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Evaluating and Analyzing Child Friendly City for Enhancing Creativity in Children (Case Study: Yazd City)

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Abstract

Nowadays, with increasing development, cities lack favorable urban spaces. The space consistency with residents' needs has attracted experts' attention. Urban spaces have a unique role in realizing social and personal needs of children. These spaces cover a large part of everyday life of the residents, particularly children. According to humanity engineering, enhancing quality of these spaces can be effective in health and development of physical abilities, reinforcement of social interactions, and growing creativity in children. The method employed is descriptive-analytical and the data collection is based on library, documentary, and field studies. The study, extracts the data by a participatory method such as questionnaires and interviews with 384 children in Yazd city, regarding urban spaces and their activities. To investigate the correlation, SPSS software and Spearman correlation model were used. To prioritize criteria effective in creating a child-friendly city and enhance creativity, the AHP model was employed. In this study, different dimensions are available to discuss the child friendly city and creativity, five criteria affecting child friendly city, i.e. location of playing, social interactions, accessibility, participation, security and safety. The three criteria affecting creativity includes sensual, physical, and behavioral creativity identified based on previous studies and using surveys of the experts. After evaluating and administering appropriate tests, it was concluded that, among the criteria of child friendly city, the criteria of security and safety has the highest

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significance and lowest significance for location of playing. The sensual dimension of the criteria of creativity has the highest and physical dimension has the lowest significance.

Keywords: Evaluation; Children; Child-friendly city; Creativity; Yazd city

1. Introduction

Cities and urban environments, in addition to adults, influence young audiences. Their perception of environment is totally different from that of other age groups. This perception produces images of the environment in children's minds which are fundamentally different from those created in adults' minds. However, a lot of spaces created for children pay little attention to children's existing dimensions and are not consistent with their perceptions, activities, and needs (Halseth & Doddridge, 2000). In fact, these spaces are shaped with regard to adults'- and not children's- characteristics and perceptions. Consequently, they not only cannot help children's development in different dimensions, but also, in a lot of cases, they cause engendering boredom in children and provide grounds for occurrence of abnormal behaviors resulting in fading of pure creativity in children (Torabi, 2011: 3).

By investigating scholars' ideas about developing creativity in children, it can be inferred that some consider creativity as a social phenomenon originating from the needs and requirements of the society and family conditions. Some consider it as a personal phenomenon on which factors such as motivation, emotion and feelings, and personal learning are effective (Amabile et al., 1994). Another group of scholars know creativity as a cognitive concept which interacts with high processes of theoretical mind, intelligence, imagination, and information processing. Finally, the other group is considered as a multidimensional concept on which a set of social and cognitive factors are effective. Accordingly, creativity is influenced by environmental effects (Gharebiglou, 2012: 87).

Nowadays, children's rights have been highlighted in the society and child friendly cities are favorable grounds for reaching this important issue and children's development at all ages. Child friendly city, according to the Convention on the Rights of the Child and Universal Declaration of Human Rights (1989) try to realize rights such as the right to comment on the desired city, participation in decision-making about the city, the right to participate in society and social life, access to basic services (such as health, education, shelter, drinking water and other related services), protection against violence and exploitation, meetings with friends and playing, possibility of safe traffic in streets, the right to live in a clean environment, having favorable green and accessible spaces and to recognize children as citizens (Riggio, 2002).

In Iran, modern and machine life is moving along its initial stages; there is increasing tendency to migrate to big industrial cities. The increase in the population and needs of residential places has resulted in devastating housing and converting them into buildings

with high stature. In such conditions, urban open spaces are considered more important because children and adolescents as largest social groups (in Iran, under-18-year-old population makes a large part of the city's population) require open urban spaces. However, children's interactions with urban spaces in the third-world cities in Iran seem to be considered insignificant and our dangerous cities do not know how to accept children. These cities prefer to keep them in protected places up until children come to the age of encountering urban environments. While investigating the needs and problems that children face in urban environments, together with planning and designing urban spaces in a way motivate them to participate in cities, it can result in enhancing the quality of these spaces for all people (Gharabiglou, 2010: 14).

Yazd City is one of the outstanding historical cities in the desert of Iran, which enjoys particular cultural and tourist attractions. In addition, it is considered as the first adobe city in the world. Because of its unfavorable climate, this city does not enjoy urban green spaces and recreational land uses. Considering the General Population and Housing Census in Iran (2011) and the 31% population of children in the City of Yazd, planning and designing the urban spaces of the city provide appropriate grounds for the presence of children in social interactions. This is also in line with the authorities of the city as they insist on converting Yazd into a social and citizen-centered city. This issue causes Yazd to be converted into a child friendly city (with regard to their psychological and physical needs and qualitative enhancement of their development and creativity in public spaces outside home and school). Accordingly, the present study aimed to identify factors affecting children's creativity in urban spaces of Yazd City and to investigate the hypothesis that: "It seems that according to existing ideas about child friendly city, there is a correlation between child friendly urban spaces and development and growth of creativity in children with regard to the status quo of Yazd City and accordingly, basic strategies can be achieved". In this regard, by using data distribution of land uses related to child friendly city, the mentioned hypothesis will be verified.

Halseth and Doddridge (2000) in a research entitled "Children's Cognitive Mapping: A Potential Tool for Neighborhood Planning" tried to answer this assumption that how planners and designers can learn more from children about their use of, and needs in, such neighborhood spaces. They evaluated the application of cognitive mapping with children against Lynch's well-known typology of urban design elements. As a result, it shows how cognitive map techniques may provide a way to collect information on what is of interest and importance to this often overlooked user "constituency".

Wridt (2010) in a research titled "A Qualitative GIS Approach to Mapping Urban Neighborhoods with Children to Promote Physical Activity and Child-Friendly Community Planning" mentioned that obesity epidemic in children has increased and they consider the role of neighborhoods in supporting children's physical activity and healthy development. In this research, participatory and qualitative GIS approach is conducted with ten and eleven year-olds grown up in a diverse low-income communities in Denver. Results illustrate the

utility of qualitative spatial analysis to understand the relationship between children's perception, the built environment, and social factors that shape children's active transport, leisure, and recreation in their neighborhood. Children's local knowledge should be valued and solicited in community-level health and planning interventions to promote physical activity.

Holt et al., (2009) in a research entitled "Neighborhood physical activity opportunities for inner-city children and youth" investigated physical activities of children and youth in neighborhoods and urban opportunities and barriers. They considered factors such as features of neighborhoods, families' interventions and programs supervised by adults as effective on children's activities. Finally, lack of security and safety as well as environmental factors were considered as threats and organized programs were suggested for children's activities.

Aarts et al., (2011) in their study entitled "multi-sector policy action to create activity-friendly environments for children: a multiple-case study" investigated the existing vision in this type of policy in four urban regions in Netherlands and concluded that structural cooperation among different parts of politics and the governments can result in facilitation and increase in child friendly environments. They considered lack of time and resources as the main challenge in this type of policy.

Esmaeilzadeh Kavaki et al., (2014) in their research entitled "Evaluation of child-friendly city in terms of Islamic architecture and urbanism in the new era" evaluated the characteristics of child friendly indices and their compatibility from the viewpoint of Islamic architecture and urban development. They suggested some recommendations about the conversion of the existing urban spaces into Islamic cities. They also discussed how children can participate in the process of urban decision making and management.

Matini et al., (2014) in a study entitled "Criteria for designing neighborhoods based on child friendly city: case study of Farhang Neighborhood of Mashhad" investigated spatial-physical aspects and finally presented criteria such as readability, accessibility and permeability, identity, presence and participation for designing child friendly neighborhoods.

Rabi'pour and Taghaddosi (2014) in their study entitled "Analyzing child friendly city using the SWOT model: case study of Zone 13 of Tehran" evaluated characteristics and indices of child friendly city and presented competitive strategies. Manochehri and Alizadeh (2014) in a study entitled "Child friendly city, a step towards future sustainable city: case study of Mashhad City" investigated urban per capita allocated to children in projects of urban development in Mashhad. They concluded that the amount of per capita allocated to child-specific spaces in urban development projects of Mashhad cannot realize children's needs regarding their population and are less than standard per capita. Therefore, paying attention to children's needs in development projects of Mashhad and moving towards the formation of child friendly city can provide better life not only for children, but for all citizens in order for sustainable development to be realized in Iranian-Islamic cities.

2. Identification of the region

Yazd City is one of the historical cities in Iran located in front of the Central Plateau of Iran adjacent to the central desert. The residential history of this city dates back to millenniums before the advent of Islam. Yazd City is the center of Yazd Township and capital of Yazd Province which is located on the Isfahan-Kerman road. This city is located between 54 degrees and 18 minutes to 54 degrees and 24 minutes east longitude and 31 degrees and 40 minutes to 31 degrees 56 minutes north latitude. Its area is about 91km (fig 1) (Moayedfar et al., 2014: 3). The population of this city is 432194 according to the Population and Housing Census of 2006.

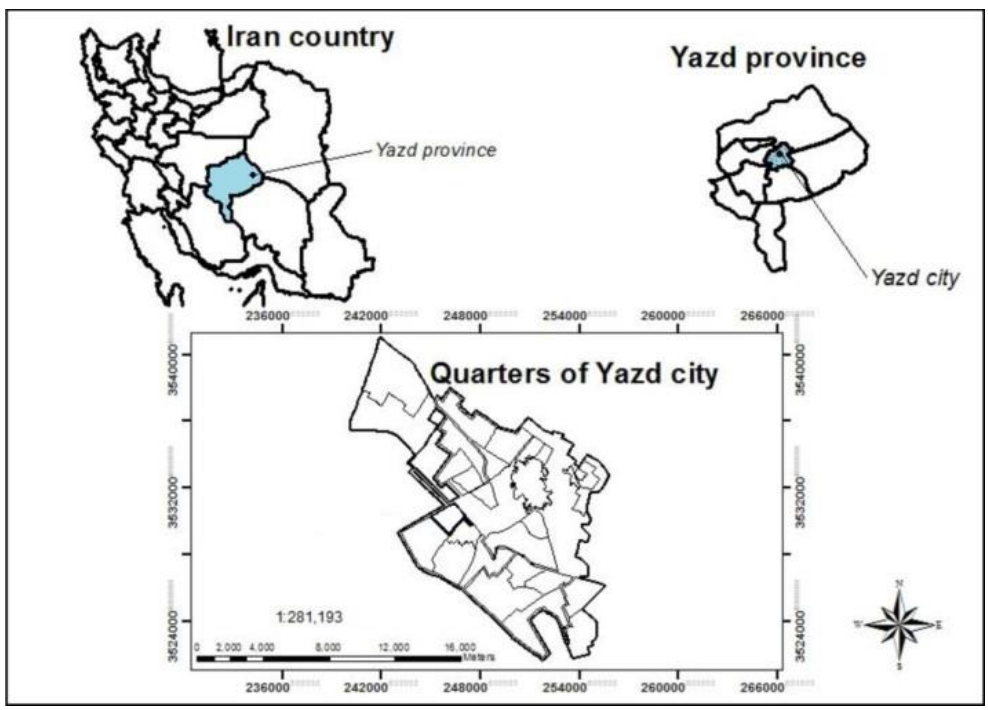

Fig 1 Political and administrative division of Yazd City (resource: Moayedfar et al., 2014: 86)

As the ease of access to activities and services is considered as one of the indices of child friendly indices, in this section, significant land uses in a child friendly city such as green spaces, educational, health, sports-recreational, and cultural land uses in Yazd City are considered (fig 3). By considering appropriate per capita according to Table 1, shortages and extras of the considered land use are investigated for the predicted population in 2016, which will be approximately 551085 individuals.

Table 1 Estimation of the amount of required area and lack of land use areas attracting children in Yazd City

Land uses		**Suggested per capita**	**Area (hectare)**	**Required area (hectare)**	**Shortage of area**
Educational	Kindergartens	0.35	3.87	19.29	-15.41
	Primary schools	0.9	39.4	49.6	-10.12
	Secondary schools	0.82	34.48	45.19	-10.70
	High schools	0.64	38.64	35.27	3.37
	Academies	0.66	34.26	36.37	-2.11
	Total	**3.37**	**150.65**	**185.72**	**-34.97**
Cultural land uses		1.2	20.2	66.13	-45.93
Therapeutic land uses		0.95	46.03	52.35	-6.32
Health land uses		0.35	2.48	19.29	-16.80
Green spaces		8	156.76	440.86	-284.10
Sports land uses		2	64.01	110.21	-46.20

Resource: Basic information: Armanshahr Counseling Engineers, 2009: 89

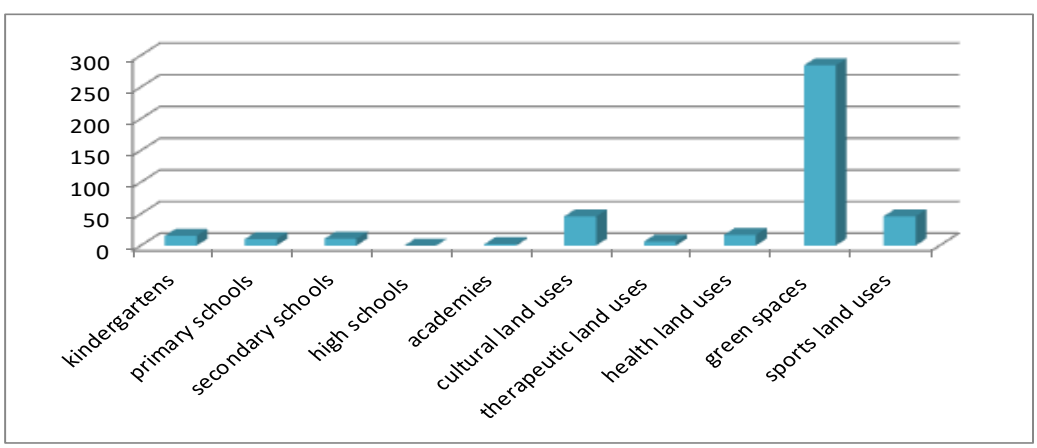

Fig 2 Lack of areas for land uses, 2016

According to fig 2 and table 1, in most significant land uses of Yazd, shortages are observed in per capita. The shortages mostly go to green spaces and sports land use,

followed by cultural land use. These land uses are spaces that mostly attract children and by enhancing their areas, more appropriate environments can be achieved for children.

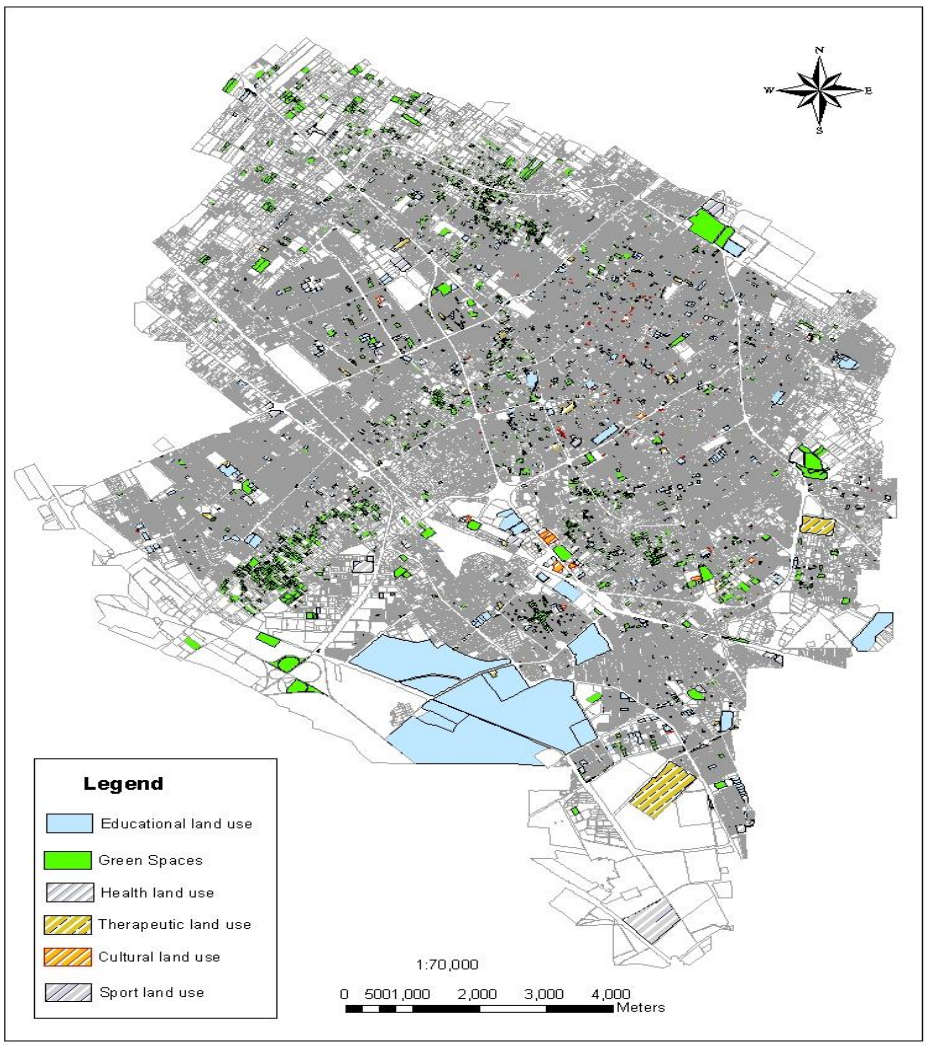

Fig 3 Land use map of Yazd City (resource: Arseh Counseling Engineers, 2007: 94)

3. Methodology

The prevailing approach of the present research is applied and in terms of the nature of the subject, the research method is descriptive, analytical, and survey. In addition, employing Spearman correlation coefficient, the relationship between planning the urban child-oriented space as well as growth and development of creativity in children of Yazd

were investigated. Statistical data were extracted using library and field studies (questionnaires and interviews with children) and research questions were regulated with regard to research objectives and key factors in investigating and evaluating child friendly city and creativity. Moreover, to investigate correlation, the SPSS software and Spearman correlation coefficient were used. The AHP model was implemented to prioritize criteria effectively on creating a child friendly city and enhancing creativity in Yazd.

The population includes all children in Yazd City. According to the Rights of the Child Convention in 1989, by a child in the present study we mean a human being who has not reached the age of 18 years and the Population and Housing Census of 2011, the population of children in Yazd City is 193407 individuals (Deputy of Planning and Employment of Governorate of Yazd, 2011: 56) (table 2). The sample size was calculated using Cochran formula for children as 384 participants and their ideas about child friendly city were investigated. In addition, since parents are considered effective on employing urban spaces, their ideas were used randomly and were employed in prioritizing the criteria and the creativity in the ideas.

Table 2 Children's population of Yazd City in 2011

Age group	Men	Women	Men and women	
			No.	Percentage
0-4 years old	27389	26509	53898	9.3
5-9 years old	24673	23690	48363	8.3
10-14 years old	22825	21604	44429	7.6
15-19 years old	23821	22896	46717	8
Total	**98708**	**94699**	**193407**	**33.2**

Resource: Deputy Governor of Yazd planning and employment, 2011: 56-60

4. Discussion

4.1. Framework of indices of a child friendly city

In this section, first, the indices of child friendly city are presented and introduced in scientific research resources as well as scholars' ideas and then the framework of indices of child friendly city is constructed (table 3).

Table 3 Indices investigated in different resources

Plans and ideas / Indices	Driskell (2008)	Satterthwaite (2004)	Horreli (2007)	Cityfreindly (2011)	Howard (2006)	Woolcock & steele(2008)	Bartlett (2005)	Chawela (2002)	Woolcock & steele(2008)	Driskell (2002)	Jacobs	Mumford	Lenard	Shia
Security and safety	●	●	●		●	●	●	●	●	●	●			
Access to the nature and green spaces	●					●	●	●	●	●		●		●
Healthy environments, public health supply and garbage collection	●	●					●	●					●	
Access to facilities, activities and services	●		●	●	●	●		●	●	●				●
Existence of environments for entertainment and recreation	●	●					●		●	●		●		●
Access to favorable communication in the environment	●	●					●	●		●			●	
Existence of various public spaces for interaction		●			●		●	●						
Reducing traffic, considering public transport, paying attention to the quality of pedestrian and bicycle routes		●				●	●	●		●			●	●
Making children to participate and valuing them	●		●	●	●	●	●		●	●				

Regarding table 3, the frequency of important indices in child friendly city can be observed in table 4:

Table 4 Framework of indices of child friendly city

Indices of child friendly city	Frequency of indices
Security and safety	10
Access to facilities, activities and services	9
Access to the nature and green spaces	8
Making children to participate and valuing them	8
Creation of environments for entertainment and recreation	7
Reducing traffic, considering public transport, paying attention to the quality of pedestrian and bicycle routes	7
Access to favorable communication in the environment	6
Healthy environments, public health supply and garbage collection	5
Existence of various public spaces for interaction	4

Considering the identification of important indices of the research, research questions were developed with regard to the aims and key factors evaluating the child friendly city. The investigation of this index includes five criteria; location of playing, social interactions, accessibility, participation, security, and safety investigated in the form of certain items in the questionnaire distributed among 384 participants. The results are presented in table 5 in the form of frequency distribution related to each dimension of child friendly city.

Regarding the obtained data, it can be identified that the mean scores of items of the child friendly city are higher than the moderate level. It means that these cases can be enhanced in urban spaces of Yazd.

Table 5 Frequency distribution of items related to child friendly city

	Criteria	Items			Frequency (%)	Mean
The child friendly city	**The location of playing**	From among water, soil, animals, and to play in the nature and green spaces, which one do you like more? 1. Water; 2. Soil; 3. Animals; 4. Play in the nature and green spaces			Relationship with animals: 44.8% Green spaces: 31.8 Water: 21.6 Soil: 1.8%	2.87
	Social interactions	With whom do you like to spend your leisure time and activities? 1. Solely; 2. Parents and family members; 3. Friends and peers; 4. Children of relatives			Friends and peers: 42.4% Parents: 22.7% Children of relatives: 20.8% Solely: 14.1%	2.7
	Access	How many minutes is the distance of your home to the nearest parks in your neighborhood by foot? 1.5 min; 2. 5-10 min; 3. More than 10 min; 4. The lack of parks in neighborhoods			The lack of parks in neighborhoods: 37.2% 5 minutes: 22.7% 5-10 minutes: 16.1% More than 10 minutes: 11.5%	2.48
	Participation	Which spaces do you like more in the city? (If you were as the mayor, which space would you like to construct in the city?)			Gyms and pools: 13.8% Playgrounds and parks: 13% Circuses and folk shows: 12.7% Spaces for biking: 12%	6.47
		Music hall for children	Museum for children	Toy House		
		Spaces for biking	Green spaces	Stores for children and adolescents		
		Book houses	Cinema for children	Circuses and folk shows		
		Others	Playgrounds and parks	Gyms and pools		
	Security and safety	With which vehicle do you go school? 1. By foot; 2. Automobile; 3. Bicycle; 4. Public transportation			Automobile: 85.9% By foot: 7.6% Bicycle: 4.4% Public transportation: 2.1%	2.01
		Where are your playgrounds? 1. Alleys in the neighborhoods; 2. Playgrounds and parks in neighborhoods; 3. Sports complexes in neighborhoods; 4. Yards or green spaces of complexes			Yards or green spaces of complexes: 34.4% Playgrounds and parks in neighborhoods: 21.1% Alleys in neighborhoods: 13.5% Sports complexes in neighborhoods: 10.9%	3.66

4.2. Investigating criteria of creativity

Playing is one of the main features and needs of childhood causing comprehensive (social, emotional, mental, physical, etc.) development. Moreover, it is considered as an important factor in creating vivacity in children and results in the growth of creativity in them. Considering these factors concurrently causes the creation of a sense of children's belongingness to the environments.

The present study investigated the creativity among children as one of the main dimensions. The framework to investigate this index includes 3 criteria of behavioral, physical and sensual domain of creativity in the form of items presented in table 6. Frequency distribution related to each dimension of creativity is also identified.

Table 6 Frequency distribution of items related to Creativity

	Criteria	Items	Frequency (%)	Mean
Creativity	**Behavioral**	Developing creative games	2.18	1.84
		Creating new ideas	5.1	1.27
		Evoking the sense of exploration	9.93	2.1
		Creating warm and freely relations with children	15.24	2.7
		Compliance with certain behavioral patterns in games	1.05	0.54
	Physical	Observing scales for children	10.1	1.93
		Flexibility of spaces with children and maintenance	2.74	1
	Sensual	The use of the nature (by combining spaces with the nature)	4.2	2.50
		Taking advantage of the natural elements in the design of spaces (soil, water, etc.)	29.6	2.87
		Creating a sense of privacy and tranquility in spaces	10.71	2.01
		considering outdoors or courtyards	6.35	1.7
		Implementing programs such as: selection and planting of herbal species in open areas of kindergartens	0	0
		Creating the favorable landscape (trees and lawn spaces)	2.8	1.02

4.3. Analyzing the research hypothesis

In the present study, it is necessary to investigate the relationship between child-oriented urban spaces and development of creativity in children. The variables of child friendly urban spaces and criteria of creativity were identified and used for estimating the correlation between these two factors, and the accumulation of items in different dimensions was considered. The questionnaire items were regulated in the form of ranked data, analyses were then conducted in the SPSS. Based on the Spearman correlation coefficient, the results indicated that correlation between criteria of child-oriented cities and enhancing creativity in children is at a highly significant level as r=0.726 (table 7). That is, the more the criteria related to child friendly city include security and safety, participation, access, etc., the more the city of Yazd would be improved, and thus different dimensions of creativity including behavioral, physical, and sensual creativity increase in children from Yazd.

Table 7 Results of Spearman correlation coefficient between two factors of the child friendly city and creativity

			city	creativity
Spearman's rho	city	Correlation Coefficient	1.000	**.726***
		Sig. (2-tailed)	.	.013
		N	384	384
	creativity	Correlation Coefficient	**. 726***	1.000
		Sig. (2-tailed)	.013	.
		N	384	384

*. Correlation is significant at the 0.05 level (2-tailed).

Furthermore, regarding the issue that different dimensions have been investigated both about child friendly city and creativity, according to the AHP model, different dimensions of these two factors in Yazd City were prioritized. The AHP model is one of the multi-criteria decision making models based on paired comparison and hour rates from 1 to 9. The estimation of the degree of significance of each criterion was compared with others to identify the weight of items. To do these paired comparisons, experts' ideas related to children's affairs were employed. The results of the comparisons are presented in tables 8 and 9.

Table 8 Matrix of paired comparisons of criteria of child friendly city in Yazd city

Child friendly city	Location of playing	Social interactions	Access	Participation	Security and safety
Location of playing	1	1/5	1/7	1/3	1/9
Social interactions	5	1	1/3	2	1/5
Access	7	3	1	4	1/3
Participation	3	1/2	1/4	1	1/5
Security and safety	9	5	3	5	1

According to the Expert Choice, the final weight of criteria was calculated and presented in fig 4. Accordingly, from among criteria affecting child friendly city, security and safety with the weight of 0.502 had the highest significance, whereas the location of playing with the weight of 0.034 had the lowest significance in Yazd.

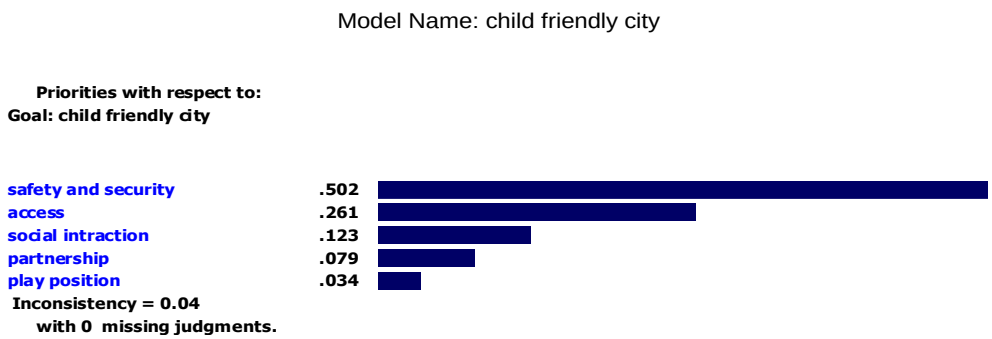

Fig 4 Prioritized chart of the weight of criteria related to child friendly city using the AHP model

The criteria related to creativity in Yazd City, using the AHP model and regarding the mean scores of experts' ideas, were investigated and the results are presented in table 9:

Table 9 Paired matrix of criteria related to creativity in Yazd

Creativity	Behavioral dimension	Physical dimension	Sensual dimension
Behavioral dimension	1	3	1/2
Physical dimension	1/3	1	1/3
Sensual dimension	2	3	1

In addition, according to the calculations conducted in the Expert Choice, the final weight of criteria was calculated and presented. Accordingly, from among criteria affecting child friendly city, the sensual dimension with the weight of 0.528 and behavioral dimension with

the weight of 0.333 had the highest significance, while the physical dimension with the weight as 0.14 had the lowest significance in Yazd (fig 5).

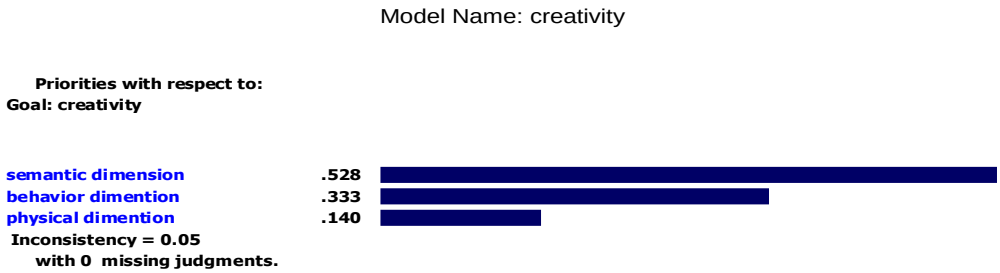

Fig 5 Prioritized chart of the weight of criteria related to child friendly city using the AHP model

5. Conclusion and suggestions

Children have different attitudes and preferences in urban spaces. In general, it can be stated that an urban space should be socially and physically accessible to all people regardless of their income level, physical limitation, and wherever they live in a city. In addition, this space should be able to provide a ground for equal presence of all residents. It should be appropriate for their social needs. For example, to supply accessibility, not only ideal conditions of adolescents should be considered, but also the needs of disabled and old individuals and those mothers with big baby strollers or baby bags, or children who use bikes in these public and social spaces in the city. In addition, by knowing children's abilities and skills, we can increase the presence of children in the city. Moreover, by a sense of participation and independence that is created by children's social interaction, we may enhance the sense of self-confidence in children and consequently increase their creativity.

The findings of the present study about Yazd City, regarding the newness of the subject, indicated the lowness of operational and implementation levels of the child friendly city by effective organizations such as the municipality of Yazd. There is shortage of social facilities and utilities for children, such as lack of recreational places and green spaces in the city and lack of security for children in public passages and urban spaces. The results indicate that the proposed per capita for projects was for the entire city of Yazd. Hence, the calculation level of land uses especially for children cannot be valid. The per capita allocated for children in development project of Yazd city compared to children population cannot realize the needs of this social layer. For example, in Yazd, there are thousands of children who do not enjoy the conditions, instruments, and facilities for playing. To realize children's needs, appropriate toys, relations among peers, identification of phenomena and facing new issues, enhancing children's health and training life skills via plays, etc., Yazd requires establishment of toy houses and consider per capita of land uses in urban

development projects for accessing cognitive, psychological, emotional, and physical development.

Unfortunately, most of the land uses of Yazd city in each neighborhood are more economically, and not emotionally, advantageous; therefore, these spaces cannot realize children's needs. Consequently, applying playgrounds which cannot be parks can contribute to children' development. It is better that all spaces, passages, and sidewalks in the city be more attractive for children by using different designs, appropriate lighting, and favorable urban furniture in order that children today and in future will not observe a gloomy and dull environment in the city and instead make a constructive relationship with the urban space. In general, based on the statistics and figures obtained from investigating levels, per capita and high-level projects, in the status quo, we face serious shortages for children's needs in the present and future. Naturally, these shortages will be more serious for the future with population increase and the capacity of Yazd to accommodate more population. Therefore, this problem requires appropriate planning and design to enhance the quality of settlements and increase the level of services.

The results obtained from research analysis emphasize prioritizing the criteria of child-friendly city and creativity in Yazd city. Appropriate and more executive strategies can be suggested to create child-friendly urban spaces and to enhance the creativity in children from Yazd.

- Security, safety and access

- Neighboring spaces specific to children with residential areas
- Creating spaces to sit near open local spaces
- Enough light
- Observing security considerations

- Social interaction

Regarding the effect of rich Islamic-Iranian architecture on Yazd, the following traditional strategies can be applied in the city:

- Identifying and defining the center of neighborhoods away from vehicular roadways
- Creating a walkway in neighborhoods
- Creating bicycle tracks
- Converting dilapidated spaces into places tailored to the needs of children
- Enhancing the quality of public spaces of Yazd according to the culture and identity to enhance and stimulate the activity level and desired behavior for children in Yazd.

- Participation

- Children's participation and decision-making about their city

- Using signs to orient the children in the neighborhood
- Child - scale use of furniture
- Use of bright colors in urban areas

- Location of playing

Regarding the lack of green spaces and playgrounds in Yazd and the existence of arid lands, the following strategies are presented:

- Increasing the per capita of urban green spaces
- Designing theme parks
- Creating game garden
- Using natural elements such as sand, water and animals in designing spaces.

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