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Investigation of Indicators Affecting the Design of Elementary Schools and Children's Creativity Centers with Emphasis on Promoting Environmental Quality and Increasing the Social Skills of Children*

Zahra Sadat Ghodrati[a] - Behrooz Darvish[b] - Neda Balanian[c]**

[a] M.A. of Architecture, Faculty of Art and Architecture, South Tehran Branch, Islamic Azad University, Tehran, Iran (Corresponding Author).

[b] Professor of Architecture and Urban Planning, Faculty of Art and Architecture, South Tehran Branch, Islamic Azad University, Tehran, Iran.

[c] Professor of Architecture and Urban Planning, Faculty of Art and Architecture, South Tehran Branch, Islamic Azad University, Tehran, Iran.

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ABSTRACT

Modern society must encourage creative children to do its activities. Many studies have examined this topic over recent years, but the effect of architectural space design on creativity flourishing has received less attention. Hence, this study aims to identify the indicators affecting creativity and skill training among children. The main purpose of this study is to create a space for intellectual growth and flourishing social skills in children of the 2-10 age range, motivate inner challenges, challenge attitudes, and develop skills, and examine the role of education and the effect of architecture on the educational environment. The key question of this study is whether the indicators affecting the design of the elementary school and children's creativity center can improve creativity and increase social skills in the educational environment. This study used a descriptive-analytical method and collected data through the documentary method, interview (questionnaire), field visits, and observation. The questions of the questionnaire are distributed among statistical society (ordinary individuals, trainers, children's parents), and the hypotheses are designed and evaluated then the findings are analyzed based on the effective indicators for designing elementary schools and creativity centers by using analytic hierarchy process (AHP) to identify and prioritize the elements, SWOT to evaluate strengths and weaknesses, SPSS software for statistical analysis, and EXCEL software to divide and organize the results. Ultimately, it was concluded physical indicators and natural factors of the outside environments, cultural and social variables, and favorite architectural elements of children in addition to architectural design and creating legibility in design facilitate creativity and social skills. Regarding the design components of child space in the selected settings, it was found that design components have a positive effect on creativity growth and skill training among children. Moreover, research hypotheses that aim to confirm the effect of physical components of child space on activity development and skill training were realized.

Keywords: Design of Elementary School and Creativity Center, Social Skill, Creativity, Tehran City.

* This paper has been derived from the first author's MSc thesis titled "Design of Kindergarten with Approach to Creating Creativity and Promoting Social Skills among Children" guided by the second author and advised by the third author in the Faculty of Art and Architecture of Islamic Azad University South Tehran Branch, 2010.

** E_mail: zahra_ghodrati@ymail.com

1. INTRODUCTION AND STATEMENT OF PROBLEM

Children are the most sensitive age group in society, so they need to experience social life at their scale in this period of their lives when their personality, mental, physical, and social growth roots are shaped. This case requires providing a childish and intimate space that is free of adults' crowding, a world full of attractive colors where a child can express their feelings, new thoughts, and inner talents, and a space that allows the child's growth and creativity (Pourian 2011, 40). Creativity is one of important and interesting research subject, but it is difficult to implement it in different scopes, especially educational field (Runco 2007). Improved and developed creativity in childhood has a lifelong influence, so it may highly affect the development of countries (Guilford 1968). Creative thinking is necessary for modern humans, so it seems that the current social, economic, and cultural features make individuals acquire skills and training differently compared to the past (Stricker 2020). Researchers believe that the creation of suitable situations teaching individuals and timely encouragement influence the process of improving children's creativity (Van Liempd 2018), and the best age for creativity improvement in children occurs between 2 and 10 (Kupers 2019). In the opinion of Gardner[1], imaginations and thoughts shaped in early childhood create the base on creativity during puberty. The creativity improved during childhood has a lifelong influence (Amabeli 1996). This study aims to emphasize those strategies for designing physical environments related to children, which effectively foster their creativity and train their skills. Therefore, this study identifies the process of creativity growth and evolution by reviewing the papers and books about creativity and skill training from the viewpoint of psychology and architecture. This paper then proposes design ideas based on the diversity in elementary schools, creativity centers, and educational spaces for 2- to 10-year-old Iranian children with an approach to improving creativity and skill training. The results of this study can be used for some centers, such as elementary schools and creativity centers, as well as the complexes designed for children. For this purpose, the main question is whether the effective indicators in the design of elementary schools and children's creativity centers can improve creativity and increase social skills among children in educational environments. It is also asked how architectural design can be used in the creativity flourishing process, and increasing the skills of children. How does the space quality in the outcome of space's physical components influence the process of enhancing creativity and skill-training of children?

2. BACKGROUND

Many studies have been done on children, creativity, and architecture for children, so all of them cannot be mentioned herein. Hence, some of these studies are reported in Table 1.

Table 1. Some Studies Conducted on the Research Topic

Authors	Research Title	Conclusion
(Khosravi 2021)	Investigation of children's architecture features and its relationship with child creativity	Creating stimulating spaces with specific qualities is designed to meet children's needs encouraging them to be curious dynamic and imaginative in the environment.
(Soleimani and Khairy 2021)	A qualitative meta-analysis on environmental specifications affecting the children's creativity in schools and educational institutions	A suitable architectural design helps to achieve these goals providing children with a sense of peace in a comfortable condition and space.
(Atai and Torabi 2021)	The role of physical components of the environment in children's morale and mental dynamics (in architecture space for children aged 3-6 years)	Design components have a positive effect on the child's growth, and aim to confirm the effect of physical components of child space using diverse environmental triggers (light, sound, form, vegetation, soil, etc.)
(Beh Nia et al. 2020)	Some lessons from Children's participation in the design process of child-friendly urban spaces	Features of favorable space from the view of children have been examined in three scopes of architectural specification, specific characteristics existing in the considered space (educational or medical), and behavioral principles of personnel or coaches.
(Shah Hosseini and Saghafi 2018)	Creative environments at children's club	Creative environments include natural, quiet, joyful, physical, flexible, and stimulating environments. Doing creative activities provides a suitable place for creativity flourishing.

Authors	Research Title	Conclusion
(Azizi Far 2017)	Design of kindergarten with an approach to increase creativity in children.	The stimulating nature of the environment has a positive and significant effect on the three factors of curiosity, participation in games, and imagination. The impact of designs' flexibility in elementary school and creativity centers on the curiosity and imagination of children is positive and significant.
(Mark Diode et al. 2015)	Guideline for design of schools and kindergartens	In addition to architectural aspects of the educational spaces, this study has examined educational techniques of various countries sometimes the creative methods used in various schools, and architecture position in education progress.
(Harrington Susan 2015)	Seven criteria for choosing and designing outdoor play spaces for young children	Seven criteria (7C), these seven criteria are based on the findings adopted from a five-year multidisciplinary study on the play space in outdoor space in child care centers in Vancouver and include character, context, connectivity, change, opportunity, clarity, and challenge. This study paid more attention to change while ignoring context without paying full attention to all seven criteria.

3. THEORETICAL FOUNDATIONS

To examine the effect of suitable architectural principles for elementary school and creativity centers, the topics related to child psychology, creativity, social skills, and architecture must be analyzed within the process of education quality and mental growth of children.

3.1. Child Psychology

Bandura[2] believes that role modeling is one of the powerful sources of growth and development, which is also known as imitating or observational learning. According to the revised view of Bandura, children gradually perform more selectively in case on the subject they imitate. He believes that a large part of human learning is done through the classic conditional method, and another part through the operant conditional way. In his opinion, the behavior of a person (except for reflective behaviors) are learned through time, and personality is achieved through the experiences acquired from the environment (Berger 2010, 30). Table 2 reports the developmental psychology theories based on the psychology views that are divided into three categories.

Table 2. Theories Introduced in Developmental Theory

	Person's Nature	Development's Purpose	How Human is Developed
Learning Theories	A child's character is shaped easily through the factors available in the environment. These factors can include rewards or punishments or be some models and patterns that children live easily by imitating them.	No objective or limit is considered for humans believing that any living organism can match itself with the environmental conditions it lives in to acquire its specific habits.	In this field, just minor changes are investigated. The environment is the mode emphasized in the interaction between organism and environment.
Cognitive Theories	Children in fact acquire experiences that are interested to discover and explore them.	When a person evolves in terms of cognitive development to be eventually able to think of the concept of anything in an abstract way and reach the required conclusion.	Individuals do not deny the changes but emphasize the available changes in the growth quality. In the action between organism and environment, these theories emphasize the organism.
Psychiatric Theories	The child is guided through their powerful inner instincts.	The balance and control over inner feelings and motivations of individuals are developed, so they must be free of the conflicts created for them during childhood.	From the view of psychologists, each step is not the change of entering the previous step but is a new step that happens in a specific period of life and is experienced.

(Ahadi and Bani Jamali 2003, 34)

3.2. Creativity

Many definitions have been proposed for creativity, presenting specific theories. According to the studies conducted by Guilford[3] who has used advanced statistical models and methods and computer programs and concluded that the intellectual force of humans can be divided into four separate factors that each can be measured separately. In his opinion, these characteristics directly affect creativity and include fluency of intellectual flow (imagination), flexibility of intellectual force, originality of thinking, and elaboration. These four specifications shape divergent or unconventional thinking (Karimi 2019). Rodez has presented a framework for different creativity approaches. This framework expresses that creativity is studied at four levels: person, product, process, and press (environment). This framework has been the study based on creativity levels (González 2019). Davis and Rimm express that characteristics of creative individuals are classified into various categories, including originality, autonomy, risk-taking, being energetic, curious, having a sense of humor, being interested in complexity, being artistic, open-minded, need for loneliness, and high perception. Moreover, being aware, emotional, ethical, curious, and intelligent are characteristics of a creative person. Moreover, Sak assumes that being imaginative, emotionality and curiosity are some characteristics distinguishing creative students from gifted ones (Gucyeter 2020).

3.2.1. Review of the Amabile's Creativity Model

Amabile believes that creativity has three important components, including creative thinking, domain and trajectory of expertise, and motivation. When these three components are interconnected, a person's creativity anticipation would rise, as depicted in Figure 1.

Fig. 1. Amabile's Component Model (1966)
(Presidential Strategic Research Center)

3.2.2. Role of Environment Architecture in Improving Children's Creativity

When a child understands the new stimuli in the environment and reacts to them including moving towards it, reaching it, seeing o manipulating it, the child collects new information about the environment and learns new skills enabling him/her to perceive new efficiencies and use them creatively to develop his/her creativity (Louro 2019; Van Liempd 2018). Therefore, a creative environment is defined as an environment that can stimulate creativity. A group has introduced the features of the learning environment as the most important factor for creativity development (Hernández-Torrano 2020). Moreover, for creativity incidence and development, the learning environment must encourage students to discover new ideas, take risks, and interact. Brown, Campione, and Erez believe that students must have a free environment that is suitable for creative thinking (Gucyeter 2020). There are many factors affecting creativity growth, and Figure 2 depicts the nexus between various factors affecting creativity.

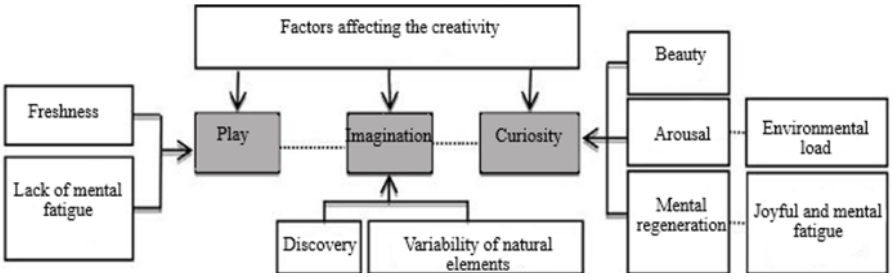

Fig. 2. The Nexus between Various Factors Affecting Creativity
(Shafipour et al. 2014)

3.3. Evaluating Criteria Stimulating a Sense of Place in Children

To create child-friendly environments, place design results in a sense of place based on the potential efficiencies that are actualized by children. Hence, the design of environments with potential efficiencies in which children participate would create a sense of place. Constructing caves, play routes, and other attempts they make informedly to define a certain space such as creating a space for mounting paintings on the wall indicate a realm for the child in the environment (Chatterjee 2005, 13). According to the mentioned points, there are other items affecting the architectural design for children as shown in Figure 3.

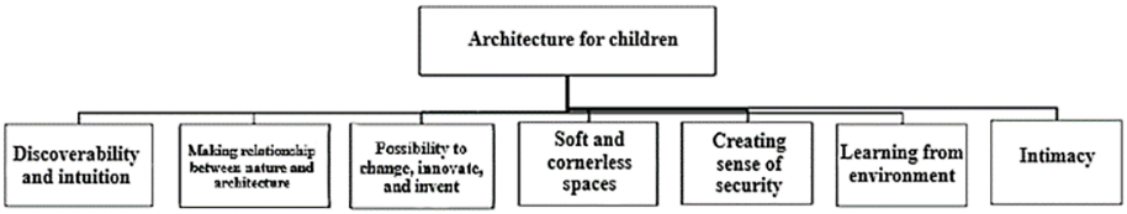

Fig. 3. Items Affecting the Design for Children

4. METHODOLOGY

To carry out this research and collect data, descriptive-analytical methods, and three documentaries, interviews (questionnaires), field visits and observation have been used. Those studies that have reviewed the current status of the considered topic have been reviewed to achieve the practical goals of the study which is designing an elementary school and creativity center. After the required data are collected, the Likert scale has been used then the questions are reviewed and possible ambiguities are removed after doing the mentioned steps regarding the research variables. The mentioned process would reveal and express the acceptable content validity of the questionnaire, and then Cronbach's alpha measurement method is used to assess the research reliability and ensure the estimation of internal consistency between considered questions and components. For this purpose, the questionnaires were distributed among statistical subjects based on the Likert scale Cronbach's alpha was measured using the data obtained from the mentioned questionnaires through relevant software. It should be mentioned that the alpha value always varies between 0 and 1 but this value must be greater than 0.7 to achieve acceptable reliability of the questionnaire. The closer this value to 1, the more reliable the questionnaire will be. In this research, Cronbach's alpha coefficient was assessed for 105 members and each variable.

4.1. Statistical Society

Regarding the research title, Khavaran Cultural Center has been chosen as a statistical sample because it is an outstanding cultural-social place located in District 15. To strengthen the proficiency topic (architectural design), the Islamic Azad University Sout Tehran Branch has been considered in addition to the statistical sample mentioned above. Two days from July 14, 2019, to July 15, 2019, were considered and statistical society was measured based on the Morgan Table (N=105).

4.2. Conceptual Model

According to the theoretical foundations of the study, statistical society's comments on the quality of the design of a center called the elementary school and creativity center were examined based on the creativity and social skill approach using a questionnaire, which was examined descriptively and analytically in the discussion and conclusion sections. Finally, the results of the study were obtained and designed in the conceptual model of the study as shown below.

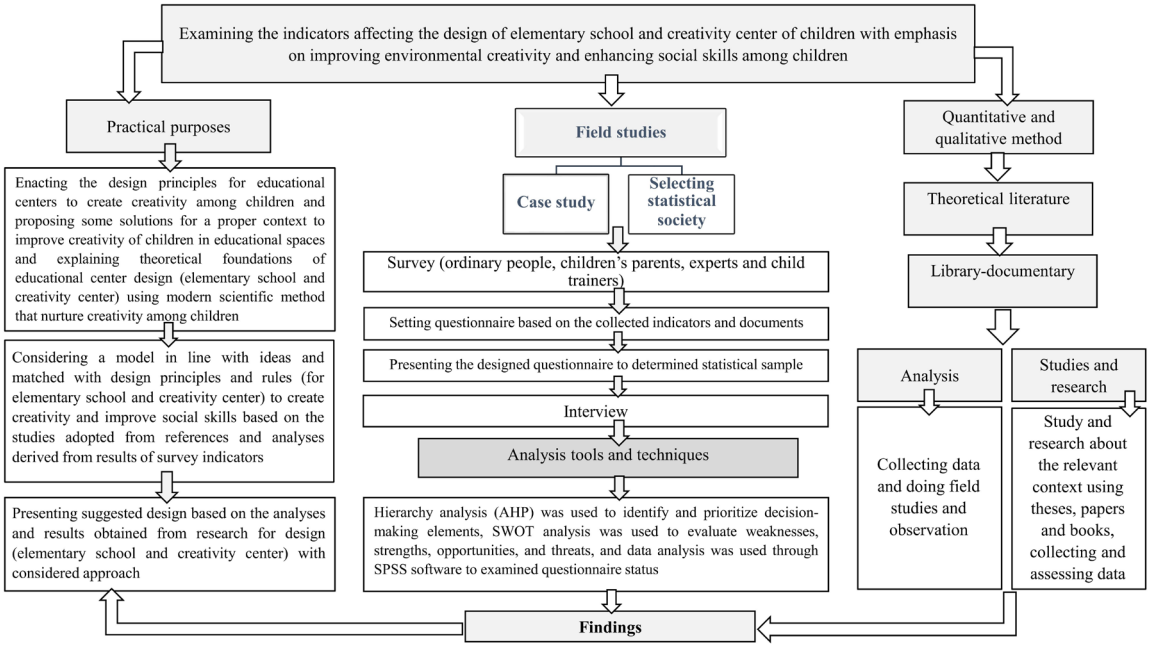

Fig. 4. Conceptual Model

4.3. Analysis Tools and Methods

In the data analysis step, the AHP method was used to determine and prioritize the elements, including possible purposes, criteria, characteristics, and options. This part of the study indeed determines and prioritize the important objectives of designing an elementary school and creativity center then the SWOT table has been used to design suitable strategy for activity evaluate feedback and action, and discover weaknesses, strengths, opportunities, and threats, and achieve more preparedness for coming incidences (Table 3). SPSS software has been used for data analysis, especially the results of questionnaires and field studies, as well as for examining the hypotheses obtained from the study. For this purpose, the raw data and information are imported as facts and figures then the results are obtained from the software (using SPSS software to examine the accountability of the questionnaire's items). The questionnaire data are examined at a descriptive level through this software. At the descriptive level, frequency distribution tables (frequency and percent) and diagrams are calculated and determined. In the final step, the obtained results are divided and organized then imported as classified categories into the EXCEL software. Table 3 reports the SWOT analysis of external and internal factors regarding the strengths, weaknesses, opportunities, and threats. Ultimately, the strategies are mentioned based on the mentioned options.

Table 3. SWOT Analysis

Internal Factors / External Factors	Strengths (Internal)	Weakness (Internal)
	S1-site elongation towards east and west S2-sufficient land for design S3-site's north-facing view and landscape towards green space and park S4-educational classrooms and behavioral therapy workshops S5- Activity of elementary school and creativity center in single and double shifts	W1-chamfering and irregular shape of the site W2-far distance between site and fire stations W3- site adjacency to park (possible injury caused by wicked people) when children enter and exit W4- the worn-out fabric of the site and surrounding environment
Opportunities (External)	O/S-based Strategies	W/O-based Strategies
O1-park around the site O2-easy access to the public transportation system O3-easy access of the site to main streets O4-existence of the clinic on the main street O5- the existence of a police station on the main street O6-presence of cultural adjacencies	O1-S1: design of the main building in the direction of site elongation and suitable view of available green space and park. O1-S3: Place playground space of children in the courtyard towards the considered park to achieve a better view. O2-S4: the easy access of the site to public vehicles allows parents to attend meetings more readily.	O1-W1: designing the site using the architectural technique, chamfer, and fracture, and converting it to spaces with better views over outdoor space. O3-W2: the site access to main streets allows faster relief in case of fire. O5-W3: when a police station is near or its station is installed inside the park, the possible injuries or risks are prevented.
Threats (External)	S/T-based Strategies	W/T-based Strategies
T1-improper jobs in front of the main door T2- crowding and congestion around the site when school is closed T3-noise and sound pollution when bells are rung for rest and closure times T4- lack of access to supermarket and store centers The low cultural level of the area and unwillingness of children to be present in elementary school and creativity center T6- lack of recreational places for children around the site.	S2-T3: since the size and area of land are not limited considerably, the micro-spaces can be managed in the design and place of spaces considering the noise pollution on the western side of the design. S5-T5: encouraging parents to attend classes and workshops S2-T4: the sufficient space in the site allows to design of a user-suited store (elementary school and creativity center).	W3-T6: the existing park and playground inside it can provide a suitable safe recreational space for all people, especially children regarding the police station existing there. W5-T6: some problems can be solved by using standard materials and construction instruments such as UPVC windows and other devices and renovation.

4.4. How to use Highly Important Indicators in Examining Case Studies

According to the theoretical foundations of the study and selected case studies (both Iranian and foreign studies), it was concluded that spatial attributes affecting creativity including the physical environment and form can improve creativity. Table 4 examines and reports the prominent specifications of case studies.

Table 4. Examining Effective Specifications and Its Architectural Appearance in Case Studies

Row	Specification	Architectural Appearance	Case Study
1	Flexibility and Multipurpose	Possibility to use an outdoor space at different times for various functions and activities	Muzeiko Children's Science Centre
2	Group and Joint Activities	Creating a space for reading books in a group, group play and painting, child participation in environment arrangement, and change through furniture	Southern Cross Primary School
3	Natural Elements	Using driving natural elements, such as plants and water in indoor and outdoor space	Muzeiko Children's Science Centre

Row	Specification	Architectural Appearance	Case Study
4	Daylight	Direct daylight irradiation from walls, ceilings, corridors, and most spaces	Southern Cross Primary School
5	Shape and Area of Spaces	Space simplicity concept and child's sense of security	Southern Cross Primary School
6	Legibility	Spatial design in a way that is easily remembered by children without any ambiguity	Badbadak Art School
7	Signs	Design of attractive elements such as tree and house	Southern Cross Primary School and Muzeiko Children's Science Centre
8	Spatial Diversity	Playing with different lights and shadows through colorful glasses, surface differences, mixed furniture, colors, and fabrics of the surfaces	Southern Cross Primary School and Muzeiko Children's Science Centre
9	Visual Connection with Outdoor Space	Relationship between child and sky, green space and nature through skylight and terrace	Southern Cross Primary School and Muzeiko Children's Science Centre
10	Safety	Using soft texture (foam coating with parquet coverage on floors and walls), controlling the height of staircases and fences, the direction of door openings, the height of windows, etc.	Southern Cross Primary School

5. FINDINGS

Research findings were evaluated based on the statistical society, sample size, and questionnaire. Figure 5 depicts the descriptive statistics based on the data obtained from the test (demographic characteristics of the statistical sample).

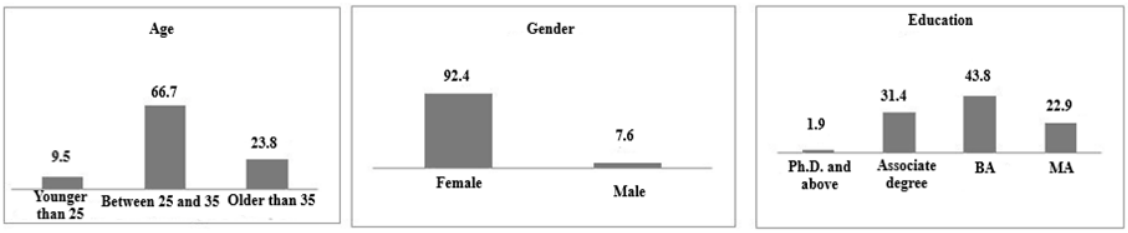

Fig. 5. Frequency of Age, Gender, and Education Level of Respondents

5.1. Distribution of Variables

Data description indicators are divided into three groups: central indicators, dispersion indicators, and distribution form indicators. In this part, research variables are distributed based on the most important central and dispersion indicators (standard deviation 2) then the questionnaire's items are determined based on the priority in Table 5.

Table 5. Respondents' Frequency Distribution based on the Questionnaire's Items

Priority	Items	Mean	SD	Standard Error	t-Value	df	Sig.
1	Does legibility in the interior design of elementary schools and creativity centers increase the quality of the educational environment?	4.1429	1.26665	.12361	33.515	104	.000
36	Is the design of the library essential as a part of the waiting space for parents in elementary school and creativity center?	4.0952	1.24440	.12144	33.722	104	.000
15	Is color diversity effective in making balance and smoothing the educational environment in elementary schools and creativity centers?	4.0571	1.31433	.12827	31.631	104	.000
16	Do the different colors create excitement among children in the environment of elementary school and creativity center?	3.9810	1.27838	.12476	31.910	104	.000
2	Does the legibility in the interior design of elementary schools and creativity centers increase the permanence and sense of belonging in children?	3.9714	1.36901	.13360	29.726	104	.000
18	Does the daylight (direct irradiation through walls and ceiling) in the elementary school and creativity center increase the quality of learning and creativity of children?	3.9714	1.15573	.11279	35.212	104	.000
10	Does the furniture suitable for children in the interior design of the elementary school and creativity center meet individual needs?	3.9619	1.38622	.13528	29.286	104	.000
7	Is the connection between spaces (architectural plan) to achieve a circular pattern attractive for the child?	3.9524	1.33288	.13008	30.385	104	.000
34	Is it necessary to design a space for leisure time (play, match, etc.) for parents to spend time with their children in elementary school and creativity center?	3.9524	1.30370	.12723	31.065	104	.000
39	Does group and joint play increase the shareability among children?	3.9429	1.17530	.11470	34.376	104	.000
38	Does the creation of a platform for interaction between parents and children in the elementary school and creativity center effectively improve their social skills?	3.8952	1.23976	.12099	32.195	104	.000
29	Does safety affect the sense of security among parents?	3.8762	1.38464	.13513	28.686	104	.000
27	Does a space for holding theater and performance courses in the elementary school and creativity center lead to the intellectual development of children?	3.8571	1.28922	.12581	30.657	104	.000
14	Does the employment of mixed furniture and observance of surface height in architecture lead to permanence and attractiveness?	3.8000	1.33301	.13009	29.211	104	.000

Priority	Items	Mean	SD	Standard Error	t-Value	df	Sig.
24	Does the creation of a space for composing poems and poetry in the elementary school and creativity center increase the self-confidence of children?	3.8000	1.37561	.13425	28.306	104	.000
41	Do playing devices (Swing, slide, see-saw, etc.) in the courtyard space of the elementary school and creativity center create communicational interactions between children?	3.7333	1.28801	.12570	29.701	104	.000
32	Does the application of various geometric volumes or shapes such as a cave, tree, and house in the design of the elementary school and creativity center make children satisfied and persuaded to attend this center?	3.7048	1.32957	.12975	28.552	104	.000
31	Does the use of various geometric volumes or shapes such as caves, trees, and houses in the design of elementary schools and creativity centers make creativity?	3.6952	1.45525	.14202	26.019	104	.000
20	Does the use of different lighting patterns in elementary schools and creativity centers make children satisfied?	3.6762	1.36223	.13294	27.653	104	.000
19	Does the use of different lighting patterns in elementary schools and creativity centers increase spatial quality?	3.6476	1.32999	.12979	28.103	104	.000
17	Does a new view of painting (mural) lead to skill training among children?	3.6381	1.36666	.13337	27.278	104	.000
11	Does the use of furniture for children in the interior design of different lighting patterns in elementary schools and creativity centers create a sense of belonging among children?	3.6190	1.36143	.13286	27.239	104	.000
21	Does the creation of a visual connection between indoor and outdoor (sky, green space, nature) spaces of elementary school and creativity centers increase learning among children?	3.6000	1.28303	.12521	28.752	104	.000
3	Do the architectural shape and structure and space area and size in the interior design of elementary schools and creativity centers affect the communicational interactions among children?	3.5810	1.44635	.14115	25.370	104	.000
37	It is essential to design a coffee shop as a part of the waiting space for parents in the elementary school and creativity center.	3.5810	1.37827	.13451	26.623	104	.000
40	Do play devices in the courtyard space of the elementary school and creativity center increase the intellectual development of children?	3.5714	1.39957	.13658	26.148	104	.000
25	Does the creation of a space for poetry courses in the elementary school and creativity center enhance the intellectual growth of children?	3.5619	1.40003	.13663	26.070	104	.000
28	Does safety observation create a sense of comfort in children?	3.5429	1.42794	.13935	25.424	104	.000

Priority	Items	Mean	SD	Standard Error	t-Value	df	Sig.
4	Do the architectural shape structure and space area in the interior design of the elementary school and creativity center (in terms of size and function) affect the mental development of children?	3.5238	1.27924	.12484	28.226	104	.000
8	Is the different architecture (quiet space, loneliness corners, etc.) essential for the elementary school and creativity center?	3.5238	1.33081	.12987	27.133	104	.000
26	Does the creation of a space for holding theater and performance courses in the elementary school and creativity center increase self-confidence among children?	3.4952	1.42183	.13876	25.190	104	.000
9	Does the integration of individual and collective spaces affect the sense of participation and communicational skills of children?	3.4762	1.35941	.13266	26.203	104	.000
23	Do the natural elements (plants, water, farm) in the space of the elementary school and creativity center create a sense of pleasure and happiness in children?	3.4381	1.30770	.12762	26.940	104	.000
5	Are the architectural shape and structure and space size in the interior design of the elementary school and creativity center (in terms of size and function) effective in creating a better space for children's learning?	3.3810	1.38939	.13559	24.935	104	.000
22	Do the natural elements (plants, water, farm) in the space of the elementary school and creativity center create a sense of responsibility in children?	3.3524	1.47401	.14385	23.305	104	.000
12	Does the use of movable furniture create a sense of participation in children?	3.2857	1.37781	.13446	24.436	104	.000
30	Does the CCTV inside the elementary school and creativity center create security in the complex?	3.2857	1.37081	.13378	24.561	104	.000
6	Does the connection between spaces (the architectural plan of the elementary school and the creativity center) reach a circular pattern to increase a child's productivity and performance?	3.1619	1.33102	.12989	24.342	104	.000
33	Does the use of different geometric volumes and shapes such as a cave, tree, and house in the design of elementary schools and creativity centers serve as entertainment in training courses?	3.0952	1.37648	.13433	23.042	104	.000
35	Is it essential to create a space for leisure time for parents when are in the elementary school and creativity center?	3.0571	1.26968	.12391	24.673	104	.000
13	Does the use of movable furniture create a sense of responsibility among children?	3.0286	1.25159	.12214	24.795	104	.000

According to the data reported in the table above, the first question with a mean value of 4.19 is the priority, while question 13 with a mean value of 3.02 is the last priority, which is confirmed statistically and the remaining ranking questions are sorted as shown in this table.

5.2. Inferential Statistics through SPSS Software

Statistical analysis of results obtained from the questionnaire, field studies, and hypotheses has been done through SPSS software.

5.2.1. Testing Normality of Variables

To examine the appropriateness of research data (proposed hypotheses), the valid Kolmogorov-Smirnov test has been used (Table 6).

Table 6. Kolmogorov-Smirnov Test of Research Variables

Hypotheses	Sig.	The Final Statistic of the Test
Main Hypothesis	0.288[c]	0.270
Hypothesis 1	0.197[c]	0.890
Hypothesis 2	0.458[c]	0.260
Hypothesis 3	0.469[c]	0.698
Hypothesis 4	0.566[c]	0.198

According to this table, the distribution of data is normal if the significance level of all independent and dependent variables is greater than the test level (0.05). The central limit theorem can be used to test normal distribution.

5.2.2. One-Sample t-Test

Hypothesis 1: it seems that physical and environmental indicators of outdoor space have a significant relationship with enhanced creativity and improved social skills of children (Table 7).

Table 7. Results of One-Sample t-Test of Hypothesis 1

Mean	SD	Standard Error	t-Value	df	Sig.
3.5390	0.64039	0.06250	56.62	89	0.000

According to results reported in Table 7, a significant difference exists between the mean values of the considered sample and hypothetical mean available in the country at the significance level of 0.01 (t=65.32) regarding the effect of physical and environmental indicators of outside on increasing creativity and improving social skills of children. Therefore, the effect of the mentioned cases is at the upper-intermediate level.

Hypothesis 2: it seems that some variables such as physical indicators, environmental factors of outdoor space, space shape, and area, and cultural and social variables in addition to architectural design affect the creativity incidence and promotion of social skills (Table 8).

Table 8. Results of One-Sample t-Test of Hypothesis 2

Mean	SD	Standard Error	t-Value	df	Sig.
3.7143	0.60692	0.05923	62.71	89	0.000

According to results reported in Table 8, a significant difference exists between the mean values of the considered sample and hypothetical mean available in the country at the significance level of 0.01 (t=62.71) regarding the effect of physical indicators, environmental factors of outdoor space, space shape, and area, cultural and social variables in addition to architectural design affect the creativity incidence and promotion of social skills of children.

Hypothesis 3: it seems that some factors such as design of interior arrangement, lighting, the texture of objects, color of objects, view and landscape of outdoor space, complexity and stimulation and flexibility, and design of interior spaces that contribute to more interactions between children are effective components (Table 9).

Table 9. Results of One-Sample t-Test of Hypothesis 3

Mean	SD	Standard Error	t-Value	df	Sig.
3.5390	0.64039	0.06250	56.62	89	0.000

According to results reported in Table 9, a significant difference exists between the mean values of the considered sample and hypothetical mean available in the country at the significance level of 0.01 (t=56.62) regarding the interior arrangement design, lighting, texture of objects, color of objects, view and landscape of outdoor space, complexity and stimulation and flexibility, and design of interior spaces in the design of indoor space of elementary school and creativity center. Therefore, the effect of the mentioned cases is at the upper-intermediate level.

Hypothesis 4: it seems that the use of visual paintings and architectural elements that are attractive to children, as well as the outstanding works in space decoration and creating a space in which, children's works can be shown every day in the design of elementary school and creativity center play a facilitating role in creativity and improving skill-training of children (Table 10).

Table 10. Results of One-Sample t-Test of Hypothesis 4

Mean	SD	Standard Error	t-Value	df	Sig.
3.8286	0.55299	0.05397	70.94	89	0.000

According to results reported in Table 10, a significant difference exists between the mean values of the considered sample and hypothetical mean available in the country at the significance level of 0.01 (t=70.94) regarding the use of visual paintings and architectural elements that are attractive for children, as well as the outstanding works in space decoration and creating a space in which, children's works can be shown every day. Therefore, the effect of the mentioned cases is at the upper-intermediate level.

Table 11. Results of Friedman Test on Prioritizing the Indicators

Hypotheses	Mean	Priority	SD	Sig.
Hypothesis 4	3.8286	First	0.55299	
Hypothesis 2	3.7143	Second	0.60692	Chi Square=28.32
Hypothesis 1	3.6349	Third	0.56838	df=3 Sig=0.0000
Hypothesis 3	3.5390	Fourth	0.64039	

According to the results of the Friedman test reported in table 11, data related to hypothesis 4 are at first rank and data of hypothesis 2 are at second rank, while features of hypotheses 1 and 3 are at third and fourth priorities, respectively. This relationship has been confirmed statistically because the obtained significant level is less than 0.05.

6. CONCLUSION

According to theoretical studies conducted on the design of an elementary school and ideal creativity center with the approach to improving creativity and social skills, some effective strategies must be considered based on the physical and mental conditions of children, so the sense of child's satisfaction would improve comfort level in them nurturing the fields for creativity incidence and skill-training for them. Regarding the considerable importance of the mentioned concepts in the design of children's spaces, Table 12 reports the main principles and basics of design and factors affecting the topic approach and how they influence creativity, social skill, and architectural design principles, and final summarization. The main question of the study points to the effective and efficient indicators and secondary questions that address some cases in the design of elementary schools and creativity centers referring to creativity flourishing and skill-training process, as well as the last question that investigates the quality of space and its impact on the outcome of physical components, it can be stated that mentioned points in Table 12 are responses to the asked questions.

Table 12. Summarization of Conducted Studies

Subject	Titles	Summary of Studies
Child	Effective and Efficient Indicators of Architecture in Improving Creativity and Social Skill	1. Designing spaces based on the age range of children 2. Using space-specific colors and colorful composites 3. Making sense of imagination in children using imaginative elements and fictional characters in stories 4. Design of special collective and group spaces 5. Allocating a part of indoor space to flowers and plants and designing natural space inside the building
Creativity	Strategy and Effect of Creativity on Architectural Design	1. Dividing some educational or play spaces based on the children's creativity and intelligence 2. Design of spaces that contribute to creativity incidents making child to think of creative ideas 3. Active contact between natural and social environment 4. Design of a space with different potentials for children's experience and doing group and participatory activities.
Social Skills	Effect of Spaces' Architecture on the Social Behavior of Children	Environment and social-economic relationships, beliefs to which a child is connected have a significant impact on the personalities playing a determinant role in nurturing their mental and psychological structure.
	Strategy and the Effect of Social Skill on Architectural Design	1. Design of spaces and operating workshops inside the elementary school and creativity center 2. Design of spaces outside the environment for group participation regarding the skill training 3. Separating spaces of practical, theoretical, and psychological workshops 4. Defining a space for the participation of parents and instructors to improve parents
Architecture	Space Quality in the Outcome of Physical Components of Space in the Creativity	Architecture is an art that has encompassed humans and humans are more influenced by the environment rather than their surrounding space. The architecture of the space of elementary school and creativity center is an effective factor in education and training because the environment has a direct impact on their learning and creativity levels.
	Effect of Architecture on Flourishing Creativity and Increasing Social Skill	1. Architecture based on the cultural and social level of each area 2. Architecture based on the gender of children 3. Architecture based on the IQ and creativity of children 4. Suitable design of spaces and physical environments to train individuals can nurture the skill in each field for the person

According to the results obtained from various studies, it can be stated that children have some conflicting needs, such as the need for being in a private place or being among peers. Therefore, these contrasts must be considered when a space is designed for children, so the mentioned needs must receive great attention regarding the conducted studies and this attention must be considered in the design. Hence, these contrasts are identified and prioritized and the children's needs are classified in the same way. According to the mentioned points, the space design for children must be done in the spaces based on the scales that are suitable for children allowing them to experience a private space while designing space where they can have teamwork and practical activities. Those spaces that create a different visual experience for children are highly attractive to them. In an ideal elementary school and creativity center with an approach to creativity and improving social skills, the architectural design symbols must be matched with the physical and mental conditions of the child, so they can freely and surely choose this space for play feeling peace and mental security there. The space of the primary school and creativity center must be innovative for the child creating a factor for improving the child's creativity and curiosity to enhance his/her creativity. All inner needs of a child must be considered to create an environment full of comfort to create a sense of peace in the environment. The required measures must be taken to meet these needs. If the space and its relevant elements are designed based on the physical, mental, and psychological conditions of the children, they can easily use their relevant spaces and devices, and this satisfaction finally leads to mental peace and improved creativity and skill-training of the child.

According to the questionnaire that was designed and distributed among statistical samples; 41 questions were formulated then the information reported in Table 5 based on the inferential statistics of SPSS software shows the first question is at priority with

a mean value of 4.14, while question 13 with mean value 3.02 is at the last rank, and this relationship has been confirmed statistically. According to the answer of the statistical sample, it was concluded that creating legibility which was one of the independent variables in the first phase of the study was considered the answer given to the main question of the study also as the main priority, so it could reach the main purpose and covered it. Therefore, the results of responses showed that children like those environments where they can find the paths and rooms quickly without being confused; in addition, color diversity is considered an influential factor in this environment. Another option that is one main priority for the design of elementary schools and creativity centers is the use of daylight and its effect on the improvement of children's creativity and the creation of motivation among them. Then, the design of child-specific furniture, the spatial connection of the plan, and the design of spaces for group plays are the most important cases mentioned by the statistical sample. Hence, all of the mentioned options are considered before designing an elementary school and creativity center, and the less important options were placed at the last priority or were completely ignored. After the questions of the questionnaire were examined, the hypotheses were tested using a one-sample t-test that was used to answer the research question. According to the obtained results, the research hypotheses are confirmed if the significance level of indicators is less than 0.05 and the mean value of indicators is greater than 3. However, the hypotheses are rejected if the significance level of indicators is greater than this value. According to the inferential statistics through SPSS software, the hypotheses were tested confirmed, and prioritized as reported in Tables 6-11. Also, hypothesis 4 indicates that in the design of the elementary school and creativity center, the use of visual paintings and architectural elements that are interesting for children, as well as the prominent works in space decoration and creating a place in which children can put their works on the wall every day facilitate creativity and promotion of skill-training in children. Hypothesis 4 has priority, while hypothesis 2 (indicating that physical indicators, natural factors of outdoor space, space shape, and area, cultural and social variables in addition to architectural design affect the creative incidence and promotion of social skills) is at second rank of priority. Hypotheses 1 and 3 have obtained the third and fourth ranks of priority, respectively. Moreover, a SWOT table (Table 3) was used to examine and propose strengths, weaknesses, threats, and opportunities of internal and external factors.

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CONFLICT OF INTEREST

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ENDNOTE

1. Howard Earl Gardner (1943)
2. Albert Bandura (1925)
3. Joy Paul Guilford (1897-1987)

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