Improving the quality of life in a residential complex by identifying the practical criteria of educational public spaces

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SCIENTIFIC RESEARCH

ABSTRACT

Introduction: One of the approaches to improve life quality in a residential complex is by modifying them properly to an educational public space. An educational public space is consisted of three factors: individual, community and physical space, the important factor in these environments are, the proper individual and general education and respecting the natural or artificial surroundings. Based on the probabilistic approach, an environment can have a direct impact on an individual. An environment can teach us cultural, moral and social values. The purpose of this study is to identify the criteria for designing educating public spaces in a residential complex to improve the environmental quality. Therefore, the qualitative data was collected with the help of library documents in two categories: Residential Satisfaction Factors and Educational Public Spaces Criteria. Then, both groups were adapted based on content validity and a questionnaire was used to collect quantitative data. The questionnaires were distributed among the architecture professors, according to the Delphi method. SPSS 18 software was used to analyze the quantitative data to prioritize and correlate the criteria and micro criteria for designing educational public spaces in the residential complex. The results indicate that among all of the criteria for an educational public space, safety is more important than other criteria, in a residential complex, the top five criteria are as follows: health and safety, aesthetics, social -cultural interactions, and national-local identity. Therefore, it can be concluded that by applying the micro criteria of the aforementioned criteria in the communal spaces of residential complexes, the quality of residential environment can be improved.

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1. INTRODUCTION

Environment plays a major role in creating most of the behavioral traits. In other words, many of our emotions, habits, tastes, and even attitudes and communications are significantly affected by the environment. Therefore, many scholars have called the environment a university that can teach and effect each person, based on their backgrounds and talents. A university that no one will ever graduate from [11]. This is called educating environments, a subject that has been proposed in the recent years.

Educational environments have significant effects on their users, who will be educated by direct and indirect guidance. The purpose of designing these environments is to educate, exchange and benefit from the experiences of others to enhance the quality of life of the residents. An educational public space is consisted of three factors: individual, community and physical space, the important factor in these environments are, the proper individual and general education and respecting the natural or artificial surroundings [12].

An educating environment would improve three qualities: social, cultural and moral values. An environment with cultural values will have an effect on its users' personality. The moral values based on logic and human experiences impose restrictions on human freedom, and communicating can also be mentioned as a social values.

1.1. Review of Literature

Considering the conducted studies to use the criteria of educational environment in the residential complex, we first study the interaction between the criteria of the quality of the residential environment and educating environment, as follows:

1.1.1. The quality of the residential environment

If designers and researchers consider the quality of the residential environment based on its concept as a man made environment, it should include a set of adaptations between "physical environment, residents and their needs" and in developing the design indicators of these environments, we consider the mutual relation between the two components of the "basic characteristics of the physical form of a residential environment" and "needs and expectations derived from the cultural and social values of the inhabitants," by establishing a link between theoretical and practical areas, and by extracting the physiological, environmental and psychological, social and cultural criteria of residential environment and translating them into designing criteria, it is possible to improve the quality of these environments. Consequently, a qualitative judgment about the well-designed residential environment requires an examination of the level of residents' satisfaction, which depends on the functional concept and adaptation of the physical form of the residential environment to a series of needs and expectations of its inhabitants [3].

Indeed, it can be concluded that satisfaction criteria can be used to identify the improvement of life quality in a residential environment. In fact, the concept of residential satisfaction is closely related to the concepts of standard of living, well-being, livability, quality of place and quality of life and health, in such a way that these concepts overlap and sometimes are considered the same [4]. Therefore, the concept of satisfaction and the related criteria will be discussed.

1.1.2. Resident Satisfaction

This is a multi-dimensional and broad concept. May (1996) considers health, physical environment, services and facilities, social development, individual

development and security as various aspects of residential satisfaction. McLaren (1996) believes that two different types of measurements can be used to measure quality of life. First, objective measurements which include the tangible aspects of the human environment, and secondly, the mental indicators that measure the degree of satisfaction of individuals in a particular aspect. Studying these measures in terms of mentioned aspects can lead to a certain amount of quality of life in a given society [5].

Argonnes and Amrugo (1997) also argue that the objective traits of the environment become mental traits and then affect the sense of satisfaction. The mental traits are also affected by the characteristics of the person using the space [6].

Marcos and Sarkisian (1986) consider the satisfaction of residential environment depend on different variables such as compatibility, maintenance, visual appearance, satisfaction with management, the presence of homogeneous neighbors, understanding of economic value and satisfaction from other neighbors; Adaptation of the inhabitants has an impact on the value of the economy, the appearance and the satisfaction of the residential environment. Residents' homogeneity and maintenance by neighbors satisfaction is effective on the satisfaction of the residential environment (Figure 2-5) [7].

Counter considers the three main components in assessing residents' lives: the spatial aspects (architecture and urbanism), human aspects (such as social relations) and the functional aspect (services and facilities). By combining different viewpoints and relying on the definition of Counter in a comprehensive approach to the place, three general components can be named to raise an emotional bond between the individual and environment that ultimately leads to a sense of place and satisfaction. The first one is "physical form of a space" that includes elements of the physical environment such as

views and perspectives, scale, signs, the ratio between mass and space, which, according to Lynch, make the environment more or less legible. The second one is "activities" includes the vitality and behavior of the people, and the third aspect is "concept" that includes attraction, perceptual functions, and quality assessment of the environment [8].

Widerman and Anderson presented four key questions that included perceptual, emotional, and behavioral concepts of residential satisfaction:

- How much is the satisfaction of residents (from space or housing)?
- How long do residents like to live in this place?
- If the residents (for whatever reason) moved from this place, would they like to live in a similar place?
- Do residents suggest this place to their friends [4]?

Bonaito et al., conducted various studies about the residential satisfaction among Roman citizen and consider that satisfaction is related to the physical aspects (the physical form of mass and space, space efficiency and the presence of nature), social aspects (people and social interactions), functional (public services, recreational services, business services, transportation services), underlying aspects (health and hygiene, maintenance).

Yo et al., (1999 and 2006), conducted a global study on the perceived quality of residential environment in Italy, and mentioned eleven criteria in four groups, comprising three units in relation to spatial aspects (planning space-design, space layout, accesses and green spaces) a unit focuses on human aspects (people and social relations), four units dealing with functional aspects (insurance, recreational services, economics and transportation), three units in relation to the underlying aspects (lifestyle, environmental health and maintenance) (1997) [9].

1.1.3. Effective factors in creating satisfaction

Satisfaction with the residential environment means how people evaluate their living environment. Actually, there is no agreement to determine the type of assessment for the satisfaction of residents and users; because each person has various definition of satisfaction in term of personal, social, economic, physical and cultural conditions. According to the studies, four areas of personal factors, social factors, cultural factors and architectural and environmental factors can be considered effective in residing satisfaction (Fig. 1). The discussion of this research has been on architectural and environmental factors. Therefore, in order to investigate the architectural and environmental factors more effectively, based on the conducted studies in our country, the criteria and sub criteria of satisfaction has been identified and are presented in Table 1.
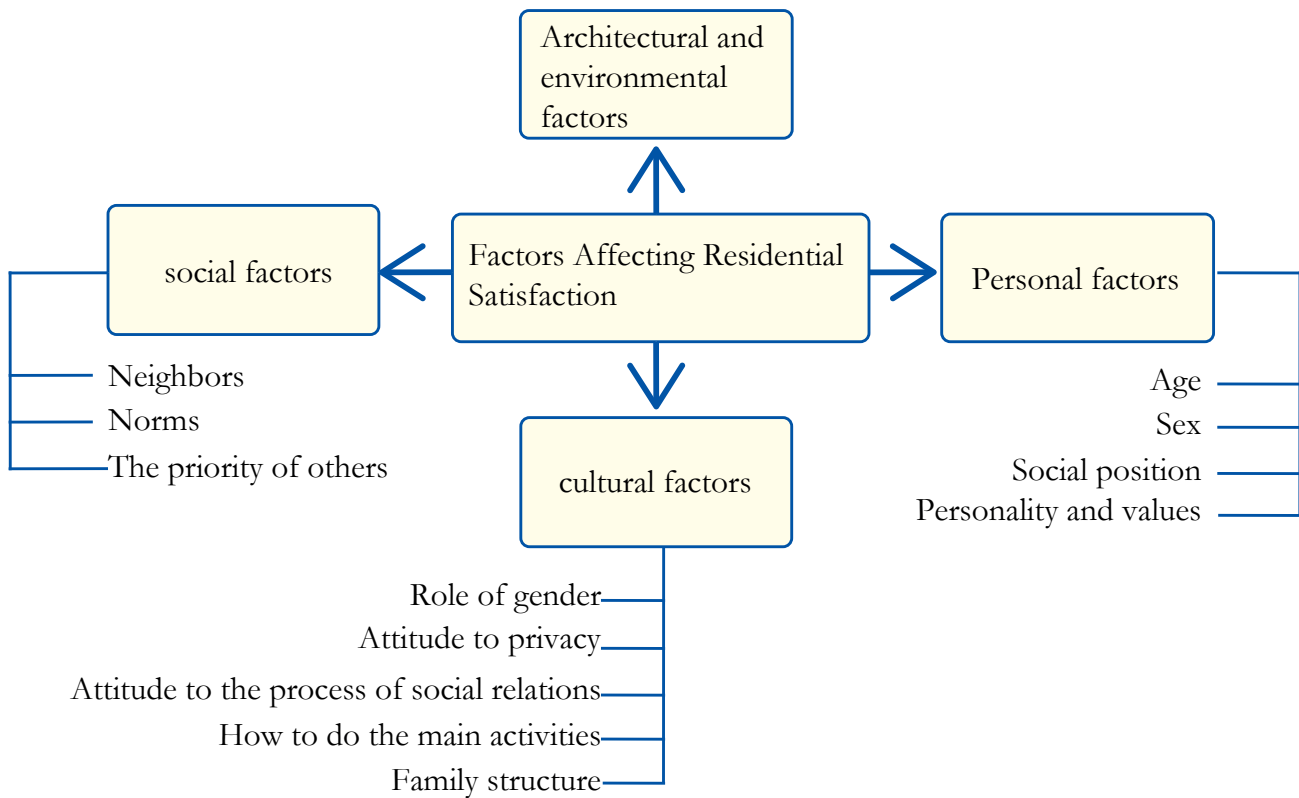

Figure 1. Factors Affecting Residential Satisfaction (Source: Writer)

Table 1. Effective Architectural and Environmental Factors on Residential Satisfaction (Source: Writer)

Architectural and environmental factors	Criterion	Measurements	Sources
Social aspect	Social interaction	Relationships with neighbors, Relation between same aged groups, Participation in social activities, Making friends, Proper security and protection, Privacy and social interaction	(Sassani et al., 2016), (Gharebagloo, Einifar and Yazidi, 2013), (Ghiyi et al., 2011), (Rafie'an et al., 2008), (Soil Zand and Baghalian, 2015)
Functional aspect	Facilities and General Services	Complex facilities (Shooting and lift, guard, parking, ...), Sport facilities, Recreational facilities, Service Facilities, Environmental quality, Leisure space, Management methods	(Rafiyan et al., 2008), (Ghiasi et al., 2011)
Spatial aspect	The proper mental and objective image of housing	Qualitative features (proper landscape, proportions of spaces, colors of spaces, light of spaces), quantitative features (dimensions of spaces, number of bedrooms, number of flats in the complex)	(Ghiasi et al., 2011), (Zabihi et al., 2011), (Rafiyan et al., 2008)
	Accessibility and permeability	The hierarchy of access to the urban communication network, suitable access to services, facilities and important urban utilities, access for pedestrians and drivers and its division, the access path to the residential flats (entrance, staircase, lifts), creating a connection between residential space and outdoor spaces	(Ghare Baglou and Khaleghi Moghaddam, 2013), (Zabihi et al., 2011)
	Mass and space	Desirable layout of blocks, occupancy level and appropriate density, open space for children playground, open space for gathering	(Zabihi et al., 2011)
	The landscape	Appropriate views, favorable form and facade of buildings	(Rafiyan et al., 2008)
	The environment	Proper green space in terms of quantity and quality	(Zabihi et al., 2011)
	Comfort and safety	Commuting vehicles, commuting of inappropriate people, safety of space in terms of health, reducing noise pollution, moderating congestion, providing thermal comfort, providing conditions for mental health (the distinction between privacy and hierarchy, proportion between form and function, The presence of natural elements)	(Sadegh Saberi et al., 1395), (Gharebagloo and Khaleghi Moghaddam, 2013), (Rafiyan et al., 2008), (Soil Zand and Groghalian, 2015)
	Coherence	Location of different spaces (such as sports fields, playground, sitting area, ...), and their dimensions	(Behzad Far and Ghazizadeh, 2010)
	Confidentiality	Spatial hierarchy, privacy and public boundaries, the possibility of monitoring, sense of territory and control	(Behzadfar and Ghazizadeh, 2010), (Sassani et al., 2016)

	Security	Security of the complex, security of each flat, visual permeability, safety and social cohesion	(Rafie'an et al., 2008), (Gharebagloo, Einifar and Izadi, 2013), (Khak Zand and Baghalian, 2015)
	Identity	Importance, Honor, Unwillingness to Replace	((Sassani et al., 2016)
	Charm and delicacy	Providing clarity and readability, environmental conditions, a suitable context for responding to emotional needs, creating a suitable environment for responding to objective motivations (providing facilities for exploring, diversity and richness of the environment, freedom of choice)	(Nozari, 2004)
	Location desirability	Nature, Flexibility, Micro Environments, Environment Capabilities	(Khak Zand and Baghalian, 2015), (Behzad Far and Ghazizadeh, 2010)
	Adjusting with cognitive and perceptual abilities	Readability, Scale, Navigation	(Khak Zand and Baghalian, 2015), (Sadegh Saberi et al., 2016)
	Adjusting to the needs of users	Paying attention to the needs of children, the elderly and the disabled, participatory architecture (participation in design studies and initial ideas, maintenance, design choices)	(Kamel Nia, 2013)
	Vitality and socialization	Possibility of the presence of different groups of residents at the residential area, managing the residential complex by the residents	(Ghare Baglou and Khaleghi Moghaddam, 2013)
	Diversity and Functional Dynamics	Avoiding the monotony, flexibility of spaces and activities, paying attention to empty spaces as a living space	(Ghare Baglou and Khaleghi Moghaddam, 2013)
	Paying attention to cultural and social dimensions	Having beliefs (sanctity, creation of the universe, the spirit of life), meeting the spiritual needs (establishment, sustainability, privacy, upbringing of the soul), improving the quality of residence (territory and privacy, security, comfort, peace)	(Pour Deihimi, 2003), (Khakpour et al., 2014)

1.2. Educational environments

The structure of the educating environment consists of three factors: individual, community and physical environment, as in these environments, individual and communal education and respect for the surrounding environment, both natural and artificial, are considered [2].

The individual education of the users of these environments can be categorized into five factors of physical, mental, social, emotional and moral factors. The three mental, social and emotional factors are related to the individual's abilities and the physical factor is associated with the structure and function of the human body, and moral factors

highlight the respect for moral values. The social development of users of a educating environment can also be categorized. These factors are like individual education, include five areas of physical, mental, social, emotional, and moral. The effect of the physical domain on the inclusion of artifact structures on architecture is quite clear. Other factors are also related to architecture.

The environment can have an indirect impact on the individual, an environment can teach its users, cultural, moral and social values.

1.1.1. Identifying the principles of designing an educating environment

In order to form a learning environment, after understanding the concept correctly, the principles and criteria of its design should be identified. The principles of designing an educating environment are as follows:

Principle 1: Noticing the indirect education of the environment

One of the most basic principles in designing educational buildings is paying attention to indirect environmental trainings and the transformation of these signals into forms that, in addition to being feasible, have fundamental impacts on the learning of cultures and norms required by human societies.

Principle 2: Mutual education of citizens and residents of the building

According to the first principle, the environment transmits the customs and values and cultural and social standards to humans, and since each person's perception is different, therefore, in designing educational spaces, it should be noted that the residents should have the opportunity to share their perception from the space with each other.

Principle 3: Interaction of the attitude governing the architecture with the thoughts of others

Architecture and all the attitude towards it, have a close relation with human life. Architectural space is created through one of the main human abilities, namely his creativity, the creativity of individual is made up of his beliefs and ideas, and it creates a space that embraces these principles. As a result, the person's attitude appears in architecture. On the other hand, architecture teaches principles to an individual that regulate his life. Therefore, the principles governing the architecture and ideas of the individual interact and form each other.

Principle 4: The principle of the dynamism and interactivity of man and building

Constructing a building that can meet man needs as he matures, and even contribute to its progress is part of the function of a prominent architecture [10].

Using the conducted studies, the educating environment design criteria can be summarized in Table 2:

Table 2. Educational Environment Designing Criteria (Source: Writer)

Educational Environment Designing Criteria	Measures
Security (Mansouri, 2015)	The presence of women and children and the elderly in the environment, the presence of disabled and unfortunate, the presence of families in the environment, crime rate statistics, proper view, proper lighting at night, observance of factors such as the isolation of territory congestion and personal space
Health and safety (Mahdavi Nejad et al., 2012)	Safety in the structure of the routes, the collection of waste from the environment, the collection of sewage and surface water from the environment, the public health environment, the safety of public activities, healthy living by providing an environment for mobility
Access and circulation (Mansouri, 2015)	Readability of accesses and facilities in space, the priority of the pedestrians in the space, the possibility of playing for children and teenagers, the readability of space available in the environment
Spaces and public facilities (Samadzadeh, 2012)	The provision of internal spaces within the scope of the field provides for the establishment of social relations, providing intermediate spaces that interact with the surrounding environment.
National and local identity (Samadzadeh, 2012)	The presence of Islamic and Iranian symbols and the reference of cultural memories, encouraging coordinated behaviors with the Iranian Islamic culture by the environment, the relation between the form and the functions, trimming the environment of the wicked and anti-cultural elements, using local materials, conservation of the vegetation of the region
Flexibility (Samadzadeh, 2012)	Flexibility in space, flexibility in furniture
Transparency (Samadzadeh, 2012)	The connection between the interior and exterior, increasing the readability of information, which leads to a better understanding of the environment
Naturalism (Samadzadeh, 2012)	Observing diverse plant species in the architectural space, using natural materials, promoting environmentally friendly goods, paying attention to recycling and recyclable materials, using natural patterns in design, compatible with region and climate, minimizing damage to valuable resources such as soil and vegetation and water
Aesthetics (warmness, charm, courtesy) (Mansouri, 2015)	Harmony, suitable furniture, compatible with climate and region, using familiar and eye-catching views, quiet environment, purity and simplicity.
The emphasis on interconnection and the development of local relations in space (Mansouri, 2015)	Presence of designed spaces for gathering, the existence of accepted cultural and local elements by citizens, the presence of elements and spaces in human scale, the presence of public services and sanity
Cultural and social interaction (Mansouri, 1394)	The presence of different ages in the environment and the possibility of interacting with each other, encouraging voluntary activities among generations in the specified space, the possibility of group interaction in the environment, social control and public monitoring on the spaces

2. RESEARCH METHODOLOGY

This study is based on a combined exploratory method, first, the quality data were collected by reference to library documents for identifying and matching the criteria of the educational environment and the qualitative criteria of the residential environment. Then, the quantitative

data was collected using a questionnaire and applying Delphi method. The designing variables of educational public spaces were formed in the residential complex by using qualitative data, which were organized through a structured questionnaire. The questionnaire was prepared for the first round using the Delphi method. This questionnaire was distributed among the ten professors of architecture, and then the results were analyzed, and in order to achieve sustainability in the responses, some questions were sent to the professors for the second time. Finally, the collected data was analyzed by SPSS18 software. These analyzes included a review of the central indicators in the data and the Kendall correlation test. The priority and correlation between criteria and micro criteria were determined based on data analysis.

3. DATA ANALYSIS

3.1. Adapting the criteria of the educational spaces to the quality criteria of the residential complex

In order to analyze the information, the first step was to adapt the criteria of the educating environment to the qualitative criteria of the residential environment, in order to determine the overlap of these two series of criteria, this process is presented in Fig. 2.
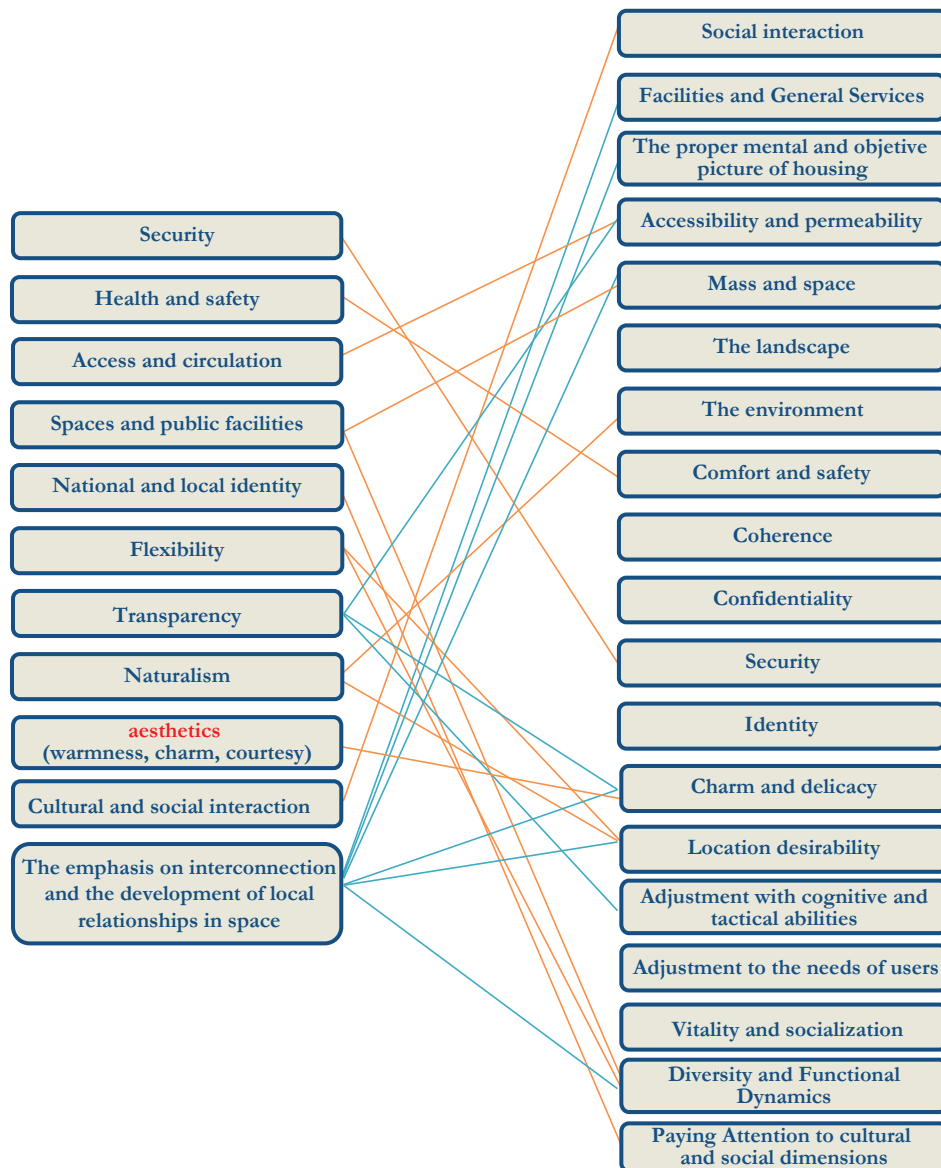

Figure 2. Adjustment with the criteria of the educational environment and the standards of the residential complex (Source: Writer)

3.2. Designing and validation of the questionnaire

Cronbach's alpha method was used to check the reliability of the questionnaire. In this way, the results of above 0.7 were acceptable and the results of the analyzes could be trusted for research projects. Although the Cronbach's alphabet of data was close to one (0.969), but some of the questions were omitted because some criteria were below 0.7, some questions that were overlapping with other questions and could be removed. Also, to solve this problem, some questions were referred to some of the professors (whose grades differed from the mean scores) for re-scoring. The general Alpha-Cronbach is given in Table 3 below.

Table 3. Cronbach's alpha in step three (Source: Writer)

	General	Criteria A	Criteria B	Criteria C	Criteria D	Criteria E	Criteria F
Cronbach's Alpha	.967	.701	.715	.821	.713	.703	.918
No of Items	47	6	2	6	5	5	5
	General	Criteria G	Criteria H	Criteria I	Criteria J	Criteria K	
Cronbach's Alpha	.967	.769	.712	.782	.863	.860	
No of Items	47	3	3	2	4	6	

3.3. Criteria Analysis

Given the reliability of the questionnaire, reasonable results can be obtained from the questionnaire based on the extracted data from the questionnaire, which is further discussed.

3.3.1. Prioritization the criteria based on mean scores

Based on the mean scores (Table 4), we can prioritize the criteria for educational public spaces in the residential complex as follows:

1. Security
2. Health and safety
3. Aesthetics (warmness, charm, courtesy)
4. Cultural and social interaction
5. National and native identity
6. Naturalism
7. Access and circulation
8. Spaces and public facilities
9. The emphasis on interconnection and the development of local relationships in space
10. Flexibility
11. Transparency

Table 4. Examining the central indicators of the criteria (Source: Writer)

	A	B	C	D	E	F	G	H	I	J	K
N Valid	9	9	10	10	10	10	10	10	9	10	10
Missing	1	1	0	0	0	0	0	0	1	0	0
Mean	7.78	6.22	6.80	7.60	7.80	7.10	6.00	7.00	6.89	8.10	8.30
Median	8.00	6.00	7.00	8.00	7.50	7.00	6.00	7.00	7.00	9.00	9.00
Mode	8[a]	6	7	8[a]	7	7	5[a]	5[a]	7[a]	9	9

a. Multiple modes exist. The smallest value is shown

3.3.2. Criteria Correlation

The correlation of the criteria was based on the Kendall test in SPSS18 software. The Kendall test was used between the Kendall test and the Spearman test, both of which are used for discrete data, because there are few repeated data in the project.

According to this test, correlation with the positive direction of health and safety criteria and security criteria were determined. Also, the criterion of naturalism and the criterion of spaces and public facilities also have a positive correlation.

3.4. Micro core analysis

The three criteria of security, health, safety, and aesthetics (warmness, attractiveness, and elegance) that are more important to professors, are examined. The results are as follows:

3.4.1. Microeconomic analysis of security

According to Table 5, you can prioritize the criteria for a security measure based on average scores as follows:

K_5) Lightning Instructions at night.

K_1) Increasing the presence of women, children and elderly in the environment by designing spaces appropriate to the needs of each group and providing them with suitable facilities.

K_6) Increasing security in the environment by observing factors such as privacy, congestion, territory and personal space.

K_2) Providing architectural solutions to facilitate the presence of disabled and unfortunate.

K_3) Creating spaces for the presence of families in the environment. (K2 and K3 have the same significance)

K_4) Proper vision to all parts of the environment.

Table 5. Examining the central indicators in the microeconomic criteria (Source: Writer)

		K_1	K_2	K_3	K_4	K_5	K_6
N	Valid	10	10	10	10	10	10
	Missing	0	0	0	0	0	0
Mean		7.40	6.80	6.80	6.70	7.70	7.30
Median		8.00	7.50	6.50	7.00	8.00	7.00
Mode		9	5[a]	5	8	8	7

a. Multiple modes exist. The smallest value is shown

3.4.2. Micro criteria Analysis of Health and Safety

According to Table 6, it is possible to prioritize the criteria for health and safety measures based on average scores:

J_4) Creating new designs to encourage users to collect waste from the environment.
J_2) A proper design of the routes to create safety.
J_3) Designing spaces for mobility in users to improve their health.
J_1) Collecting surface water and planning to use it.

Table 6. Examining the central indices in the health and safety measurement (Source: Writer)

		J_1	J_2	J_3	J_4
N	Valid	10	10	10	10
	Missing	0	0	0	0
Mean		6.20	6.50	6.40	6.70
Median		6.00	6.50	7.00	7.00
Mode		6	5[a]	7	7

a. Multiple modes exist. The smallest value is shown

3.4.3. The analysis of aesthetics micro criteria (warmness, attractiveness, elegance)

According to Table 7, the aesthetics criteria can be prioritized based on average scores as follows:

E_4) Application of familiar and eye-catching facades enhances the beauty of the environment.
E_1) The sensitivity of the environment enhances by creating harmony and coordination between the whole with the components, as well as the components designed with each other.
E_3) The design of the spaces improves with the climate of the area, making the environment more comfortable.
E_5) Providing different sensual experiences by using proper architecture methods.
E_2) By knowing the users and designing the suitable furniture for them, and providing the ability to change and move, the sensitivity of the environment increases.

Table 7: Examining the central indices in aesthetics micro criteria (warmness, attractiveness, conditioning) (Source: Writer)

		E_1	E_2	E_3	E_4	E_5
N	Valid	10	10	10	10	10
	Missing	0	0	0	0	0
Mean		7.10	6.50	7.00	7.20	6.60
Median		7.00	6.00	7.00	7.00	6.00
Mode		7[a]	6	6	7	6

a. Multiple modes exist. The smallest value is shown

4. CONCLUSION

As it was mentioned, the purpose of this study was to identify the criteria for designing public spaces for educating in a residential complex to promote envi

ronmental quality. According to the results of the questionnaires, which are based on the Delphi test, these criteria are as follows: security, health and safety, aesthetics, cultural and social interaction, national and local identity, naturalism, access and circulation, spaces and public facilities, emphasis on interconnection and the development of local relations in space, flexibility and transparency.

By using the correlation test, two criteria for "naturalism" and "public spaces and facilities" as well as "health and safety" and "security" measures are positively correlated.

According to the results of the questionnaire analysis, the priority of micro criteria was also conducted. In this paper, the micro criteria are presented in the first three criteria. These analyzes indicate that the micro-criteria for "proper lightning at night" and "creating new designs to encourage users to collect waste from the environment" have been ranked top scores by professors for two criteria, "security" and "health and safety" respectively.

The micro criteria of " applying familiar and eye-catching facades in the design to reach the "aesthetics" criterion is a top priority.

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