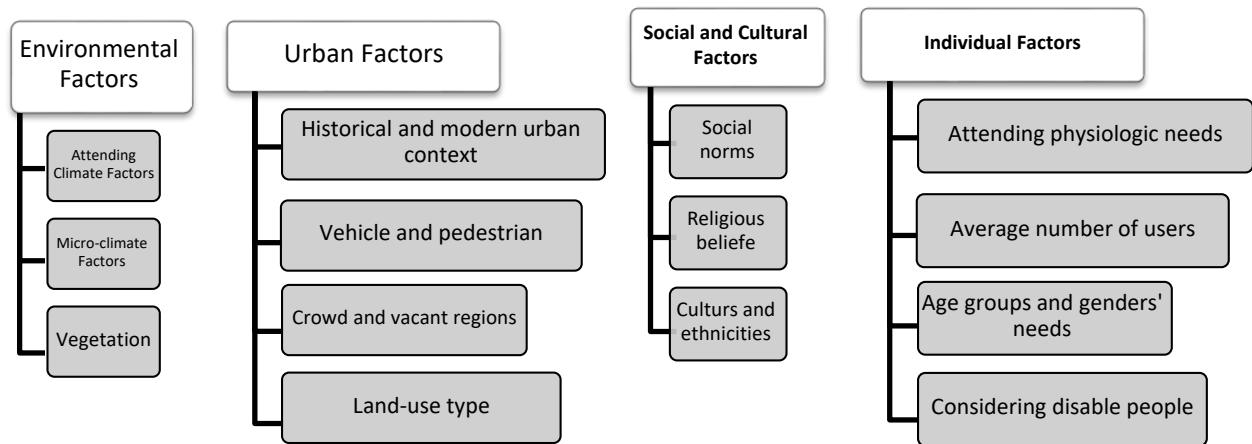

Figure 7. Theoretical mode for relationship between urban furniture design (FD) and city beauty (MC), tested in AMOS

Offering general principles

Urban furniture includes different types which are related to city identity and its image and show our culture. Among the urban furniture, are branches, seats, bus stations, trach bins, billboards, commercial announcement and urban symbols that each of these has its importance. Through appropriate design and considering their characteristics, we can respond to citizens' needs and their identity. On the basis of studies and analyses in Bu-Ali street, we can propose four categories regarding objective and subjective indexes as urban, environmental, individual and social-cultural factors. In designing urban furniture according to aesthetic principles and the role of color in creating proportions and avoiding inappropriate landscape, below factors are suggested:

Environmental Factors	Urban Factors	Social and Cultural Factors	Individual Factors
Attending Climate Factors	Historical and modern urban context	Social norms	Attending physiologic needs
Micro-climate Factors	Vehicle and pedestrian	Religious beliefe	Average number of users
Vegetation	Crowd and vacant regions	Cultures and ethnicities	Age groups and genders' needs
	Land-use type		Considering disable people

Figure 8. Final model for effective objective and subjective indexes for assessing urban landscape esthetic emphasizing on urban furniture color in Bu-Ali street

Conclusion

Reviewing theoretical showed that city beauty is not achievable through visual factors but considering contextual, spiritual and residents' visual needs is required which are all influenced by social and cultural circumstances. Color has its capacity for having influence on the environment and hence motives residents positively and adds definition and beauty to the space. It also can bring the life to the urban environment and can build it as an abounded space. Designing urban furniture should provide both physical and mental comfort while this requires users' cultural, economic, religious and social backgrounds. Considering the location of urban furniture and their users requires desired studies especially about their demographic characteristics for example their different ages, ethnicities, cultures and religious beliefs. Designing urban furniture without paying enough attention to the designing context and without consideration towards the historical value of the place, may lead to visual disturbance or can decrease the efficiency of the space. Overall, this may lead to decreasing the level of vitality in urban spaces. According to studies in Bu-Ali street as mentioned above, this street includes valuable context history and considering this feature is essential and this is while that none of existing urban furniture have been painted regarding this street's characteristic. In addition, we deal with semi-closed modern spaces so, urban furniture designing in new and modern urban context will lead to users' dissatisfaction in this context. Also, regarding presence of different ethnicities and genders in this street, lack of enough study about users and citizens' needs in this context and region with different cultures, beliefs and special communities will lead to visual disturbance in this area. Considering region climate needs while the climate of Hamedan is mountainous along with heavy rains and snows, as well as using cold colors in many spaces all have intensified cold colors. Choosing colors and existing urban factors such as crowd, scale and the way of using vehicle and pedestrian on this street where the number of pedestrians is high is not appropriate. Also attending to details and designing in human scale for users who touch the space closely has not been considered. The story for those who see the landscape from their cars from far distances is the same. Studying environmental structure of the region is also essential. On this street, old trees appear and this requires compatible furniture painting while in existing situation, it has not been applied. It should also be mentioned that vendors usually sell their goods on Bu-Ali street at night so citizens come to this street at night too. For this reason, prediction of desired colors for night should be important. We should have specific design for colors for such hours.

Time Factor	Visual Considerations
•Different hours •Different seasons •Appropriate materals •Stability and durability •Environmentaly friendly •Repaire and preservation	•Visual Proportions •Attention to colors composition •Composition •Light as color complementory •Attention to details •colorful surface area

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