

Analysis of the Position of Architectural Spatial Elements in Children's Mental Image

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ABSTRACT: Environmental psychology is one of the subjects that has currently attracted the attention of many people involved in education. Paying attention in school, work, and generally life environments in addition to other elements, can play a significant role in attracting individuals and improving their lifestyle, education and work. Hence, tending to spatial elements in educational environments, especially in primary school, can provide a suitable setting for attracting students, increasing their level of interest in learning, creating mental and physical peace, and correct education of members of the society. This study was performed to separate legible and illegible spaces in the minds of primary school students. The drawings of the educational environment by the students showed legible concepts and images with regards to the intended factors.

The results show that the position of spatial elements in mental imaging of boy and girl students with regards to individual, social, and other aspects are different. Some, such as the activity playground are more important for boys, and green space and a colorful setting is important for girls and attracting them to school. In other factors, such as social factors, the two groups are similar. Hence, the use of adequate lines, vibrant and varying colors, decorating the environment, and granting importance to the basic needs of both groups (considering their age and sex) seems necessary.

Keywords: Spatial elements, Place, Images, Children's minds

INTRODUCTION

A locale is a place where we have a complete understanding of our existence (Davoodi, ND:12). A location becomes a locale when a person comes in contact with other layers of his being. These layers can be in connection with nature (through common activities with fellow humans), or become clear in the corner of the forbidden space. Thus, a person becomes acquainted with other layers of his existence, which also occur in the outer world, and his cognition of his surroundings and himself increases. A person has different images from different locales. His feelings can affect his perceptions of the surroundings and the formation of mental images of the locale. These mental images give the local a personality. Locales are the environment surrounding humans. When we speak of the relation between a person and the environment, we are talking about environmental perception that relates first to cognition of the environment and then to perceive it by human beings (Habibi, 2008).

Observation of the environment is creating a mental image based on experiences and observations of the past. If information is not well organized, using it for recognition of

the environment and creating a correct and complete image of it will be difficult. Illegible spaces are spaces that do not create a specific image in the mind. This ambiguity creates various problems and difficulties on different levels: From feeling insecurity in that space, to lack of personality. How can we refine (make legible) existing spaces? How can we design spaces that stay permanently in the minds of its users? The answer to these questions lies in the meaning of mental images and their creation. This article, which is written in two parts, attempts to clarify the meaning of space and locale, and explain how they affect the formation of mental images in children.

Problem Statement

Education officials are seeking procedures for increasing students' educational performance in schools. These procedures include offering a variety of choices and educational programs, different educational methods, new school books, more experienced teachers, extra after-school classes, and even longer school year. It is clear that the teacher, the school books, students, the teaching methods, educational management, and the family, are elements that affect the learning process and improving the educational trend. However, the educational space that the students are in is also an important element

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that should not be ignored. In this regards, the elements that give life to the skeletal space of the educational setting, are the spatial elements placed in that setting. Spatial elements and their arrangement, make the educational setting leave being dull and impenetrable, and are considered the setting's eloquent voice.

These elements should be used as tools for connecting the students to the setting in order to improve the quality of education. Each individual spends 10 to 12 years of his life, from primary school through graduating from high school, in schools. Therefore, the educational setting should express the beauties to which the student is exposed. When the student enters the school for the first time, the school environment and the set of elements it contains influence his mental image that lead him to being interested or not interested in being present in that locale again. Hence, school is not just limited to the classroom, but a series of skeletal homogeneous elements and the surrounding environment form the basis for a school which is committed to the continuous improvement of the educational process, while paying attention to all effective elements, including mental imaging of students. Considering all these issues and the objectives of educational centers regarding the education of students, in other words development of creativity and improvement of their thought process, we can pose this question: What message does the use of adequate spatial elements in schools carry for students? What effect does it have on their educational and behavioral efficiency and their mental imaging?

This study is a content-focused analysis study. The basis for our study are the drawings and a series of illustrations obtained from the children. Through these we can assess their effect on children's mental picture. In this analysis, the units under examination are the powers to see, separate, and distinguish, the spatial elements in the school yard.

MATERIALS AND METHODS

Importance and Necessity of the Study

Considering the objectives of education in the past two decades, reverence and protection of human values regarding education, respect, and congeniality as factors affecting students' education, especially children's; and the correction of some factors in the act of learning and developing talents and improving students' mental image of the school seems necessary. Some of these factors are: teaching method, method of conducting the classroom, type of teachers' and students' clothing, school architecture – which includes classroom design, the design of the teachers' and the principal's room, schoolyard, playing area, buildings, lighting, sound, and...

Considering the increasing growth of environmental psychology in the present age, and its effect on individual souls and minds, and creating motives for performing or not performing an activity, the importance of students' mental imagery, in the process of learning and developing talents,

cannot be disregarded. Hence, analyzing the effectiveness of spatial elements in educational centers seems necessary.

Research question

In the beginning of this research, some questions were formed, this study is after finding adequate answers to them. These questions are as follows:

How do spatial elements and their arrangement in educational settings create a position in the formation of students' mental pictures?

What is the relationship between the differences in mental images of spatial elements and the sex of children?

Research Hypothesis

After posing the research questions, a hypothesis, based on these questions, were formed:

It seems that the mental picture of boys and girls of spatial elements is different. The effect of functional elements is great for boys, and for girls aesthetic elements have greater effect. Noting this in schools that use these elements correctly has a significant position.

Research Objectives

Creating an optimal space for improving education in order to ease and expedite learning and developing talents through impressibility by environmental psychology. This will happen only if a calculated engagement occurs between the educational system, the student, and the educational setting. The design and architecture of schools in the world today are found to be effected on education and, next to other factors, its attractiveness and influence is completely sensed. This study can help those in charge of school design and architecture to aid, educational officials in creating motivation and a better image of the educational setting, and as a result learning, using the influence of spatial elements on students. This causes students to form a deeper mental connection with their surroundings and the educational setting. Therefore, this research, which is conducted for scientific analysis of the effects of spatial elements and their usage, considering native symbols of design and architecture, for creating a better mental picture and improving the learning process and the flourishing of talents, is necessary.

History of this Research

The founder of the idea of self-image or the mental - picture was a plastic surgeon named Dr. Maxwell Maltz. Self-image or self-picture is a unique and private idea and image of personality, abilities, values, and other attributes related to the self. In fact points to the degree of acceptability and value of the individual according to himself. It is the ideation that individuals have about themselves, and accept themselves with that ideation. The first studies on children's drawings were performed by psychologists early in the twentieth century.

Prior to that, researcher's attention was focused on the works of children and youth that tried to imitate grown-ups. The most important factor in focusing on children's drawings is the advancement of the science of psychoanalysis, which has offered adequate information for the analysis of children's drawings, and has identified drawings as a method for knowing the child (Mohammadi, 1990, 11)

Through children's drawings, psychoanalysts find out children's problems (sensorimotor, emotional, cognitive...) and the reasons for them, and treat them after analysis of the problem. The UNESCO has also performed researches regarding this matter. In 1960, experts at this center sent two different stories, for two age groups (10 to 14, and 14 to 17 years old) to children in 11 countries, and requested to draw drawings related to the topic, and send them to the center. After collecting and analyzing the drawings, it was noticed that in regards to color selection for scenery, appearance and clothes and skin color of the characters in the story, the shape of buildings and streets, type of trees and plants, climate, customs and cultures, there are differences and this indicates children's different perceptions from their surroundings (Unesco, 1960). Unfortunately, in Iran researches in this subject have not been performed, and if there are any, the results are not available.

Locale

The locale is a place for events – necessary for life, to take place. It has a close connection with existence and life. "A locale is a place where we have a complete perception of existence and our being." (Davoodi, ND, cited from Habibi 2008, 50) For Iranian scholars of the past, a locale was the same thing as a space, and was defined by it. "To the scholars, the inner surface of the contained matter which is tangent to the outer surface of the container", and to the Speakers, it is "an obscure space which is occupied by matter and its dimensions penetrate that space." (Dehkhoda, 1994). And Sadra says: "locale is the inner surface of contained matter such that no part of it lies outside the surface, and this does not happen other than in parts of this world, such as individual elements, and whenever the sum of all that is in this world (all times, and spaces) are viewed as one,

Chaos, in the Greek language, means space, a ditch, empty and wide space, and yawning. It is derived from the root *xasko*, meaning to yawn. Aristotle and his predecessors considered chaos to mean unorganized and chaotic existence, and an empty space (empty of matter). Pythagoreans viewed space as equivalent to infinite void, and the function of void was to keep things separate. Plato, alluding to Pythagorean's view, explained the world geometrically, using geometric figures. He described the world as a shape that one, always exists and does not deteriorate, and two provides a place for all objects that are created (Bani Masoud, 2007, 94). Ralph says: Even though it is shapeless and not fallen, whenever we perceive and feel space, typically the concept of locale is also formed. To Ralph, locales are essentially conceptual stations that have been formed based

on an event. By dipping them in meanings, individuals, groups, or societies, space turn into a locale. For example, Wenceslas Square, which was the center of the revolutionary events of Vltava, is now the symbol of the citizens of Prague (Carmona et al., 2006:97). Shultz mentions phenomenology in architecture as environmental phenomenology with the subject of nature and the structure of locale in connection with life. He mentions that when an event takes place, we say it is rectified. This indicates that a locale forms the inner and essential section of the living world. Hence, we cannot hold life in one hand and locale in the other; we should hold a complete and coherent combination of both. In fact, he believes that "clear mental pictures that cause the individual to have personality" are subject to having meaningful locales. According to him, methods and boundaries are factors for cognition of the surroundings, and usage of memorable signs and symbols are effective in the human's perception of a locale. These signs can be familiar or memorable signposts for people. Altogether, feelings and perception of space is the meaning of locale (Nurberg Shultz 2003, 89).

The ideation and the mentality that any person holds and believes about himself from his mental image. Each person has a unique image of his personality, abilities, values, and other related items; and is seeking to answer this question: "What is my feeling about myself?" If the answer to this question is accompanied with a positive mental image, it causes self-confidence, and can lead to a healthy and valuable life, and if it is negative, it turns the individual into a disturbed, depressed, and disabled creature. It can be said that mental image is an inner predictor. In the sense that if it is positive, a successful and happy life flows, and if it is negative, by creating disorder in thoughts, habits, and behavior, defeat followed defeats. In fact a person's behavior is his mental image put into action, and personal and social functioning, empowered by internal conversation in accord with his mental image, can form the mental image stored in the unconscious or change it. This cycle is repeated constantly. The functional result of this cycle is that it is not possible to change a person's behavior, unless his previous experiences are changed; the use of mental imagery in doing so has exceptional effect. (Alipour, 2004, 1) (Table 1)

Children's Drawings

Giving a specific definition of art is very difficult, since no thinker has been able to define but its elements. They have all tried to clarify its contents and meaning. In other words, defining art means limiting it, whereas artistic creativity knows no limitations, and escapes the boundaries of the definition. Hence, in this article, we will suffice to a quote from Leo Tolstoy regarding artistic activity. Tolstoy believes that artistic activity is awakening a feeling experienced, and transferring it through motion, sound, images, lines, colors, or... such that others experience that feeling. Drawing is no exception; it expresses the feelings of its artist via lines, shapes, colors, combinations and...

Table 1: Analysis of the concept of locale, and views of various experts about it.

Alborz Davoodi	A locale is a place where we have a complete perception of our existence
Scholars	Inner surface of the contained matter that is tangent to the outer surface of the container
Speakers	An obscured space that the object occupies, and is penetrated by the object's dimensions
Sadra	Inner surface of the contained object, such that no part of it is outside the surface; and this does not occur other than in parts of this world
Aristotle and his predecessors	They considered chaos to mean unorganized and chaotic existence, and an empty space (empty of matter)
Pythagoreans	They viewed space as equivalent to infinite void, and the function of void was to keep things separate
Plato	Alluding to Pythagorean's view, he explained the world geometrically, using geometric figures. He described the world as a shape that one, always exists and does not deteriorate, and two provides a place for all objects that are created
Ralph	Locales are essentially conceptual stations that have been formed based on an event. By dipping them in meanings, individuals, groups, or societies, space turn into a locale
Shultz	Phenomenology in architecture as environmental phenomenology with the subject of nature and the structure of locale in connection with life

Children's drawings, as well as adult drawings, expresses the child's feelings, even though this feeling may not be realistic. Piaget believes that children perceive reality through their personal experiences from the surroundings. This means that what the child regards as a reality of life is not the same thing as reality, but the child's interpretation of reality. The only factor that distinguishes the work of a child from an artist, are his cultural provisions, experiences, and using their information. Through drawing, children display the world they have seen and experienced, and their attachments. One can observe children's personalities easily in between the lines of their drawings, through the use of space, or the absence of parts of the drawing, in the subject chosen, or... And so we can find our way into them, and aid their education and the development of mental and social capacities. Children's drawings, during the mental realism period (5-10 years of age), has a close relationship with children's mental characteristics. They do not draw what they see, they draw what they know. In this age range, because of getting to know more words and finding more differences and more distinguishing factors between objects, the child draws the object he knows best. For this reason, his drawings have two opposing characteristics. One is that he neglects to express elements that are visible, but not important to him; and the other is that he expresses elements that are important to him, but not visible. In this stage, a child's drawing does not possess aspects to identify an object or its outer reality. An unclear and disorganized drawing, even scribbled, is full of meanings that each convey feeling and images regarding reality (Arefnia

1996, 163).

Images of Sexual Differences in Children's Drawings

These differences are often based on the methods of upbringing, and the culture dominant in the family. These affect the children's thoughts and imaginations. They are even seen in children's imaginary figures. Most boys draw strange, innovative, and imaginary drawings. Girls, on the other hand, observe arrangements in their drawings, and more order is seen in their drawings. Girls generally draw the peace and beauty of nature, but boys have more affinity toward anger and combat. Every child draws in accordance with his mental and spiritual state.

In children's drawings, perspectives (as we know it) don't exist, but are y by vertical borders; objects higher on the page are sensed to be farther away, and object lower on the page are sensed to be closer, In regards to proportions we should say that they do not match reality; figures that are more important are drawn bigger, and non-important details are omitted.

This research is conducted as a field study. Questionnaires in the form of drawings were distributed among third grade students. It has been attempted to analyze the effects of the spatial elements in the schoolyard on their mental pictures. In order to do this, we should determine the differences in the formation of mental images among boys and girls. Hence, the results obtained from the drawings from Shahid Parva boys' school, and Safran girls' school is displayed below and analyzed.

Table 2: Comparison of natural, recreational, and basic needs, and school elements between boy and girl students.

	Natural factors					Recreational factors			basic needs			school elements		
	Tree	mountain	Sun	Cloud	Wind	Play-ground	Table Tennis	Bench	Store	Drinking	W.C	Flag	Array	School Portal
Boy	45%	0%	2%	0%	0%	62%	58%	13%	31%	54%	24%	32%	42%	26%
Girl	91%	24%	33%	33%	18%	22%	11%	16%	0%	13%	0%	0%	0%	9%

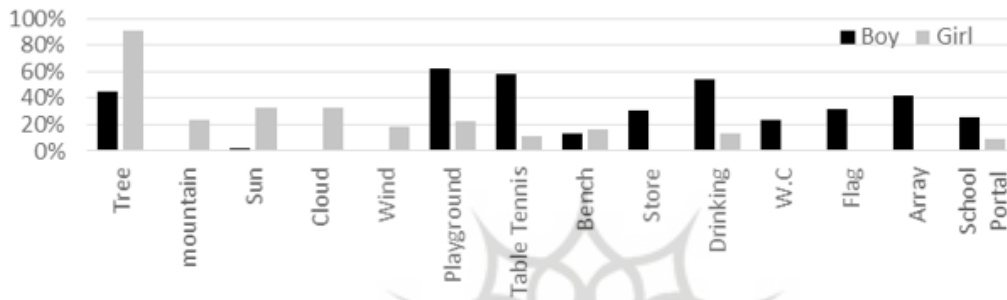


Fig 1:some of the difference in girls and boys.

In the Table 2 a,d Fig 1, some of the difference in girls and boys views regarding natural, recreational, basic needs, and school elements are of interest. They are as follows:
Girls paid more attention to natural elements than boys;

Boys paid more attention to recreational elements than girls;
Boys paid more attention to basic needs elements than girls;
School elements are heeded by boys, more than with girls ;

Table 3: Comparison of personal and social elements between boy and girl students.

	Personal elements						Social elements	
	separation of spaces	observing proportions	Accuracy				Alliance	Withdrawal
			A	B	C	D		
Boy	44%	38%	9%	7%	31%	53%	38%	12%
Girl	71%	67%	22%	41%	33%	4%	44%	0%

- A= Very high
- B= High
- C= Medium
- D= Low

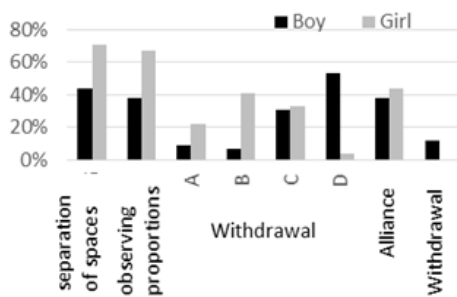


Fig 2: Comparison of personal and social elements between boy and girl students.

In Table 3 and Fig 2, the point that attracts researchers' attention is that social and personal elements, including separation of spaces, care, and observing proportions, are shown in the girls' drawings, more than in boys'.

Table 4: Comparison of the most important element as viewed by boy and girl students.

The most important issue							
	playground	principal	classroom	Line	Tree	Flag	mountain
Boy	69%	5%	7%	14%	3%	3%	0%
Girl	18%	2%	2%	0%	53%	16%	9%

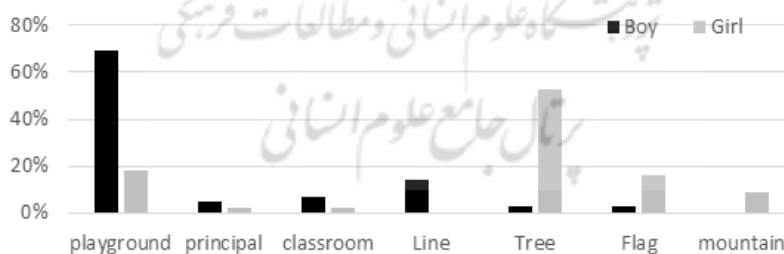


Fig 3: The most important element as viewed by boy and girl students.

From the Table 4 and Fig 3, we can infer that among elements available in the school, the following had the most importance

among girls: Tree, flag, and mountain; and among boys: playground, classroom, line, and the principal.

Table 5: Comparison of the most important element as viewed by boy and girl student.

	Other								
	Color			geometric figures			Line Type		
	one	Several	Without	rectangle	Circle	Triangle	Without	direct	Bent
Boy	9%	49%	42%	92%	8%	0%	0%	76%	12%
Girl	0%	100%	0%	62%	26%	4%	8%	36%	64%

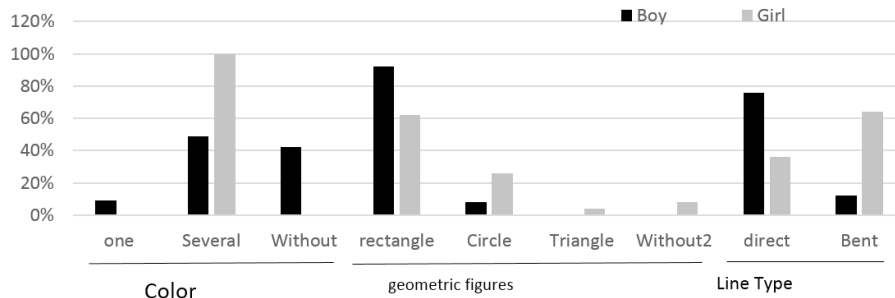


Fig 4: The most important element as viewed by boy and girl students.

From the Tables 4, it can be inferred that among elements available in the school, the following had the most importance among girls: Tree, flag, and mountain; and among boys: playground, classroom, line, and the principal.

in Table 5 and Fig 4, attention to geometric figures and the type of lines, is different between boys and girls. Girls pay more attention to curves, and circles; whereas boys pay more attention to line segments, and rectangles.

RESULTS AND DISCUSSION

Considering theories of thinkers and research literature (cited previously), based on results, the following conclusions were obtained:

It seems that in the design and realization of spatial elements in girls' schools, providing green space, either naturally (such as planting trees, or shrubs, or flowers, or...), or symbolically (as paintings on internal walls), can play an important role in attracting girl students.

Considering growth psychology, boy students are very interested in moving and energetic activities, and have a special interest in the playground and play equipment. And, considering the increasing growth in the global inclination to soccer, this inclination is also seen in boy students. Therefore, in boys' schools, special consideration to the playground, especially soccer or indoor soccer is required. It is noteworthy that the playground a place to play sports, in the apartment, attracts students to schools which causes an improvement in learning, and enables the positive release of energy, which helps improve their health and increase their attention focus on learning in the classroom. It can also be used as motivation and an incentive for the advancement of educational goals.

Considering the very high level of activity and motion of boy students, and their carelessness in protecting and keeping

the nutritional facilities provided by their parents, they need additional and energy-producing nutrition. They also need water, to compensate for the water lost through perspiration. And eventually, the need for a restroom shows up in their mental picture. Providing adequate restrooms (with regards to number, ventilation and structure) and drinking fountains (while observing hygiene, and considering the students' height and build) is essential.

Taking into account the high level of activity and motion of boy students and their carelessness, boys' schools, in order to maintain order, place great emphasis on lines and order, which has formed a better position in the minds of boys, compared to girls. Hence, observing markings in the schoolyard in boys' schools and respecting the national identity by providing a suitable place for conducting the flag ceremony can significantly help create order and care.

According to psychologists, girls value their privacy and are more structured. Therefore, separation of spaces shows up in their mental images. But boys, because of their interest in being free and unbound, pay less attention to separation of space. Therefore, specifying spaces (the playground, classroom lines, places for sitting, restrooms, and...) teaches boys, care, order, and respecting others' privacy, which are considered to be valuable social skills. And for girls, it can mean respecting their thoughts and minds.

According to social psychology, girls relate more quickly and with more skill, due to their vocal skills, and feel the need for others' attention more than boys. Boys, on the other hand, show, off their skills individually – usually through individual body skills. Therefore, it seems that providing a space for group activity – for both groups, is necessary. It strengthens boys' correct social skills, and it directs girls' social skills in the positive direction.

It seems that variation of colors in drawings and coloring spatial elements and observing proportions in design can respond positively and logically to girls' interests, which plays a substantial role in attracting them. And, for boys, it can give them adequate direction, since colors affect the unconscious even if they are not noticed.

Boy student used straight lines in the drawings of their mental image more often, which, according to psychology of lines, indicates their simplicity, stability, and strength, which matches most boys' characteristics. And girl students used curved lines more often, which shows movement, dynamism, constancy, and gentleness. Therefore, in the architecture of spatial elements in schools (including outer walls, paintings on walls, edges of walls, fences, and...) straight lines should have priority in boys' schools, and curved lines in girls' schools.

Children store and picture in their minds the structure that is designed, regardless of the design being traditional, industrial, or post-modern. But what shows in the midst of daily routine life are innate and created expectations of each of the sexes. Therefore, designers and architects should consider psychology of growth, social, personality, educator, and... in designing structures, in spite of having to design according to routine life; so their interests and wants to remain in their minds as wishes and goals.

Spatial elements and their adequate arrangement are effective in forming the student's mental images. Furthermore, the mental image formed by boys is different than girls.

CONCLUSION

The relationship between man and his environment, is in fact environmental perception, which first leads to its cognition, and then to its perception. Observing the environment is forming a mental image based on past experiences and observations. If information storage in the experiential mind evolves, we can use it for re-cognition and formation of a correct image from the environment. These items can play a significant role in attracting students to the educational setting and thereby improving the quality of education. Therefore, school designers and architects can design schools' spatial elements according to students' sex and age, using information regarding the method of forming mental pictures. Doing so, they can take an effective step in the direction of attracting and educating students, and improving their learning by creating a healthy, happy, and peaceful setting. This research was organized based on two main questions:

How do spatial elements and their adequate arrangements in educational settings create a position in the formation of students' mental pictures?

What relation does the differences in mental images formed from spatial elements have with children's sex?

First, by studying the generalities, research, and publications regarding characteristics of mental images, the views of great thinkers were gathered. Then, the drawings by students were gathered and general factors, such as natural, personal, social,

and ..., elements such as care, and type of lines used – the most important element, were analyzed. The final view can be summed up as follow :

So, considering the analysis performed on the drawings, and the mentioned factors in the formation of mental images, the results of the research are as follows:

The research hypothesis and the tables showed that spatial elements play an essential role in the formation of students' mental images in schools that use these elements correctly. Therefore, suitable spatial arrangements can prepare students for healthy, active, and lively presence in schools.

REFERENCES

- Bani Masoud, A (2007). *Post-modernism and architecture*, Khak publications, Tehran
- Davoodi, A, (ND) *Analysis of the principles of wisdom of holy locations in Ein-ologhozat Hamedani's Treatise of place and time*, in print.
- Dehkhoda, A., (1994), *Dehkhoda's dictionary*, v. 13, Tehran University Publications, Tehran.
- Habibi, S. (2008) Mental images and the concept of locale, *Honarhaye ziba*, 35, 39-50
- Arefnia, F. (1996) Children's drawings and creativity, *Nameye farhang*, 24, 160-167
- Alipour, E, (2004) Organizational mental image, *Tadbir*, 151, 80-83
- Mohammadi, T. (1990), *Personal differences in children's drawings*, *Growth and educational social sciences*, 6-7, 10-21
- Nurberg Shultz, Ch., (2003). *Architecture: meaning and locale*, (translated by Borazjani), Tehran: Jam-e Jam publications.
- Carmona, M., Tim Heath, T., & Tiesdell, S. (2006). *Public Places*, Urban Spaces, Architectural prees, Elsevier, Oxford.
- Unesco, (1960). *Institute For Education Children's Art Concentries*.