Responsive Environment in Line with the Enhancement in the Sense of Belonging to Place with a View toward Promoting Creativity

Zahra Mahdinejad Goudarzi¹, Jamalodin Mahdinejad Darzi²

1- M.A of Architecture, Azad University, Branch of Ayatollah Amoli, Tehran, Iran.
2- Faculty Member of Architecture and Urban Planning Department, Shahid Rajaee Teacher Training University, Tehran, Iran.

Abstract

Physical environment makes the basis for behavioral patterns as well as personal experiences to form. Affordance leads behavioral choices to be either narrowed or widened. Based on their behavioral needs which reflect their beliefs and insight, individuals manipulate the environment to which they finally adopt. Adapting with the environment gives rise to social interactions and senses of security and belonging, while prescribed elements within the environment, such as the nature, prepare a basis for individuals’ creativity to promote. As a concept which can be perceived from the environment, in an aware or unaware form, by the individuals’ mental cognition, the sense of belonging to place can put one in an internal connection with itself. This sense can act as a cause to transform an environment or space into a place with special sensual and behavioral features for the person, and promote the sense of belonging and creativity. Accordingly, the present research is aimed at investigating the associations among responsive environment, enhancement in the sense of belonging to place, and further, promoting the creativity. Data was collected from questionnaires distributed among 160 architectural engineers, randomly sampled from members of Engineers Association of Babol, during different hours of the day. The results indicate a significance level of less than 0.05. Considering the positive sign of the obtained Pearson’s coefficient of correlation, there is a positive significance association between the environmental affordance, the sense of belonging, and individuals’ creativity.

Keywords: physical environment, sense of belonging, creativity, natural elements.
1. Introduction

Physical environment and behavioral patterns are as closely interwoven as it is extremely difficult to have the separated, so that one may not perceive a behavior independent of its internal associations with the environment. This is the most principle point within the approaches followed by Barker (1968) and Wilems (1974) (Altman, 1992). Physical affordances make the basis for the environmental perception to from, and the sensual and behavioral reactions to emerge, and the mental schema to compose. Perception is a part of life process, by which individuals imagine, from a certain theoretical perspective, a universe within which they meet their needs (Ittelson, 1960). Perception refers to the process through which we obtain information from the surrounding environment; it is the point at which cognition and reality intercept. General perception theories emphasize on the reception of sensual experiences and senses, as related systems (Lang, 1938). The mental schema exists in the perceiver’s entity who experience its quality; it is, in to some extent, specific to what is perceived. Mental schema makes the information acceptable, and changes under the influence of the obtained information. Making the information available while being modified or adjusted by the obtained information, movement and heuristic activities dictate orientation of mental schema (Ulrich Neisser, 1977).

Figure 1. Poazza dei camp Square, Siena.

The place is an indication of the role and the presence of the architecture, an emanation of the human objectivity recognizing his/her identity as dependent on his/her belonging to places (Norberg-Schultz, 1980). As a concept which can be perceived from the environment by the individuals’ mental cognition, the sense of belonging to a place can put one in an internal connection with itself. Characteristics of the sense of place can be also expressed into other places or events, as a representation of the time and place, considering non-special elements and values (Lynch, 1981), or the sensual position at which the place can be easily perceived and recognized. Being composed of physical and social components, the sense of place leads the person to make links with the place of which he/she will see himself/herself as a part, and for which he/she defines a role within his/her mind, based on his/her experiences of indications, meanings, and functionalities (Najafi and Mina, 2011). This research begins with an analysis of physical affordances as well as the components of the sense of belonging; it then considers the associations among physical affordances, enhancement in the sense of belonging and creativity of the individuals with respect to a place.
2. Sense of belonging and creativity

Place is a totality composed of objects, recognized physical elements, and what is, in fact, referred to as the entity and spirit of the place. The place structure contains perspective, settlement, space, and personality (Norberg-Schultz, 1980). The emphasis on the “sense of place” and “sense of place value” is seen to be common in the literatures on many contexts, from geography to environmental morality, from human ecology to sociology, from phenomenology to urban planning, from cognitive anthropology to psychology, and from environmental policy to environmental economics (Cantrill and Senecah, 2001). Place consists of three related parts: physical structure, individual, internal and social processes, place features and activities performed therein (Relph, 1976).
When being experienced by individuals, a place’s physical forms, activities, and meanings are mixed to form the sense of belonging and personality (Montgomery, 1998). Research on the sense of place is focused on three branches of place characteristic, place dependency, and place identity (Jorgensen & Stedman, 2006). The concept of attachment to place is located within the environmental meanings. It has its meaning related to the perception and, from a mental aspect, environmental experience, within which territory the attachment to place is seen to be a form of the link between a person and place characteristic (Moore and Graefe, 1994). Gustafson (2001) described, as a model, the three-pole of the person, others, and environment, to build the theoretical framework for forming the meaning.

Figure 5. Conceptual model of the place and its components. Source: Gustafson, 2001.

Relph believes that a place is said to be beyond the time when it possesses three characteristics in terms of physical extent, activity, and meaning, among which he refers to the meaning as the main component (Relph, 1976; Tuan, 1974). Expressing the relation between the perception and the experience gained from the place, he believes that, with regards to the sense of place, individuals not perceive concepts beyond physical characteristics and physical elements found within a place; they sense some kind of attachment and continuous link to the place spirit (R. Cuthbert, 2006). Expanding this issue, he addresses the principal and integrated association of the concept of sense of place with human aspects; he postulates that amalgamation of a place with deep meanings and concepts is what upgrade it from a space into a place, with this upgrade expanding and deepening throughout the time. In other words, a place is a result of a set of meanings formed throughout the time as a result of meaning formation necessities arisen from human interactions and perceptions; it is an issue referring to a dimension of the sense of place mainly implicating to the unaware dimension of individuals – referred to as the sense of attachment or the sense of belonging. Highlighting the place identity as the basis and an
important factor contributing to human communication. Harold Proshansky, who recognized the individual identity as derived from the place identity which is sourced from the perception, cognition, and finally, the sense of place, puts an emphasize on the role of physical factors as part of social elements within the environment, and based on this emphasize, he attributes the important factor of person’s close interactions and communications, with his/her surrounding environment, to the physical elements of the environment as part of person’s individual and subjective identity (Proshansky, 1983).

In his research on different levels of sense of place, attachment to place, and commitment to place, Shamai classifies this sense into seven levels: 1) indifference to place, 2) awareness of locating within a place, 3) belonging to place, 4) attachment to place, 5) unification with the place attitudes, 6) presence in the place, and 5) dedication to place (1991). The first two levels are mainly perceptual and cognitive levels of one regarding the environment, while the other levels involve the person’s sense toward the place. Relfph also addresses the deepest level of attachment to place as being unconscious; he expresses that unconsciousness of the sense belonging presents itself when a separation or absence of place is happened to be experienced by the person. The sense of belonging changes within a wide range, from placelessness to attachment to and even intense psychological identification of place (1976).

Human needs can be arranged into a hierarchy of 5 classes including the needs to physiological demands, safety, love and belongingness, self-esteem, self-actualization, and creativity. The need to belonging is among the basic needs. Self-actualized persons differ from others, in terms of their basic motivation. As their needs are fully met, they act at a higher level than that at which one solely tries to accomplish the specific objective of supplying his/her shortages. Among other characteristics of these kind of persons, one may points at acceptance of self, others and nature, social interest, strong inter-individual relations, creativity, and innovation (Maslow, 1943).

Creativity is the process of sensing the problems, splitting the issues into the information and lost elements, developing hypotheses to resolve imperfections, evaluation and testing of these hypotheses, revising the hypotheses considering the test results, retest of the revised hypotheses, and finally, publishing the results (Torrance, 1992). Creativity enhancement factors include skill, flexible and imaginative thinking ability, and individual and environmental motivation. A creative person’s skills may be upgraded via creativity fostering techniques. Flexible and imaginative thinking ability depends on the individual’s personal
and inherent traits (Amabile, 1998). Environmental motivation incorporates all externalities actuating a living creature’s behaviors. The surrounding environment refers to such environments as geographical, physical, social, and cultural environments. Each and every physical factor within the environment (such as lighting, perspective, acoustics, and noise pollution) may have positive or negative contributions into the creativity. Color, texture, highlights, light, acoustics, form, and the way they are combined, space uses, and their evolution throughout the time, and in general, all aspects of the built space can have contributions into the physical, cognitive, and mental aspects of the human, and develop required motivation for creative thinking (Christiansen, 2004). Some of environmental factors working toward reinforcing the creativity are discussed in the following.

2.1. Environment’s natural factors
Developing natural environment perspective incorporating such elements as trees, vegetation, and water, promotes the creativity. Existence of plants in a space wherein creative activities are undertaken can largely contribute to creativity promotion process (McConyad, 2002).

2.2. Materials
The use of natural products and materials while reducing the use of manufactured materials along with mixed surfaces may contribute to creativity promotion (McCoy and Evans, 2002).

2.3. Color
Use of light colors
It will help promoting the creativity to use a set of colors arranged to establish a light space (Edwards, 1995). Delightful, colorful interesting pictures are also recognized, by many researchers, as the basic or the main motivation for a lot of creativities (Torrance, 1993).

2.4. Spaces’ form and extent
Spaces’ form and extent may provide a basis for individuals to gather making groups to perform social interactions (Horneker, 2005). Designing the space (in terms of form, size, and function) in such a way to promote communications may positively affect the quality of the interactions finally contributing to creativity promotion.

5.2. Accessories
Investigations indicate that complications incorporated into visual details may help giving rise to creativity (McCoy and Evans, 2002). Most of researches have proved those persons who suffer from a monotone environment to fail to implement their cognitive abilities.

3. Research methodology

3.1. Participants
Being members of Engineers Association of Babol, 273 architectural engineers comprised the population under study. Based on the Cochran method, sample size was calculated. Finally, 160 questionnaires were randomly distributed within the considered area, during various hours of the day. The completed questionnaires were then evaluated.
3.2. Questionnaires reliability assessment

Cronbach’s Alpha method is used to assess the test reliability in this research. This method is used to calculate internal consistency of the measurement mean which measures various characteristics. An alpha value of higher than 0.7 indicates good reliability while the measurements are undesirable when alpha is less than 0.6 (Cronbach, 1951). SPSS statistical software was utilized to compute confidence coefficient via Cronbach’s alpha approach; the results are reported in the following table.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Cronbach’s alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical environment affordance</td>
<td>0.815</td>
</tr>
<tr>
<td>Sense of belonging</td>
<td>0.718</td>
</tr>
<tr>
<td>Creativity promotion</td>
<td>0.819</td>
</tr>
</tbody>
</table>

As the value of Cronbach’s alpha is higher than 0.7 for all variables of the questionnaire, the questionnaire can be said to enjoy good reliability.

3.3. Investigation of variable distribution

Kolmogorov–Smirnov test is method to determine the normality of distribution of a set of collected observations. This test addresses data normality.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Number of data points</th>
<th>Test statistics</th>
<th>Significance level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical environment affordance</td>
<td>160</td>
<td>1.123</td>
<td>0.161</td>
</tr>
<tr>
<td>Sense of belonging</td>
<td>160</td>
<td>0.908</td>
<td>0.182</td>
</tr>
<tr>
<td>Creativity promotion</td>
<td>160</td>
<td>0.635</td>
<td>0.415</td>
</tr>
</tbody>
</table>

As the significance level is higher than 0.05 for all variables, the hypothesis of normality is accepted for the research variables, so that parametric approaches are allowed to be followed for the sake of testing the hypotheses.

4.3. Hypotheses investigation and result presentation

Two hypotheses are addressed in this research.

Hypothesis 1: Environment Affordance is related to the individuals’ sense of belonging to the place.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Sense of belonging</th>
<th>Existence of relation</th>
<th>Relation type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment affordance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Correlation coefficient</td>
<td>0.559</td>
<td>&lt; 0.001</td>
<td>True</td>
</tr>
<tr>
<td>Significance</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 3. Pearson correlation test statistics.
According to the above analysis, since the significance level is below 0.05 and considering the positive sign of the obtained Pearson correlation coefficient, there is a positive significance association between the environment affordance and the sense of belonging.

Diagram 1. Distribution of contributions of environment affordance into the sense of belonging.

Hypothesis 2: Environment Affordance is significantly related to the art student’s creativity promotion.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Creativity promotion</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pearson test</td>
</tr>
<tr>
<td>Environment affordance</td>
<td>Correlation coefficient</td>
</tr>
<tr>
<td></td>
<td>0.737</td>
</tr>
</tbody>
</table>

According to the above analysis, since the significance level is below 0.05 and considering the positive sign of the obtained Pearson correlation coefficient, there is a positive significance association between the environment affordance and the creativity promotion.
Diagram 2. Distribution of contributions of environment affordance into creativity promotion.

Main Hypothesis: *Environment Affordance is significantly related to sense of belonging and creativity promotion.*

Now, considering the relations confirmed to exist between dependent variables of creativity promotion and sense of belonging to place, the contributions of these variables into the main variable, i.e. environment affordance, is addressed using simple regression approach. The test results are reported in Table 4.

<table>
<thead>
<tr>
<th>Correlation coefficient (R)</th>
<th>Coefficient of determination (R²)</th>
<th>F-statistics</th>
<th>Significance level</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.820</td>
<td>0.784</td>
<td>145.321</td>
<td>0.0001</td>
</tr>
</tbody>
</table>

According to the results, since the significance level is below 0.05, the model is considered significant. The model’s coefficient of determination is 0.784. Table 5 is used to determine the significance of the independent variable in the model.

<table>
<thead>
<tr>
<th>Coefficients</th>
<th>Regression assessment coefficient</th>
<th>Standard error</th>
<th>Test statistics</th>
<th>Significance level (P-value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant coefficient</td>
<td>1.238</td>
<td>0.323</td>
<td>3.836</td>
<td>0.007</td>
</tr>
</tbody>
</table>
According to Table 5, the regression model relating the independent variable to the dependent one can be expressed as follows:

\[
\text{Dependent variable} = \text{Constant coefficient} + \text{Beta coefficient} \times \text{dependent variable}.
\]

\[
\text{Sense of belonging} = 1.238 + 0.633 (\text{Environment affordance}).
\]

Diagram 3. Distribution of contributions of environment affordance into sense of belonging and creativity.

Based on the results obtained from Table 5 and Diagram 3, the significance level of the model is observed to be below 0.05 proving the model effectiveness.

5.3. Investigation of contribution of environment affordance into sense of belonging and creativity

Every variable with P-value (as reported in Table 5) of less than 5% is confirmed to be effective on the dependent variable. For the target audience variable, the value of beta coefficient is found to be 0.014 confirming the hypothesis. Effectiveness of the target audience variable (environment affordance) on the sense of belonging and creativity indicates target audience to be a good predictor of variations in the sense of belonging and creativity. Effectiveness of environment affordance is confirmed based on test statistics, measured against creativity promotion and sense of belonging to place variables, proved to be significant.
4. Conclusion
The sense of belonging is referred to as one of the important indicators and factors when evaluating human – environment relation to develop high quality human environments. Consistent with the model of meaning formation within the environment (overall result of interactions among the individual, others, and environment), the sense of belonging to place is, in one hand, dependent on the individual attributes and characteristics including individuals’ motivations, qualifications, and cognitions about the place, while on the other hand, it has its roots in individual’s social interactions and communication with others in the environment, which is derived by the human need to belonging, as one of the primary human needs. According to the analysis of the above presented data and investigation of the resultant findings, one can suggest a direct relation between the physical environment affordances and the sense of belonging to that; one may also suggest environment elements to be contributing into the individuals’ creativity promotion. So that one may prepare the basis, for sense of belonging and creativity promotion, by predicting effective environmental elements on them. The following table presents a classification of contributing factors into sense of belonging and creativity promotion within the environment.

Table 6. Environmental perceptual elements contributing into sense of belonging and creativity promotion. Source: author.

<table>
<thead>
<tr>
<th>Contributing</th>
<th>Sense of belonging</th>
<th>Creativity</th>
</tr>
</thead>
</table>

Diagram 4. Matrix distribution of contributions of sense of belonging and creativity into each other.
<table>
<thead>
<tr>
<th>perceptual factors</th>
<th>Communal paces</th>
<th>Spatial relations</th>
<th>Environment legibility</th>
<th>Natural factors</th>
<th>Materials</th>
<th>Color</th>
<th>Space form</th>
</tr>
</thead>
</table>
|                   | • Circular arrangement of furniture  
• Declaration of communal spaces by lighting  
• Architectural public open spaces | • Circular arrangement of furniture  
• Multi-functional-social spaces in the form of open, semi-open, or closed spaces  
• Compositional and omnifarious furniture | • Openings (connecting interior space with the exterior one)  
• Stairs, functioning as a meeting place  
• Pause points at interception of paths | • Giving strength to signs  
• Main modes of arranging, organizing and classifying of spaces providing access to each other  
• Defend lighting for each place  
• Establishing a range of semi-private and semi-public spaces in-between the private and public arenas  
• Reinforcement of entries and main nodes  
• Spatial hierarchy  
• Making physical distinctions between similar uses | • Environment lighting  
• Vegetation (trees, flowers, etc.)  
• Waterfront | • Environment lighting  
• Vegetation (trees, flowers, etc.)  
• Waterfront | • Light colors  
• Delightful and interesting pictures |
|                   | • Circular arrangement of furniture  
• Multi-functional-social spaces in the form of open, semi-open, or closed spaces  
• Compositional and omnifarious furniture | • Openings (connecting interior space with the exterior one)  
• Separation of private space from public space | • Giving strength to signs  
• Defend lighting for each place  
• Attention to quality-based development of en mass among different spaces | • Environment lighting  
• Vegetation (trees, flowers, etc.)  
• Waterfront | • Natural materials  
• Physical symbols and signs | • Light colors  
• Delightful and interesting pictures | • Paradox (order and disorder, full and empty, light and heavy, new and old)  
• Ambiguity |
• Slope adjustment based on the human capabilities
• Incorporation of comfortable ramps and stairs into the space
• Easy access to personal and communal facilities

Stress
Form deformability and deconstruction
Sensible and insensible metaphors

Accessories
• Identity and cultural symbols (opening, crest, ceiling, wall, etc.)

Visual details complexities
Developing a dynamic and non-monotone environment

Based on the investigations performed, the geometry of the architectural elements of the space, climate- and socio-identity symbols-suited design, responsiveness to the human needs like what is involved in proper ramp and stair design, the way the place’s furniture are arranged, environment lighting in various spaces (open, semi-open, and closed), openings’ dimensions and the way interior environment connects to exterior space (semi-private and semi-public spaces, public and private inter-arena), strengthening the signs, nodes, and place’s entry, and vegetation coverage (trees, flowers, and waterfronts) strongly contribute to the individuals’ presence in the place and promotion of their sense of belonging. Since the environment may make the basis for the individuals’ creativity to grow, it should prepare the conditions with its own specific features. Spaces’ form (paradox, ambiguity, stress, etc.), circular arrangement of furniture within the spaces, so that individuals can communicate the information on their achievements, omnifariousness of the furniture in terms of facial figure, the manner by which closed space are connected to open space, borders’ delineation, each places’ (either open or closed) lighting, existence of vegetation coverage and waterfront within the place which realizes delightful and interesting scenes and makes visual details more complex, materials, symbols and signs incorporated into the place, environment’s dominant colors which are mainly light colors, and in general, a dynamic non-monotonic environment can provide the basis for individuals’ creativity to promote.

Investigating the facts presented on the above table, one can conclude that perceptual factors of physical environment strongly contribute to the individuals’ sense of belonging and their creativity promotion, so that undertaking required practices in the course of design, one can significantly help improving the environment’s function.
References