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In the Name of God

Dear Readers,

I, on behalf of the editorial board, am proud to present this issue of the *International Journal of Applied Arts Studies (IJAPAS)* under the sponsorship of the Islamic Azad University, Yazd Branch. We were driven to found the *IJAPAS* by a noticeable lack of journals, in the Islamic Republic of Iran in particular, devoted to architecture, urban design, urban planning, architectural conservation and restoration, painting, art history, graphic, digital arts, fashion design, performing art, industrial design, aesthetics and semantics. Although the academic world is increasingly driven by cross-disciplinary visions and models, we seek multi-disciplinary views, an attempt to inform researchers, graduate students, and professionals about the trends, ideas and innovations being put forward in applied arts. To this end, in addition to standard articles, in every volume of the *IJAPAS* we hope to provide a special issue related to a respective field with innovation.

We are also sending out a call for papers related to *Applied Arts* to appear in the next issue of *IJAPAS* in Feb – Mar 20234.

Finally, I should mention that we are committed to a speedy refereeing process for every article submitted to us. We effort to reply to all papers submitted within five weeks' time with a response about acceptance or rejection. We also do not require formatting for submissions in our style until *after* the paper has been accepted by us for publication.

I would like to thank our Editorial Board for their work so far in helping to establish the *IJAPAS*. And, finally, I would like to extend my deepest gratitude to Dr. Ali Boloor, the assistant editor of the *IJAPAS*, for all of his hard work to ensure the timely completion of the issue.

I am delighted to invite you to visit us at www.ijapas.org.

Sincerely,

Dr. Abolfazl Davodi Roknabadi
Editor-in-Chief
International Journal of Applied Arts Studies (IJAPAS)
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Measuring the Effectiveness of Spatial-Phyical Components Affecting the Interaction of Human Energy with the Environment in the Traditional Houses of the Qajar Era with an Emphasis on the Three Groups of Designers, Users, and Space Users

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Research Article

Abstract

The science of interaction of energy in the environment is called feng shui, and this has led to the emergence of an ancient philosophy in China, which is used to find the correct arrangement in residential houses so that it can have the best effect on (chi). Residential houses, as the main center of human life, should have the highest level of peace. Historical and traditional houses have a hidden peace inside them, which has diminished with the passage of time. This research has been carried out with the aim of extracting the environmental components effective on the interaction of energy with the surrounding space in residential environments and examines three communities. The research method is a combination of nested qualitative and quantitative type, which first begins with a systematic study in this area to extract effective environmental components, and then the components are extracted, and in the quantitative phase, the verification of the environmental components is focused on feng shui. At this stage, ATLASTI and ORIGINPRO software are used for ease of work. In the group of designers, the lowest coefficient of determination is related to the structure with a value of (0.218) and the highest is related to materials and the presence of nature and furniture with a value of (1.000). In the group of users, the lowest is related to volume

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combinations with a value of (0.356) and the highest is related to compatibility with the background and color with a value of (1.000).

Keywords: Spatial Components; Interaction of Human Energy with Environment; Feng Shui

1. Introduction

Everything seen in the world is made of electromagnetic energy vibrations, with different frequencies that vary depending on sound, light and color. The electromagnetic field in the form of a halo surrounds all objects in the world, which science has proven and certainly accepts. The ancient Chinese know this energy as Chi energy (the vital energy of the world that flows inside every being). The energy that connects everything to one another (Rappaport, 2009: 197). Ancient people were probably able to detect its movement, sites such as Stonehenge, Karnak, Egypt, the Nazca lines along the so-called Endo built-up layer seem to indicate a base concentration of energy. Maybe they were made as a channel of this energy and maybe their creators were in contact with the flow of this energy and knew how to penetrate it (Memarian, 1999: 21).

in the far east; Understanding and controlling energy flows is considered basic and traditional healing systems such as acupuncture, Shiatsu and Kanji (Japanese massage technique) and martial arts such as Tai Chi, Chi Kung and Aikido can be mentioned in this category.

This energy has different names; It is known as "Chi" in China, "Ki" in Japan, and "Perina" in India, but there is no specific name for it in the West, although it can be described with terms such as "atmosphere" or "vital force" (Brown, 1996). Chi is centered in the East as in Oriental astrology and feng shui and is mainly located inside the human body, plants or buildings but some of them are constantly flowing and some flows from other objects. The energy of human "chi" is always mixed with the "chi" around the human being and thus the person is immediately connected to the environment and finally to the whole existence. It can be said that the energy from a distance reaches the person as a wave of "Chi" and very sensitive people may be able to receive this energy which can be seen in the form of prophecy or telepathy and inspiration and insight. For thousands of years, humans have been aware of the energy moving through existence and connecting everything in it like a big computer network.

It can be said that this energy is transferred from one institution to another and this process is the basis of Feng Shui. "Chi" energy is formed from the environment and affects human beings, mood, emotions, physical energy and over time affects human health. This energy is moved through the environment by wind, water and the energy of the sun, light and sound, and unlike some energies, it can also be transferred through solid matter. But some "chi" can enter and exit through walls, such as weather and tidal currents and the movement of air around the earth (Hale, 2001). This research aims to extract and evaluate the spatial components of the residential houses of the Qajar period, which is the most important to influence Feng Shui among these three groups.

2. Theoretical Foundation

2.1. Feng Shui

Feng Shui in Chinese (K) which means wind and water is an ancient philosophy and technique in China and is used to find the right decoration and the right arrangement of objects in residential buildings, commercial buildings, gardens, etc. to have the best effect on health, happiness, success, harmony and overall positive energy.

Kevin Lynch, a pioneer of environmental behavior research in his book The Image of the City, concluded that feng shui is an open-ended analysis of the environment in which new meanings, new poems, and subsequent developments are always possible (Lynch, 1960). Anderson and Anderson (1973) recognized that feng shui is an aspect of Chinese cultural ecology and called feng shui "the traditional Chinese science of spatial planning that contains an organized body of knowledge that is highly applied in practice and with specific goals" (1995). stated that feng shui is a system that expresses the relationship between man and nature in an environment of comprehensive thinking and human and environmental perspectives are linked in a stable system of order" Mack and Jay (2009). Today, as many researchers seek to create a deeper understanding of these relationships between the human and natural environment, architects and building professionals begin to identify feng shui as a broad pattern related to the environment and architecture (Dickinson, 1998). Huangbo (1999) believes that the practice of feng shui is an intuitive matter that includes the choice of place and spatial organization and has strong similarities with the western concept of geometry in architectural design (Robert Chuckrow, 1998: 17). Feng Shui leads us to the precise use of light, the color of materials, and the furniture of the furniture, eliminates the negative energy and provides the health and blessing of the home environment. Feng Shui reflects the increasing awareness that everything in the world is related to your feet is a very important art that is a very important art. It is a method that has been proven for centuries. Jalili and Akbari (2014), the most important thing to observe is avoiding disorder and any accumulation, using the right colors of curved lines, considering the right directions (Haeri Mazandarani, 2009: 83).

Due to the increase in population in the world and the shrinking of people's residences and the increase of people's working hours outside of their residences, the human spirit and psyche has suffered and this has manifested itself in industrial societies and the rate of depression has increased in young people and caused the loss of motivation to continue living. (Also, due to the sensitivity of the issue of energy supply and maintaining and guiding it, we should try to make the best use of what we have in order to reach the point of comfort (Day, 2012: 216). There are various ways for this. Among them is Feng Shui, which is available to everyone; and everyone can use this knowledge according to what they have (Swami, 2013: 79). The possibility of creating houses with maximum energy, health and harmony is available to human beings and it leads us to the accurate use of light, color, materials and furniture placement, it removes negative energy and provides inner peace, health and blessing in the home environment. Feng Shui reflects this growing awareness that everything in the world is connected from the inside (Moran and Yu, 2005: 141).

What is important in using the knowledge of feng shui is to match it with the available facilities. It may be that the place where you live is a small rented room or an apartment or a large villa or yard. The most important thing is to make the best use of what you have and to adjust your place, sleep, work and study as much as possible so that you can have enough comfort and peace by living in that building and know what things to collect around you will cause trouble and what things to add can change your mood. Kasegar Mohammadi and Tawfiq Bakht (2014). By using the science of Feng Shui, you can find positive and negative energies and the way to attract and repel them and use them in the design of your spaces so that the desired goals for a happy and peaceful life are realized for all people in their living environment (Loretta, 2012: 76).

2.2. “Chi” point in Feng Shui

Feng shui is based on the movement of qi, which is actually a type of energy that exists everywhere and is constantly moving from one space to another. Now this energy can have two states: positive (sheng) and negative (sha). The positive type of chi energy actually indicates that

this energy is flowing correctly in the home environment, that is, the interior arrangement of the house has been done correctly and none of the household items are placed in such a way that they are an obstacle to the free movement of this energy. However, if the internal arrangement of the devices is not done correctly, this energy will subsequently have a very irregular flow or even remain stagnant somewhere and become a destructive so-called negative energy (Yang, 2016: 8).

Residential house is the center of human life, the house must have conditions that can act as a place of human relaxation. Since the relationship between man and the environment is a reciprocal relationship, the role of the interior of the house in inducing a sense of calmness in the residents is undeniable. Khadim) Mohammadi and Safari (2014) the proper and correct flow of "chi" in the house is very important and vital (Lloyd and Sivin, 2002: 342). If "chi" cannot flow in the house, it stagnates and turns into destructive energy or "shachi". This negative energy can cause bad luck, depression and lack of health and wealth. It flows along curved lines, while "Shachi" acts like an invisible beam along straight and straight lines. That is why straight and straight lines are rarely used in oriental garden decorations. In Eastern philosophy, everything that is alive has "chi" and "chi" also has two opposite but complementary poles, which are known as "yin and yang" (Ames and Hall, 2001). According to Liu (1995), the theory of chi affects three aspects of feng shui:

Chi becomes the ontological foundation of Feng Shui. This leads to the development of the living life theory in feng shui. It is the general criterion for judging the performance of Feng Shui (Hall and Ames, 1998: 36).

2.3. Basic Concepts of Feng Shui

Feng Shui, the ancient Chinese knowledge that aims to create harmony between heaven, earth and humans, has influenced the traditional built environment design in China for thousands of years. The five basic concepts of Feng Shui in terms of environmental design are summarized below.

A. Unity between heaven and man This is the basic principle of feng shui, which means harmony between the world, earth and human energy. Energy in both physical and invisible forms, which is known as "chi" in traditional Chinese feng shui culture, natural energy or the breath of life, is valued. Feng shui designs are designed to create a balanced and harmonious environment. It can produce a lot of good qi and filter out bad qi (Brown, 1996: 174).

B. The five elements in Feng Shui Elements play a very important role in Feng Shui. The five Chinese elements are water. Fire soil wood. metal (Hale, 2001: 36)

The main part of feng shui is based on the relationship between the forces of nature, which is represented by the 5 elements (Wushing). In the tradition of the westerners, the 4 elements of earth, air, water and fire are mentioned, but in the eastern culture, these elements are 5 which have great value and importance, the Orientals believe that these elements indicate changes and they make each other, respectively, water, wood, fire, earth and metal (Webster, 2005: 163).

C. Harmony of Yin and Yang: The ancient Chinese believed that there are two opposite parts in everything: Yin and Yang represent the active principles in nature, which are displayed in the form of darkness, cold and humidity. On the human level, Bain is a symbol of femininity and passivity and also represents the realm of the dead. Bang represents the active principles in nature that are exhibited by light, heat and dryness. On the human level, Bang is a symbol of masculinity and being active and also represents the realm of life. Bin and Yang are about balance and harmony in a space that is designed to balance the lives of users when engaging in space (So, 2015: 76).

The five elements, the number five in Chinese knowledge is a sign of luck. The five elements are wood, fire, soil, metal, water. According to Chinese knowledge, the above five elements represent

change (Xu, 2003: 107), which means that one creates another. These elements complement or oppose each other, and every object in a room is a combination of one or more elements. According to Feng Shui theories, it is able to fulfill certain purposes. The placement of objects in the room can be designed in such a way that according to their elements, they neutralize or intensify each other's effects and finally indirectly affect the state of the person who works there (Walter, 2006: 154).
Constructive cycle: Water nourishes wood, wood is the fuel of fire, fire creates earth in gray form. Soil creates metal, metal can flow like water (Lao, 2004: 66).
Destructive cycle: Water extinguishes fire, fire melts metal, wood and soil wear out, soil pollutes water (Mahdavi and Gholamali, 2004: 195).

3. Research Methodology

This research is in terms of applied-developmental nature and in terms of the combined method of the nested type. First, in order to obtain the basic concepts in the field of Feng Shui, a systematic review of first-hand and second-hand sources is carried out, and based on the basic concepts and definitions, semi-structured interview questions are formulated, and in order to extract spatial-physical environmental components that are effective on Feng Shui, questions are asked from thinkers in this field. The selected houses of the Qajar period are selected with the preference system in Delphi future research and with the Kendall coefficient. Interview texts are entered into ATLASTI software, and with the help of Grand Theory techniques (open, axial coding), data reduction is started and the components are extracted and categorized. Then, based on the extracted components, a questionnaire with a Likert scale is compiled and it is given to the community of designers, space users, and users. 384 people are selected for each group. which is the upper limit of Morgan's table, validity was measured by CVR formula and its value was 0.768 and reliability was measured by Cronbach's alpha and its value was 0.811. The results are entered into the JMPSAS16 software and analyzed numerically with inferential statistics (correlation and regression).

4. Study Area

4.1. Selected Buildings of the Qajar Period

In this part, the Delphi system is used with a panel of experts to select the buildings of the Qajar period. The working method is that the panel of experts is first selected and the residential buildings of the Qajar period that meet the conditions are introduced to them.

Table 1 Selected buildings of the Qajar period

Building Name	Building Location	Kendall Coefficient	Building Introduction	Images
The house of Qawam Al-Dawlah	Chirag Bargh St., (currently Amirbir), between Sarcheshme and Amin Huzoor three roads, Shahid Javaidi Street, Mohammad Shah Qajar Period, has been built into an administrative organization, the ICOMUS Cultural Institute.	0.741	The house of Qawam al-Dawlah was built in 1253 AH, during the time of Muhammad Shah Qajar, for Mirza Muhammad Qawam al-Dawlah Ashtiani, and after him it passed to his son Motamed al-Sultaneh, one of the late Qajar rulers, and after that to his grandson, Watuq al-Dawlah. Then the house was purchased by the Ministry of Culture and Art from the heirs of Watuq al-Dawlah, and the National Organization for the Protection of Antiquities under the supervision of Professor Mohammad Karim Pirnia carried out repairs on it, and after that the building was used by cultural institutions. It was placed in various places and finally the secretariat of ICOMOS was established there	

Imam Juma's house	The eastern part of Nasser Khosrow Street, below Imam Khomeini Square, Imam Juma Street, this building was built during the reign of Naseruddin Shah Qajar. It has turned into the administrative organization of the research and library department.	0.652	This house is attributed to the Friday Imam of Tehran during the time of Naser al-Din Shah Qajar. The building is related to the years 1280 to 1300 A.H. and considering the location of this house near the Government House and the Tehran Citadel, and the fact that Imam Juma was considered a noble at that time, as well as some details of the plan, it can be assumed that a part of the current building was part of a more elaborate house, and probably its inner part was separated and the rooms around the house were destroyed.	
Kha Nakho Mushir al-Doulah (Pyrenees)	Saadi Street, Manochehri Street, Lalhazar No Street, Pirnia Street were built in the historical period of Naseruddin Shah Qajar. Its main use is currently the Institute of Islamic and Complementary Medical History Studies	0.711	This building is originally attributed to one of the prominent men of the Qajar era, Behnam Hassan Pirnia Molaq b. to Mushir al-Doulah, the son of Mirza Nasrullah Khan Mushir al-Doulah, the chancellor. He was born in Tabriz city in 1290 AH and died on 22 Aban 1314 AH after 62 years of age.	

Amir Bahadur's house	Chirag Bargh Street (currently Amirbir), between Sarcheshmeh and Amin Hozur intersection, Javidi Street No. 107, this building was built during the time of Naser al-Din Shah Qajar.	0.684	The design of this house is an example of design in the late Qajar period; That is, when the old patterns were not used in organizing the design and the visual pattern did not replace them. This building, which has been the office of the National Artifacts Association for three decades, was a part of the house of Mirza Hossein Pasha Khan, nicknamed Amin Bahadur, the court minister of Muzaffar al-Din Shah Qajar in the years 1313 to 1324 AH.	
Hidayat's house	South Saadi St., Shahid Taqvi St., No. 3, the main use of this building is the library site and reservoir and the library hall, and it was built in the Qajar period.	0.589	The building under study is attributed to the late Sadegh Hedayat, one of the famous contemporary writers. Sadegh Hedayat was born on Tuesday, February 28, in his father's house in Tehran. His father Hidayat Qoli Khan Hidayat (Itzad al-Molk) was the son of Jafar Qolikhan Hidayat (Nir al-Molk) and his mother, Mrs. Ezri Zur al-Molik Hidayat, the daughter of Hossein Qoli-Khan Mokhbar al-Doulah II. Sadegh's mother's father is a descendant of Reza Qolikhan Hedayat, one of the most famous writers, poets and historians of the 13th century in Iran, who was one of the survivors of Kamal Khojandi.	
Colonel Iraj's house	Pamnar, above the Pamnar Mosque, Sufiai Street, Shirazi Street, It is the construction period of Ahmad Shah Qajar. It is owned by the Cultural Heritage and Tourism Organization	0.642	The estimated age of the building is about 90 years, and it is very likely that the building was built during the years AH). The original owner of 1329 the building is not known, but according to the documents presented, this collection was in the hands of Colonel Iraj, one of the experienced officers of the first Pahlavi era, for 60 years.	

Qavam al-Sultaneh house	No. 59, Sitir St., not far from Jumhori St., this building is owned by the Cultural Heritage and Tourism Organization and was built during the period of Ahmad Shah Qajar.	0.588	The building that is used as a museum today was built for the personal use of Qawam al-Sultaneh and after that It was sold to the Egyptian embassy and was in the hands of the Egyptians for about seven years, then with the deterioration of the relations between Iran and Egypt and the closure of the Egyptian embassy in Iran, the commercial bank bought the mentioned building and after that it bought the former office of Farah Pahlavi and it has been used as a museum until today.	
Reza Khan's house	Imam Khomeini St., not reaching Hassan Abad Square, Nemati St., No. 46, this building is owned by the Cultural Heritage and Tourism Organization. It was built during the period of Ahmad Shah Qajar.	0.691	Reza Khan's house belonged to the Ministry of War and its construction date was between 1334 and 1339 AH. This building is almost related to the late Qajar period.	
Moghaddam House	The north side of Imam Khomeini Street is between Sheikh Hadi Street and Waliasr Street. It has turned into a museum of movable and immovable works. It was built during the period of Ahmad Shah Qajar.	0.742	The Moghadam house is one of the luxurious houses of the Qajar era, belonging to one of the courtiers of that time named Mohammad Taqi Khan is considered to be al-Mulk. The collection of buildings of the Moghadam House, owned by the late Dr. Moghadam, the son of Taqbar al-Mulk He is a great scientist and researcher. He has collected movable and immovable works of art from different historical periods and kept them in this valuable collection.	
Jalal Al Ahmad's house	Khayyam St., Shahid Haj Taghi Tarkhani Street, Shahid Karkan Esasi Street, No. 7, empty, the janitor's department is in a part of the house, and it was built during Ahmad Shah Qajar period.	0.721	The foundation of this building is related to the Qajar era and the unsuccessful reign of Ahmad Shah. The building belongs to Al Ahmad family Its original owner is Seyyed Ahmad, Al Ahmad. After that, he was transferred to Jalal Al Ahmad. Generally in the year It was renewed in 1310 AH	

5. Qualitative Findings

5.1. A Summary of the Interview

The total volume of houses consists of rectangular spaces. The circular form of one of the ponds and the octagonal form of the gardens and the other pond are built in a complementary way. Mesh windows in the basement of Motaman al-Atabah house are for attracting light and air flow and seeing the scenery outside. Mesh windows create a balance between outside and inside light. This balance makes the person who looks from inside to outside not tired of the sunlight. The designs used in making mesh windows are often designed to regulate the light inside the room. The windows in this house include doors that have windows due to the bottom being closed and the light passing through them. Symmetry, repetition and rhythm are observed in the north, east and west facades. Halls and large foyers along with the central stairs in the houses have created an elongated plan along the facade. The spatial confinement in this house is such that about a quarter of the building is closed and semi-closed space and about three quarters of the building is open space.

There are turquoise-colored tiles in the form of Fakhrumedin mesh in the basement windows. Plaster decorations can be seen on the capitals and fronts in the north facade of the Weber on the fireplaces inside the building and are seen in the form of slime motifs. Brick decorations are used in the basement ceiling. There are wooden decorations on the basement doors as well as inscriptions on the top of the cupboards.

In the entrance area, there is a large shallow rectangular pond (it was deeper in the past). A two-story building, both of which have a large long porch. Full symmetry is seen. The lower porch has eight rectangular columns and the upper porch has two rectangular columns and six elongated and long plaster hexagonal columns with Corinthian leaf capitals. On the left side of the building there is a small door with five steps leading to the basement and two windows can be seen on the sides of the door. The entrance stairs are located right after the pond and in the middle of the building (this part is outside of the facade of the building).

There are two entrances for two rooms on the sides of the main door, and each of the rooms leads to another room, which is made of eight small rooms, i.e. in human dimensions. But from the main door that has been explained, we enter the main middle room or Hozkhaneh. A square room with a brickwork basin in the center with pathways that show water entering and exiting it.

Going up the stairs, we enter a small corridor, from the left side we reach the four rooms that are located on the lower four rooms, and from the right side we enter a king's house, which is a room with three doors that sits on the pond and opens to two porches from the north and south, and the eastern corner is another staircase. In the west wall, there are three shelf niches, the ceiling of Shahneshin is also wooden and framed (in a lattice shape), pea-colored and brown, which is worked in the middle of each flower frame, and in the center, it is decorated with an octagon with a rich and prominent wooden slime.

Hierarchy discussion is a conversation between inside and outside, because the sense of outside space cannot be found in the song of inside mood, and in other words, inside lacks these properties and outside conditions cannot be allowed inside. This evolution plays a role in the hierarchy, because the entrance threshold is the condition of entry and transformation, which was placed after the door and in a space such as the vestibule (the main entrance space that is usually placed after the front door), the outer courtyard, the vestibule and the rope; But during the Pahlavi period, this structure collapsed as the inner and outer spaces became more extroverted. Most houses have 3 entrances: the entrance of the crew, the entrance of the north yard and the entrance of the south

yard. Designed for all three vestibule entrances. The story of full-fledged color can be seen in the color of the glasses of Iranian sashes, which present an image of heaven to every viewer. This celebration of color, in which no two moments are alike, actually brings joy and happiness to the residents of the house in the colors of red, green, yellow and blue.

The colored glass of the mentioned houses is a good example of the use of color in an Iranian house.

Symmetry also brings balance and diversity in Iranian houses with its beat and rhythm, because with the loss of color of the main spaces such as the tanbi house (which is considered the main core and heart of the house) and the spaces of the headlands and the integrated porch and the colorful sashes of the sub-axis also disappeared, and with the placement of some secondary elements such as the staircase in the central axis, as it should be, this sense of symmetry that gives a concept of stability in the home arena It was also forgotten. In these houses, there is complete symmetry in single spaces, including the king's room, and relative symmetry in the entire building. It is the same in views.

A porch is a roofed semi-open space that is limited on three sides and open on one side. In the houses of the Qajar period, the south porches show the view of the house behind its curtain, a view in which usually tanbi (a large and main room of the house, which is often located in the heart of the house and has a sash window), kaleh (a room located on both sides of the tanbi on the upper floor, which is created as a result of the high height of the tanbi and often overlooks it), hozkhaneh (a covered and elevated space with a pond in between) and usually associated with other spaces) and there are other elements of the house. Of course, in the late Qajar period and the early Pahlavi period, the huge verandas of this decade turn into small verandas that are only for one room and one space, and naturally, the transparency of the space also undergoes changes in terms of area during this period. Selected Qajar houses mostly have small verandas for the rooms next to the rope on the north side and a veranda for the crew.

In early Qajar architecture, the space of the house included two main and secondary axes, where the space of the house was in line with the main axis; On both sides of this axis, in the western and eastern fronts, secondary spaces were placed, which in a way adds to the sense of symmetry in the building plan. Even in the late Qajar and early Pahlavi periods, this axial pattern had an effect on the landscaping of Iranian houses, to the extent that this pattern was in the form of English and French landscaping with wide lawns, ornamental trees and shrubs, small and large rectangular ponds and ponds, flowers The work of gardens and the general lines of landscaping and gardening, which are partially out of axis, have been seen in these buildings.

After extraction and open and axial coding, a number of 38 codes were extracted, and after clarification based on the basic concepts and the main research question, 31 codes remained and the rest were deleted. The number of 13 cases is related to spatial and 18 cases are physical. The most prominence in spatial codes is related to spatial arrangement with the number of 19 and the least prominence is related to changeability with the number of 7. In the physical codes, the most prominence is related to the presence of nature with the number of 21 and the least prominence is related to the colors with the number of 6.

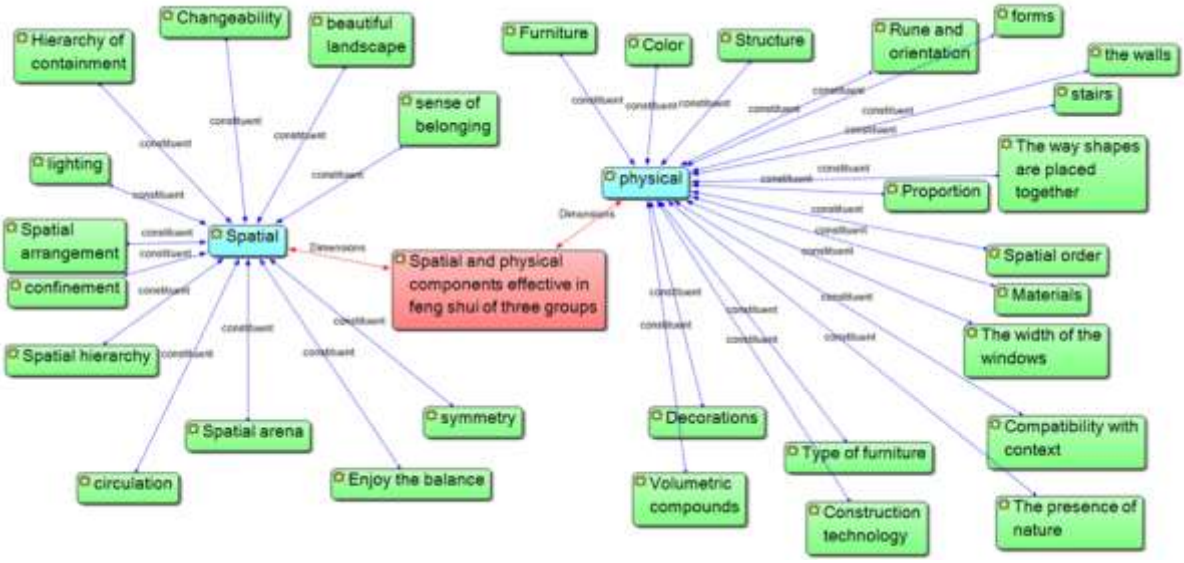
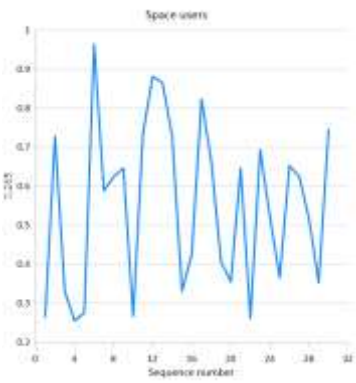


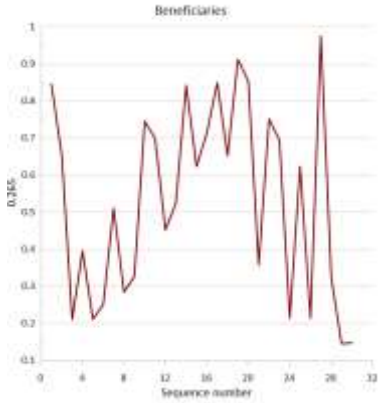
Fig 3 Classification of physical and spatial components based on axial classification and coding

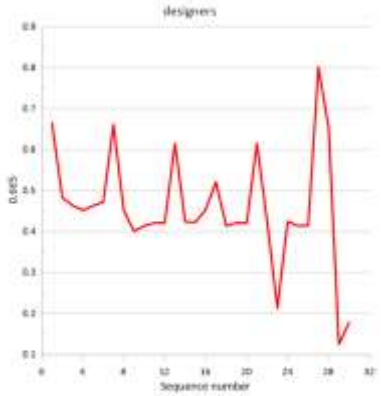
6. Quantitative Findings

According to the descriptive statistics, 253 people (70.7%) of the sample population were men and 131 people (29.3%) were women, and 74.4% were in the age group of 20-30 years. The working method is such that the question is formulated according to the number of components. And each question has an answer between 1 and 5. The sum of the scores of indicators of a component means the score given by each person to the desired quality. So, the score that can be obtained for each quality varies between 5 and 25. Based on this, we create a category in such a way that the people who gave a total score of 5 to 11 to a factor, estimated it poorly, 12 to 18 average opinion and 19 to 25 good opinions about it. The results of descriptive statistics showed that the most frequently obtained data distribution in the group of designers has a certain order and it seems that the component was used in their design. The highest frequency is related to circulation with a value of 1840 and the lowest is related to the use of balance with a value of 1011. In the group of spatial users, the data distribution value has a relatively significant distance from the moving average, and the highest frequency among them for energy interaction with their surroundings in these houses is related to the type of furniture with a value of 1814 and the lowest is related to materials with a value of 986. Visitors, the highest frequency is related to the collation process with the amount of 1694 and the lowest is related to the materials with 1054.

Table 2 Data distribution diagram in three selected groups







7. Inferential Statistics

7.1. Spearman Correlation

At this stage, after selecting the selected variables with the Delphi method, a questionnaire is compiled and randomly distributed among three groups of space users, users, and designers. The results are entered into the ORIGINPRO software, predictive relationships (regression) and correlation relationships are used for analysis. Two-Sample Kolmogorov-Smirnov Test is used to check the parametric and non-parametric type of data.

Table 3 Kolmogorov-Smirnov test to check the normality of physical and spatial variables

p	Z Kolmogorov Smirnov	Standard deviation	Average	Variable
0.314	0.793	23/3	77/27	Interactions of human energy with the environment (designers)
0.306	0.706	86/1	87/25	Components of human energy interaction with the environment (beneficiaries)
0.307	0.685	66/2	21/20	Components of human energy interaction with the environment (space users)

As can be seen in the table above, the Kolmogorov Smirnov test for the scores of the mentioned components in the three groups are not significant (p=0.314), (p=0.306), and (p=0.307) and therefore the internal and external indicators of desirable housing do not have a normal distribution and non-parametric analyzes should be used for it.

Table 4 Correlation coefficient of physical and spatial components of selected Qajar houses affecting Feng Shui

Dimensions	Components	Correlation coefficient of designers	Correlation coefficient Beneficiaries	Correlation coefficient Space users	Significance level (sig)
Spatial components	symmetry	0.254	0.662	0.845	0.001
	Spatial hierarchy	0.781	0.406	0.653	0.001
	confinement	0.645	0.355	0.211	0.001

	lighting	0.653	0.646	0.395	0.001
	Spatial arrangement	0.746	0.262	0.211	0.001
	Spatial order	0.473	0.735	0.251	0.001
	Hierarchy of containment	0.631	0.881	0.511	0.001
	Beautiful landscape	0.683	0.843	0.284	0.001
	circulation	0.473	0.982	0.326	0.001
	sense of belonging	0.623	0.274	0.745	0.001
	Spatial arena	0.836	0.374	0.699	0.001
	Changeability	0.721	0.921	0.452	0.001
	Use the balance	0.425	0.421	0.523	0.001
Physical components	Proportion	0.482	0.246	0.842	0.001
	Decorations	0.415	0.821	0.623	0.001
	stairs	0.411	0.285	0.714	0.001
	Structure	0.443	0.675	0.849	0.001
	Volumetric compounds	0.711	0.754	0.652	0.001
	thigh	0.562	0.921	0.912	0.001
	Materials	0.945	0.421	0.853	0.001
	the walls	0.615	0.216	0.358	0.001
	Furniture	0.465	0.524	0.751	0.001
	The width of the windows	0.543	0.688	0.695	0.001
	fan made	0.605	0.295	0.215	0.001
	How shapes are placed together	0.217	0.855	0.623	0.001
	The presence of nature	0.464	0.742	0.214	0.001
	Compatibility with context	0.781	0.922	0.975	0.001
	Color	0.645	0.629	0.325	0.001
	forms	0.653	0.252	0.145	0.001
	Type of furniture	0.746	0.982	0.141	0.001

Based on the results of Spearman's correlation, it was found that in the group of designers, the highest correlation is related to materials with other components with a value of 0.945 and the lowest is related to the way shapes are placed together with a value of 0.217. In the group of users, the lowest is related to the walls with a value of 0.216 and the highest is related to the type of furniture with a value of 0.982. In the group of space users, the lowest is related to the type of furniture with a value of 0.141 and the most compatibility with the context is with a value of 0.975.

7.2. Regression

To use the type of linear or multivariate regression, the internal correlation matrix diagram of the variables is used. After drawing the correlation matrix diagram, it was found that the factors have no linear relationship, so it is correct to use multivariate regression.

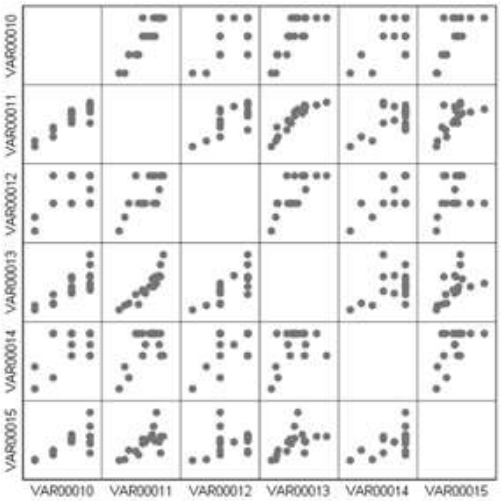


Fig 5 Diagram of correlation matrix of factors

Based on the results obtained from the multivariate regression, it is clear that in the spatial components of the designer group, the beautiful landscape component with a value of (1.000) has the greatest effect and spatial regularity with a value of (0.373) has the least effect on the interaction of the individual's energy with the environment. It is from balance with value (1.000) and the lowest is related to spatial hierarchy with value (0.354).

In the physical components, in the designer's group, the lowest coefficient of determination is related to the structure with a value of (0.218) and the highest is related to materials and the presence of nature and furniture with a value of (1.000).

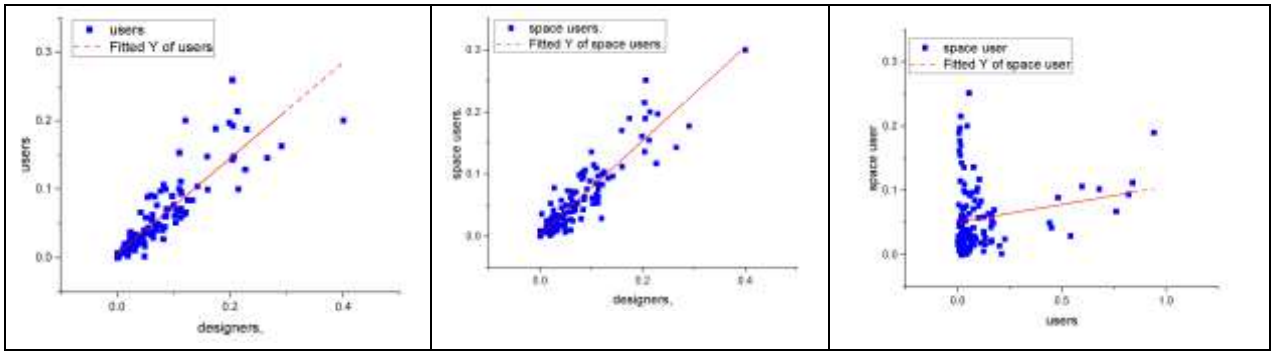
Table 5 Multivariate regression of spatial and physical components effective in feng shui of Qajar houses

Dimensions	Components	coefficient of determination	F	meaningful	coefficient of determination	F	meaningful	coefficient of determination	F	meaningful
Spatial components	symmetry	0.615	222/527	0.001	0.672	501/318	0.005	0.757	245/627	0.008
	Spatial hierarchy	0.451	122/405	0.005	0.820	801/544	0.004	0.354	255/428	0.001
	confinement	0.846	343/217	0.008	0.789	857/369	0.004	0.659	383/527	0.005
	lighting	0.746	943/199	0.007	0.658	506/710	0.005	1/000	911/259	0.002
	Spatial arrangement	0.762	612/201	0.009	0.815	289/658	0.003	0.974	564/243	0.007
	Spatial order	0.383	623/643	0.002	1/000	526/689	0.004	0.711	611/621	0.008
	Hierarchy of containment	0.753	683/849	0.001	0.895	314/278	0.003	0.569	619/872	0.007

	Beautiful landscape	1/000	603/349	0.002	0.756	586/784	0.002	0.724	652/349	0.008
	circulation	0.571	945/184	0.001	0.723	695/174	0.001	0.882	941/285	0.007
	sense of belonging	0.770	748/276	0.001	0.745	261/824	0.002	0.514	763/786	0.009
	Spatial arena	0.795	943/199	0.005	0.795	316/512	0.004	0.823	943/153	0.008
	Changeability	0.893	034/499	0.008	0.355	255/984	0.006	0.676	624/485	0.008
	Use the balance	0.467	643/673	0.006	1/000	250/518	0.008	1/000	034/574	0.007
Physical components	Proportion	0.750	782/489	0.007	0.913	211/159	0.008	0.883	838/569	0.0085
	Decorations	0.674	782/489	0.003	0.522	588/453	0.003	0.823	864/921	0.009
	stairs	0.567	782/489	0.001	0.685	255/439	0.006	0.607	351/582	0.007
	Structure	0.218	412/382	0.009	0.695	565/325	0.008	0.518	658/447	0.007
	Volumetric compounds	0.732	782/656	0.001	0.356	551/825	0.009	0.685	958/683	0.008
	thigh	0.467	643/673	0.005	0.425	133/746	0.007	0.575	620/875	0.006
	Materials	1/000	715/645	0.003	0.706	655/145	0.004	0.874	362/325	0.008
	the walls	0.674	712/546	0.008	0.723	325/659	0.008	0.756	382/742	0.009
	Furniture	0.567	732/318	0.006	0.689	333/544	0.003	0.581	325/675	0.008
	The width of the windows	0.735	654/218	0.001	0.951	154/448	0.008	0.914	185/481	0.006
	fan made	0.211	382/752	0.006	0.869	183/532	0.005	0.273	365/251	0.008
	How shapes are placed together	0.744	321/514	0.003	0.661	425/186	0.002	0.747	469/815	0.005
	The presence of nature	1/000	167/428	0.006	0.581	441/139	0.005	0.581	742/251	0.007
	Compatibility with context	0.947	175/431	0.002	1/000	288/458	0.002	1/000	223/541	0.005
	Color	0.851	425/154	0.004	1/000	239/488	0.004	0.814	219/852	0.004
	forms	0.409	421/131	0.003	0.511	369/225	0.002	0.403	575/249	0.003
	Type of furniture	1/000	222/461	0.008	0.542	614/255	0.001	1/000	154/254	0.005

In the next step, it is necessary to explain the physical and spatial dimension, which used graphical correlation for this. The results show that the results of residents and designers are correlated with each other, but spatial users or visitors have not been able to communicate with other answers.

Table 6 Graphical correlation of physical-spatial components among different groups of respondents



8. Discussion

In this research, first, to extract effective physical and spatial components in Qajar houses, interviews with scholars are started. The extracted components show the greater impact of physical components compared to spatial ones, and it seems that in order to control the components, more attention should be paid to the physical dimension. According to scholars, the presence of nature in space can emphasize the principles of Feng Shui. The results of descriptive statistics and the degree of salience in the qualitative section can be inferred that the opinions of users and experts in architecture and urban planning are different from each other, also the answers obtained in the section of inferential and descriptive statistics are inconsistent with each other and the focus should be placed on the inferential aspects of the data. Based on the results obtained in the correlation section, it is clear that the spatial components generally have a lower average movement than the physical components, and the use of the basic principles of design and gestalt psychology such as symmetry cannot promote the principles of feng shui, and the area of spatial construction that creates functional dissonance and causes people to circulate around specific spaces to perform various types of activities is more effective. But in the physical dimension, the material and its type can strengthen other components in the first promotion of feng shui. Based on the regression results, it can be understood that the impact of spatial components is less. A beautiful landscape induces a sense of peace and comfort among people, which can be an important principle for maintaining energy and human interaction with the surrounding environment. In the physical dimension, the materials and their types are next to the furniture and the way the furniture is placed and the functional activities are next to the presence of nature.

9. Conclusion

There are always many energies in the vicinity of humans, which can be used to create peace and comfort in our living environment. In the past, our ancestors raised their quality of life by using this same energy and using new methods with minimal damage to nature. Part of which can be clearly seen in climate architecture. Now, by knowing the rules of feng shui and the elements that can affect them from space and body, it is possible to reach the point of comfort and peace to an acceptable extent. Feng Shui is an almost complex science, but knowing its physical and spatial dimensions and its existing components can help designers to pay attention to the components that can provide aspects of human interaction with their surrounding environment in their designs in the field of functionality and aesthetics, in addition to paying attention to beauty rules. Feng Shui creates balance and harmony in life. Qajar houses, due to the size and also the practical freedom that the designers had in spatial arrangement, continue to provide peace and comfort to their

residents after a long period of time, and examining its principles in the application of the basic concepts of the interaction of human energy with the environment can provide designers with strategies in small apartment spaces.

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The Role of the Environmental Components of the Corridors of Educational Spaces in Increasing the Design Learning of Architecture Students

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Research Article

Abstract

The role of architectural education environment in teaching and learning is important in terms of improving the quality of education. Informal education, as an important part of education, often takes place in spaces outside the studio. Corridors, especially on the way to the studio, can be effective on students' design thinking in many ways, one of them is to increase the visual experience. which can be effective in the design process. The importance of place in education is considered as one of the dimensions of the hidden curriculum. This research is done with the aim of knowing the environmental components in educational corridors and knowing the effects of each of them. The mixed research method is nested qualitative in quantitative. In the qualitative phase, components from semi-structured interviews with university professors are conducted in the educational environment, then the components are categorized and extracted using the open and central coding system in ATLASTI software, then in the next phase, based on the components A questionnaire with a Likert scale is compiled and provided to students. The results are entered into the JMPSAS16 software and analyzed with descriptive and inferential statistics. The results show that in the spatial dimension, the attractiveness component with the coefficient of determination (0.213) has the least contribution to students' learning, and the most related to the static space component. and movement with a value of (0.872) in the functional dimension of supporting activities with a value of (1.000) has the largest contribution to students' learning and the least is

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related to the type of furniture in the corridor with a coefficient of determination of (0.224) In the physical dimension, the bulletin board component with a value of (0.132) has the least effect on learning, and the dimensions of the corridors with a value of (0.952) have the greatest contribution to students' learning.

Keywords: Environmental Components; Corridors of Educational Spaces; Architecture Students

1. Introduction

In detail, today, how to teach architecture is the biggest problem in architecture schools, so knowing the factors that affect it is also important to improve the quality of education. The studies conducted and the evaluation of architecture students' evaluation of architectural education show some deficiencies in the architecture education system in Iran. In addition to the formulation and planning of architecture courses, non-verbal education is also effective on students (Afzal Nia, 2014: 131)

Improving the quality of architectural design education, as one of the most important courses for architecture students, especially in associate and bachelor degrees, is one of the most important goals of academic architecture education. Therefore, it is important to know and improve the factors affecting it. Numerous researches conducted in this field, which are often in the field of quantitative standards of courses such as teaching methods, teaching hours, number of course units, etc., are also often in the field of formal education of courses and less on environmental aspects and informal education, causal Despite the importance of this type of education, it has been discussed especially in decision-making organizations as well as educational spaces, and its lack is felt due to the desire to improve education and maximum productivity of educational spaces (Shahcheraghi and Pashder Abad, 2014: 121).

Also, often the designers of most of the academic spaces of architecture without paying attention to the important role that informal education plays, without creating a platform as an "event place" and without creating a "sense of place" for this type of education, in fact, without taking advantage of all They create a quality space and only in line with formal education. Therefore, proving the important role of non-formal education, a part of which takes place indirectly in the environment of architectural education, can be the basis for the proper and more targeted design of architectural education spaces in line with the quality of architectural education. On the other hand, considering the generalist view of most of the researches in the field of architectural education, despite the significant progress of the studied areas including the field of environmental psychology, especially in recent years, the effects of these studies in creating change and improving architectural education are not very noticeable. is not. It seems that due to the difference of the influencing factors on different courses, we need more effective and insightful steps in architecture courses and the recognition and analysis of the influencing factors and how to influence them in the direction of quality improvement, as well as "clear and correct" analysis in The end of the research, which can provide a clearer picture of the impact and role of the architectural learning environment on the formation of a different type of architectural education that is less considered as a complement to formal education, encourage designers and planners of educational spaces to design more purposefully and pay attention to improve the quality along with the quantitative standards that currently this defect is visible in most of the architecture teaching spaces, especially the units of Azad University (Emamipour and Shams Esfandabad, 2014: 121) this research aims to extract the environmental components of the learning corridors in the educational spaces of the university It is

for architecture students and it tries to answer the question that what are the environmental components in educational corridors that are effective in increasing learning and to what extent does each of them increase learning in architecture students?

2. Literature Review

In this research, due to the wide background of the research on the variables of the title and also to avoid procrastination of the speech and writing, it has been tried to present the contents briefly and in the form of a Table 1.

Table 1 The results of domestic researchers' research (articles, theses,..)

Researcher	Publication year	Title of the article/project/dissertation report	Results and key points
Zarei Fatima-Salimi Laden	2019	Find and hide curriculum in the body of excellent learning	It is necessary to pay attention to this aspect of the curriculum so that basic changes in the field of student education are provided
Mashahiri, Mehshad, Mirjani Hamid	2018	The body of the learning environment as a hidden curriculum	Architectural education, hidden curriculum of physical environment, learning
Asgaripour Shabnam and colleagues	2018	Explaining the role of non-toxic collective spaces of architecture schools in implicit education	Social interactions, informal collective space, architecture school, informal education
Alaei, Maral, Mahdavipour, Hossein	2018	The effect of learning environment on learning	Education, university, physical environment, learning
Malekzadeh, Mozhgan, Vasheshgaran, Ali Akbar	2018	Place as an educational technology	The place has educational technology components.
Asghari, Tahera	2018	How school architecture affects the hidden curriculum	Hidden curriculum, physical environment, school architecture, environmental psychology
Moradi, Azadeh; Et al	2017	Predicting students' happiness according to hidden curriculum components	The components of the hidden curriculum significantly explain 7.22% of students' happiness in total.
Mahboubi, Tahir; Karimi, Seyyed Bahauddin;	2015	Cultivating the creativity of architecture students in the educational environment	Unity and abundance, hierarchy between whole and part, scale and natural continuity, balance, adaptation, historical continuity, technology
Fekuryan Feflora	2013	Effective characteristics of the physical environment of architecture education for the development of	In order to design architecture schools with the aim of promoting learning and placing architecture students in a growth process in which, while acquiring professional skills,

		potential talents of architecture students	paying attention to the cultural and social expectations and values of the society in question, the ability to get rid of the physical environment is required.

3. Theoretical Foundations

3.1. Environment

The environment has a wide scope and everyone has a definition for it depending on the context in which they work. There are different theories for the classification of the environment (Bastanfar, 2012: 26). The German Halpach, who is considered one of the founders of environmental psychology, developed about 100 years ago. He has criticized the indiscriminateness of the Wundt school (constructivist) and laboratory researches and investigated the effect of environmental conditions on behavior (Hafezian, 2012: 11). He separates environmental data into three types:

1. The natural environment, such as soil, air, light, etc., which affects man and his behavior and is changed by man.
2. The social environment, which is the subject of social psychologists.
3. Cultural environment that includes books, laws, buildings, etc. The cultural environment is created by humans and reflects history. (Khosravi, 2000: 58) Others define four types of environments:

Physical environment: including physical environments and artificial spaces

Social environment: people and groups and...

Psychological environment: what happens in a person's mind.

Behavioral environment: the set of factors that a person reacts to (Rahmati, 2019: 51)

The main point of these classifications and similar classifications is the distinction between the real, real or objective world around humans and the phenomenological world that consciously or unconsciously affects people's behavioral patterns and mental reactions. This discussion goes back to the basics of Gestalt psychology. Kurt Kofka (1935), one of the founders of the Gestalt school, separates the environment into two types, geographical and behavioral. The geographical environment is used to mean the environment that exists objectively and the behavioral environment as it is experienced by the individual. A general definition of the environment refers to a set of external physical factors and living organisms that interact with each other. These factors influence the growth and development and behavior of organisms. People assume certain social roles by being placed in physical-behavioral camps (Kamelnia, 2006: 73). In other words, the environment plays a role in defining the behavioral range of people. It is worth it. In this speech, environment is a comprehensive concept of physical and physical conditions such as: lighting, cooling and heating conditions, color, dimensions, etc., cleanliness, arrangement, etc. ranging from psychological conditions such as: the way of dealing with people, the methods of presentation, the number of restrictions, the feeling of peace and security and so on. In general, man seeks to find answers to his needs from the environment, and if these needs are not met by the environment, he will not establish a sensory and emotional connection with the environment. In the case of environmental feedback, the higher the level of meeting human needs, the deeper the meaning of the environment will be in a person's mind. For example, the texture and shape of the parts of a space has a significant effect on the sensory perceptions of its users, hence specifying the type of texture in different dimensions and positions can have a very positive effect on the sensory

perception of learners. The rough and rough texture creates rigidity and dryness in the rules and induces strength in the mind, and the polished and smooth textures evoke a kind of peace and purity in the mind. The proportions and graining of texture is also very important (Gides, 1989: 114). The clearer and tangible this graining is in the dimensions of the human eye, the more sense of intimacy and friendship is evident in the environment. Forms also always have a shape and meaning. and have psychological effects on humans that can be effective in learning.

3.2. Man and the Physical Environment

Undoubtedly, daily human behavior is related to the physical environment, therefore, to explain how the physical environment of architecture education affects the behavior of architecture students, it is necessary to examine the relationship between humans and the physical environment and the effects of these two on each other. In this regard, it is necessary that fundamental concepts such as value attitudes, needs, as well as factors such as perception, learning and cognition that play a role in performing spatial behaviors, because any description, analysis, statement of theory and executive statements require concepts related to that theory (Ghafari , 2007: 14) Therefore, in order to understand how to coexist and align with the abilities or capabilities of the environment, it is necessary to pay attention to how to perceive and recognize the characteristics related to behavioral positions, as well as how to relate the environment and behavior.

In examining the desires and, in other words, the conscious needs of humans, we will encounter countless desires, in such a way that it will not be possible to examine them. A hierarchy of regular features. Maslow states that conscious and different daily desires are means to reach these focused desires to goals that are considered goals in themselves (Lang, 2012: 143). He says that certain needs lead us that we cannot go beyond. That is, we reach the satisfaction of certain needs that seem to be goals in themselves. Such needs in an ordinary person have the characteristic that they are often not seen directly but are always hidden behind a set of conscious desires.

How to learn from the human environment in the field of learning is the product of the surrounding environment. Of course, this learning is based on receiving, analyzing and interpreting environmental factors by his internal factors (cognitive abilities). But the environment has a very decisive role in learning. Even when the learner is recording his mental data that is born of thinking. He is located, this thinking and its results will take on the color of the environment. Because thinking happens on behalf of this person in a situation and the knowledge that results in learning is caused by the interaction of the learner and his situation (Mortaz Hijri, 2000: 21) It can be said that learning is the result of a person's holistic knowledge of his environment and his surroundings, and in terms of psychology, knowledge is a creative and active interaction that goes on without interruption between a person (or internal factors) and his environment. Normally, this is conscious interaction through which the environment is processed (Mortaz Hijri, 2000: 21), but learning is not exclusive to space or specific people, and in fact, it is an important part of every day-to-day activity and exclusive to the classroom. It is not school lessons. Perhaps the most appropriate opportunity even for children is the society itself, just as the best situation for a child to learn a language is at home. In fact, the mother tongue is the language that a child learns in the early years of his life. The environment teaches. What is more interesting is that the result of learning this language in an environment is much more successful than learning the languages that the child will be taught formally in the following years. Therefore, learning is an important part of every person's life and it happens even when people don't think that they are learning (like when walking in the park). Most of what a person has learned (Mahmoudi, 2005: 65), happened before he reached school age and outside of school hours and after he finished school. With such a view, man is always acquiring

knowledge based on interaction with the world around him, and as mentioned, learning should not be assumed only in the classroom. New learning methods are always involved in the issue of continuous and continuous interactions of humans with each other and with environmental resources.

3.3. Learning Environment

Man has always been influenced by his environmental factors and its constituent elements. These factors continuously affect his reactions and behaviors psychologically and physically, and the impact of environmental factors on learning can be analyzed from three fundamental aspects.

1- First, the entire learning process takes place in a physical environment with understandable and measurable physical characteristics. Whether sitting in a well-equipped conference room, under a tree or in front of a computer screen, people are surrounded by information. Specific subjects in the environment such as a chair, clothes and a cup of tea attract people's attention and people constantly feel the elements around them such as the light of a lamp, the smell of food and the heat of a fire, so every learning environment is full of people. It is environmental information.

2- Second, people do not passively touch, hear or see, but actively perform these actions. In any learning environment, they manage their limited perceptual resources through actively selecting environmental information for more attention and also using Experiences and existing knowledge structures are used to interpret this information in a way that they have experienced in the past.

3- Finally, the physical characteristics of learning environments can be emotionally affected with important perceptual-behavioral results. For example, most students describe learning in a very hot classroom as a problem, and on the contrary, an environment that causes positive emotional reactions can not only lead to the improvement of the learning level, but it can also turn the environment into a lovely atmosphere for learning. A place where people search for learning. It is clear that some learning environments are more convenient and suitable and help the person to focus and be careful in learning, and it is obvious that in learning environments where there are no suitable conditions, one cannot expect anything but a decrease in learning efficiency (Melabi, 20100: 29).

In fact, the experience of each person in life and the skills he acquires are related to the environmental conditions and the product of the interaction between that person and the environment in which he lives, activity as the main factor in the growth and learning of a student is a process that is related to space And the environment of the student causes his all-round growth, and the environment affects his behavior by creating opportunities and stimulating and encouraging him (Moghadami, 2005: 141).

Educational spaces are prone to becoming dry and soulless due to their specific limitations, but all efforts should be made to prevent this incident from happening. The roots of every student's interest in learning in school and being in an educational environment are formed. And if the environment is inconsistent with the individual's expectations, a sense of repulsion and lack of interest in learning is formed in the learner (Nasiri, 2004: 26).

3.4. Influence of Environmental Factor on Learning

In the architecture of educational environments, it is necessary to pay attention to the wishes and needs of students. Because paying attention to the requirements is considered as one of the effective parameters, one of the effective educational factors in modern education is how the architecture of the school space is. The teacher, book instructor, student, teaching methods, educational

management and family are among the factors that are usually effective in the learning process and are examined and explored, while in the new education and training, the physical space of the school is not only a dry environment and Spiritless Ness is not considered to have no effect on the learning process, but as a living and dynamic factor in the quality of the educational activities of students. According to education experts, at a glance, the architecture of schools and its constituent elements such as, Color, light, sound, schoolyard equipment and can leave significant effects on learners and students along with other educational and educational factors (Parsa, 2006: 36). and the inappropriate, cramped, dark, dry and soulless school will bring boredom and depression to the students, and it will have a negative effect on the level of learning and their active and cheerful presence in the school. Recognizing the needs of paying age groups, in the meantime, studying behavioral patterns in educational environments will facilitate the recognition of needs. In this chapter, the ecological psychologist believes that there is a special relationship between the physical-architectural and behavioral dimensions of the physical-behavioral settlements. Therefore, the classroom benches, the way they are arranged, will affect their behavior and learning. (Ghafari, 2007)

Physical factors affecting learning

One of the dimensions of the educational environment is the physical factors that cannot be neglected in creating motivation and passion for education.

1. Light and its related factors, such as the amount and intensity of natural or artificial light;
2. The external dimensions of the class, including the wall, door and floor, class per area and per capita space;
3. Color and its impact on education and educational environments;
4. Class heating and ventilation;
5. Voice and the factors related to it, the organization and arrangement of the class; (Nazli, 2016)

3.5. Light and its Related Variables

In general, in the learning process, 83% of learning takes place through the sense of sight, so if the act of seeing is faced with problems, there will be a drop in learning. The purpose of providing lighting in the school is to create an environment in which the act of seeing It should be done in the best way and with the least effort so that the students' energy is used to absorb the information of the learning process and not to use this energy to fight the problems they see in the dimly lit environment. Of course, we must remember that the amount of light needed is different when performing any activity. The lighting of the classroom is provided through natural light (windows, vents, etc.) with artificial light from lamps and all kinds of lights, which in any case should be paid attention to the amount, direction and quality of light. Numerous experiences have shown that the area of glass windows It should be at least one-fifth of the area of the room in order to provide the minimum illumination for reading and writing. On the other hand, you should not hesitate to take any action that will equalize the lighting for the students. The distribution of the light should be favorable and evenly distributed so that the brightness of the surfaces does not cause discomfort to the eyes, and the amount of light should be sufficient and there should be no disturbing shadows (Shariatmadari, 1987).

3.6. Appearance Dimensions of the Class

In relation to the characteristics of the surfaces and dimensions of the classroom in general, it can be said that the walls of the classroom should be dry, smooth without joints and washable up to a

height of at least 1.5 meters, and it is better to be made of stone. The floors of the classrooms should be washable, flat and seamless, not slippery and wet, these points should also be observed regarding the ceiling, the color should also be taken into consideration, and relaxing colors should be used when painting the classroom, the color of the walls is better. can be washed, so the surfaces of the wall and ceiling of the classroom should have light colors and the floor of the classroom should be dark in color. Neufert (1994) states about the shape of the classroom that rectangle with trapezoid is the best shape for the classroom. Etc. It is not suitable for acoustics. Large curved areas create focal points. It creates a big barrier for sound. 1.5 square meters of land and 55 cubic meters of air are required for each student. In other words, for a class of 30, the dimensions of the room should be 8 meters long, 6 to 7 meters wide, and 4 meters high (Taghieh, 2013: 57).

3.7. Color and its Impact on Education and Educational Environment

Color is one of the most effective spatial elements on the human mind. The color of objects makes them better known and affects the perception of human emotions and feelings. Color recognition and light intensity are the most important factors in human vision perception. Color actually contains a lot of information about the objects around us. Experiments have proven that it plays a more important role than color for recognizing the position in space and recognizing the shape of objects. Of course, for children up to the age of 11 years, color is more important than form, and it also has a significant effect on their individual personality and mental state. Children need concentration and mental peace in class, and for this reason, it is better to use green, blue and yellow colors. According to verse 76 of Surah Al-Rahman, they rely on Rafraf Khizr and Ubqari: Hassan leans on green pillows and beautiful carpets. Since Paradise is the resting place and peace of Paradise, the preparations for the realization of peace in all its details, including color, must be provided for Paradise. It can be concluded that from the Quranic point of view, green is a relaxing color, and otherwise, the Quran's emphasis on its extensive use in heaven would not be justified (Kadivar, 2014: 38).

In addition to green, blue and yellow colors, to create mobility and attractiveness, their complementary colors should also be used in limited dimensions. In fact, complementary colors are a kind of contrast that demand each other and complement each other when viewed. Of course, when using this combination, it should be kept in mind that one color should always be the dominant color and the complementary color should be used as an accent color, for example, in the class, the dominant color should be green and the complementary color should be red in small dimensions and sizes and to create A sense of movement should be used, creating a tone contrast can also help the colors shine in the class and make them more expressive. The tone contrast is created by using pure colors without mixing with black or white. When these colors are placed next to each other in a composition, because they are different from each other due to their color difference, they can create a tone contrast. Using black and white next to pure colors can create a tone contrast and intensify the effects of dark colors. or clear to help; Because black, due to its darkness, when it is used as a background or in the vicinity of colors, it can greatly increase their brightness and shine, while white makes the colors appear darker and more emphasized. Regarding the class, we can make the main background white. Or consider milk to make it look more transparent by reflecting light, and show key and emphasized elements such as blackboards, class library cabinets, and teaching aids with colors such as green, blue, and yellow to emphasize them. and appear darker and deeper in the eyes of the viewer (Azimi, 2017).

3.8. Classroom Heating and Ventilation

Another factor affecting learning is the appropriate equipment for producing heat and cold, which lack of attention can cause learning and injuries. It is necessary for that, if the ambient air is too hot, pressure will be placed on the body's thermoregulation mechanism and the efficiency of physical and brain activities will decrease, so it can be seen that the temperature in the class is a factor that affects how the learners work and as a result It affects their learning (Afzal Nia, 2014: 131), besides, the air in the classroom should usually be changed three to five times per hour because the air in the room should not contain more than one percent of carbon dioxide.

In Figure 1, shows the summarized concepts;

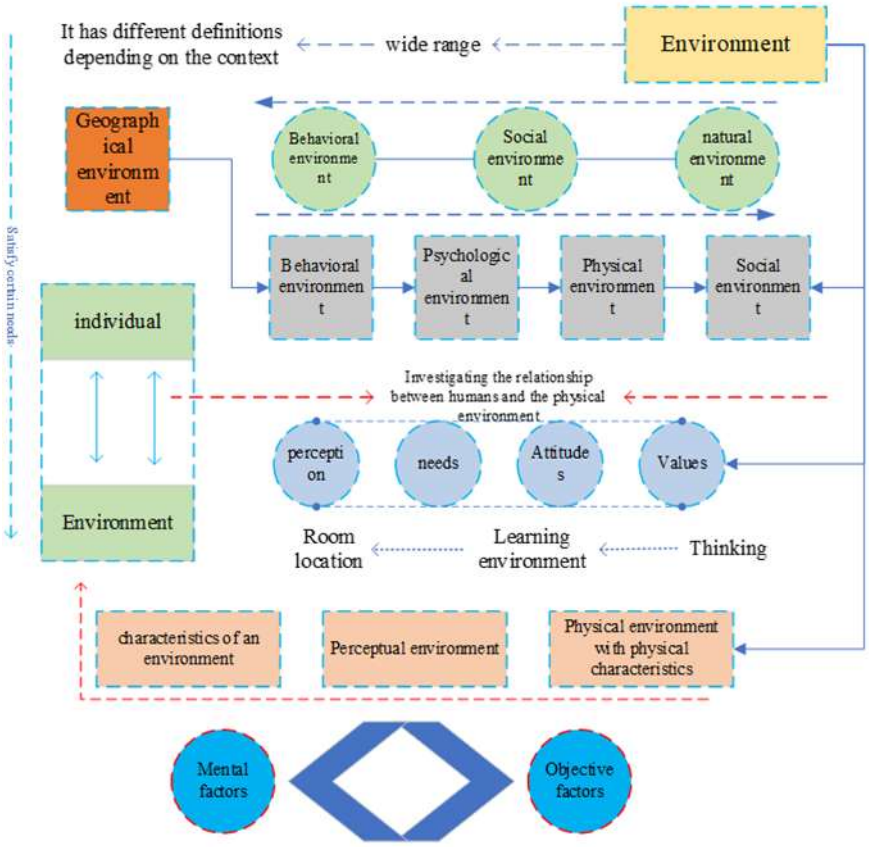


Fig 1 Summary chart of basic concepts

4. Research Methodology

The research method in this study is based on the developmental-applied type and in terms of the nested hybrid method approach. In the qualitative phase, a semi-structured interview is used to extract the environmental components of the educational corridors, and the results are entered into the ATLASTI software to reduce the texts and open and central coding with a code letter system and easier labeling. Sampling is for semi-structured interviews with snowball experts with the criteria of entering the research. Interviews are conducted until theoretical saturation, 34 people are interviewed, and repetition happens from 28 people. Delphi is used for the reliability of the results

and the correctness of the instrument (correctness of the items). Questions are formulated based on basic concepts in theoretical foundations. After extracting the components, a questionnaire with a Likert scale is compiled based on each component and is provided to the final year undergraduate students. This is the beginning stage. The results are entered into the JMPSAS16 software and analyzed with inferential and descriptive statistics. The sampling is random and cluster and the upper limit of the Morgan table is used to calculate the sample size. And the number of 384 people is selected. To check the validity of the research, the CVR formula is used, which is 0.71 for 20 experts, and Cronbach's alpha is used for reliability, which is 0.81.

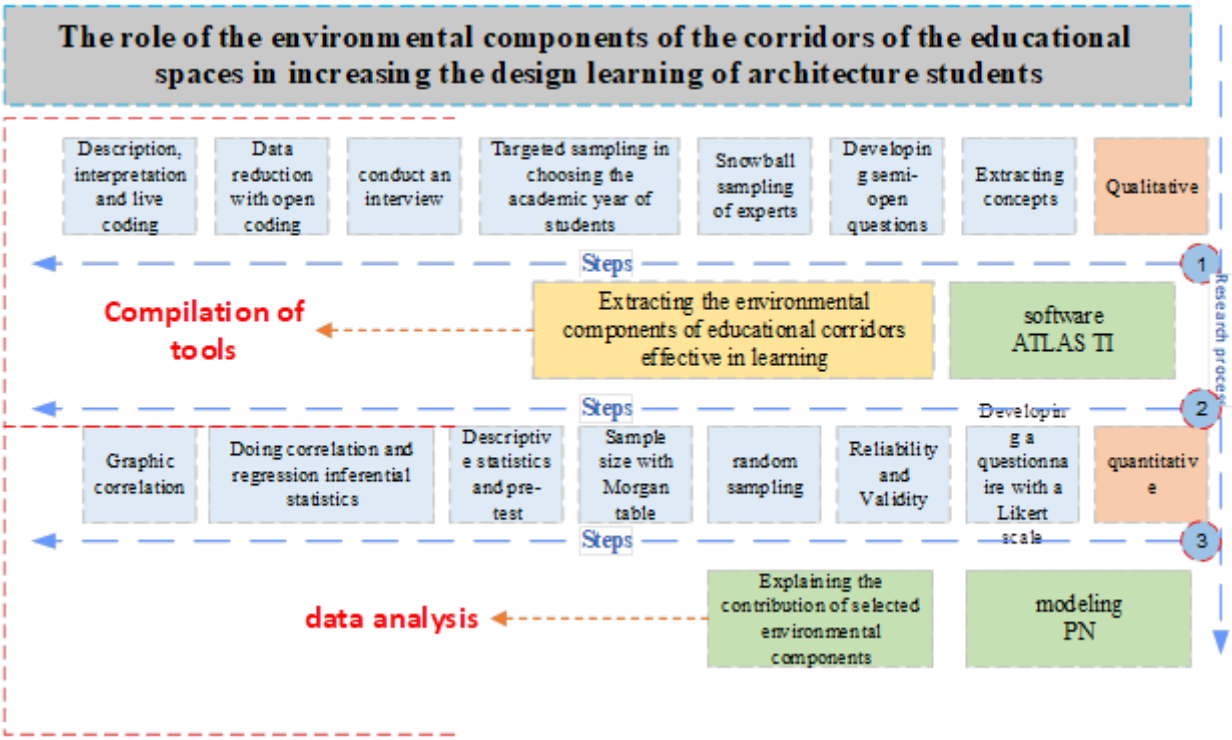


Fig 2 The process of the research method in this research

5. Qualitative Findings

The interviews were continued until theoretical saturation and data repetition of the texts, for this reason, 46 people were interviewed, and the results of the 36 interviews were repeated. At this stage, the interviews are converted from spoken to written in text format and entered into ATLASTI software, and labeling is started based on three approaches, description, interpretation and live coding in the open coding stage. Then, based on the components, the expert panel starts to code the components based on the central format (themes, concepts). At this stage, a general axis is used to connect the components with each other, and that is how the components are used in the environment.

In the coding phase, 38 codes were extracted first, and after summarizing the data based on the main categories and concepts, the number of codes reached 34. The most prominent is related to the component of multi-functional spaces with 29 and the least repeated is related to routing with 7.

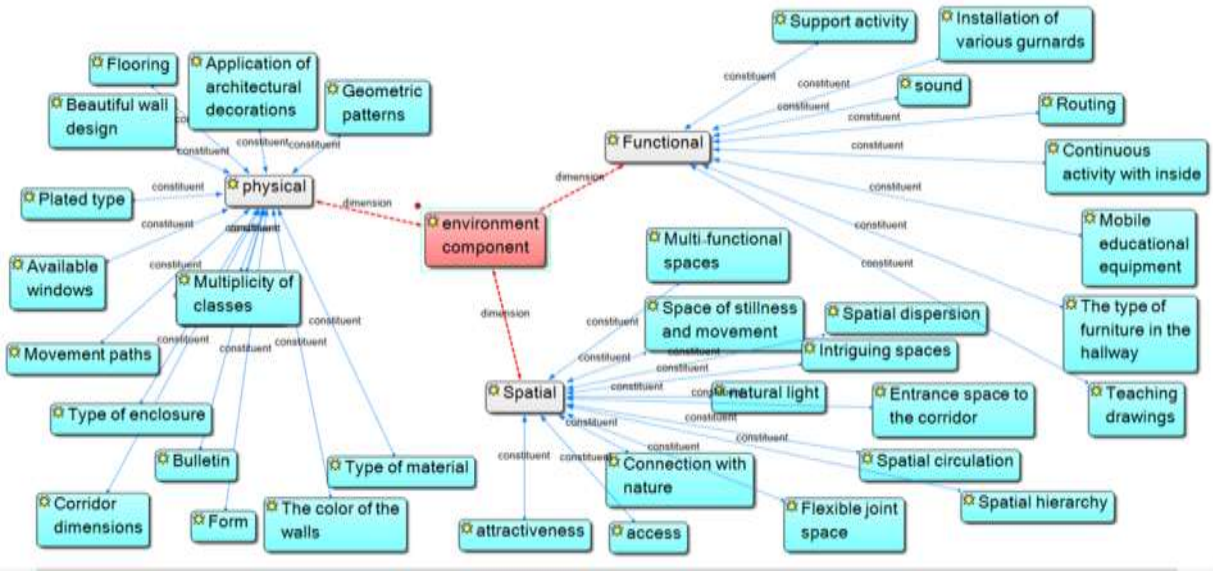


Fig 3 Selected components from the open and central coding of interviews with intellectuals in the ATLASTI9 software.

6. Quantitative Findings

According to the results obtained from the descriptive statistics, 256 people (66.6%) of the sample size are men and 128 people are women (33.3%) in the age group of 20-30, 30-40, 40-50, 50- It has been 60 years. The working method is such that for the effect of each criteria on each of the environmental components of the educational corridors, a question is formulated and provided to the space users. Each question has an answer between 1 and 5 (very little to very much). The sum of the scores of the indicators of a component means the score that each person gave to the desired quality, so the score that can be obtained for each quality is between 1 and 5. So, their frequency range is between 384 and 1920 for each component in each circle. The results show descriptive statistics and data distribution. The highest frequency is related to activity support with a value of 1901 and the lowest is related to existing windows with a value of 1011. The support of the data distribution of the moving average emphasizes the high accuracy of the extracted environmental components in the measurement of learning.

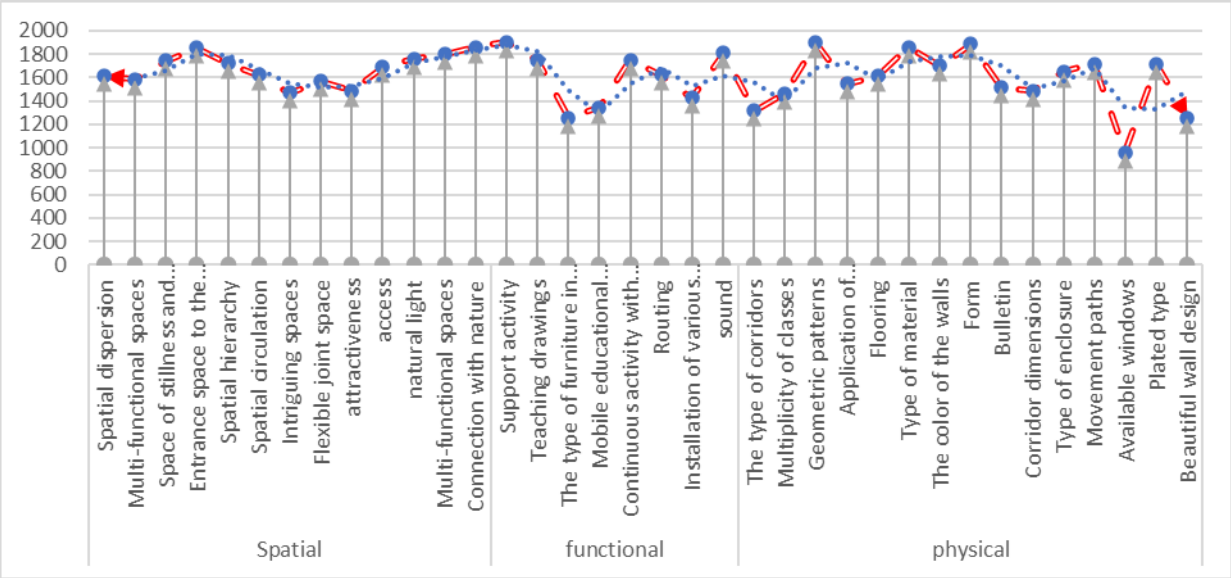


Fig 4 Frequency chart of environmental components of educational corridors

7. Inferential Statistics

In this stage, after choosing the selected variables in the qualitative stage, a questionnaire is compiled and randomly distributed among the users of the space who are final year architecture students. The questionnaire is shown. The results are entered into the JMPSAS16 software, predictive relationships (regression) and correlation relationships are used for analysis. Two-Sample Kolmogorov-Smirnov Test is used to check the parametric and non-parametric type of data.

Table 1 Kolmogorov-Smirnov test to check the normality of the variables of environmental components of educational corridors

Variable	Average	Standard Deviation	Z Kolmogorov Smirnov	P
Environmental components of educational corridors	21.32	11.6	0.417	0.194

As can be seen in the above table, the Kolmogorov-Smirnov test for the score of the environmental components of the educational corridors is significant (p=0.194) and therefore their internal and external output do not have a normal distribution and non-parametric analysis should be used for it. Based on the results of inferential statistics in the Spearman correlation stage, it is determined that the highest correlation between the activity support component and other components is with the value of 0.941 and the lowest correlation is related to the bulletin board with the value of 0.162. The significant amount and low value of the components indicate the high influence of the components on each other.

Table 2 Spearman correlation of environmental components of educational corridors

Dimensions	Variable	The correlation coefficient	The significance level	Degrees of freedom
Spatial	Spatial dispersion	0.762	0.001	383
	Multi-functional spaces	0.372	0.004	383
	Space of stillness and movement	0.872	0.011	383
	Entrance space to the corridor	0.685	0.012	383
	Spatial hierarchy	0.597	0.008	383
	Spatial circulation	0.436	0.008	383
	Intriguing spaces	0.852	0.006	383
	Flexible joint space	0.665	0.005	383
	attractiveness	0.813	0.017	383
	access	0.425	0.014	383
	natural light	0.414	0.021	383
	Connection with nature	0.421	0.022	383
Functional	Support activity	0.941	0.002	383
	Teaching drawings	0.615	0.001	383
	The type of furniture in the hallway	0.424	0.004	383
	Mobile educational equipment	0.423	0.011	383
	Continuous activity with inside	0.454	0.012	383
	Routing	0.341	0.011	383
	Installation of various gurnards	0.578	0.013	383
	sound	0.514	0.014	383
physical	The type of corridors	0.542	0.012	383
	Multiplicity of classes	0.541	0.011	383
	Geometric patterns	0.654	0.014	383
	Application of architectural decorations	0.221	0.013	383
	Flooring	0.521	0.021	383
	Type of material	0.522	0.001	383
	The color of the walls	0.524	0.004	383
	Form	0.619	0.011	383
	Bulletin	0.162	0.012	383
	Corridor dimensions	0.812	0.008	383
	Type of enclosure	0.532	0.008	383
	Movement paths	0.852	0.006	383
	Available windows	0.725	0.005	383
	Plated type	0.711	0.017	383
	Beautiful wall design	0.762	0.014	383

To use the type of linear or multivariate regression, the internal correlation matrix diagram of the variables is used. After drawing the correlation matrix diagram, it was found that the factors have no linear relationship, so it is correct to use multivariate regression.

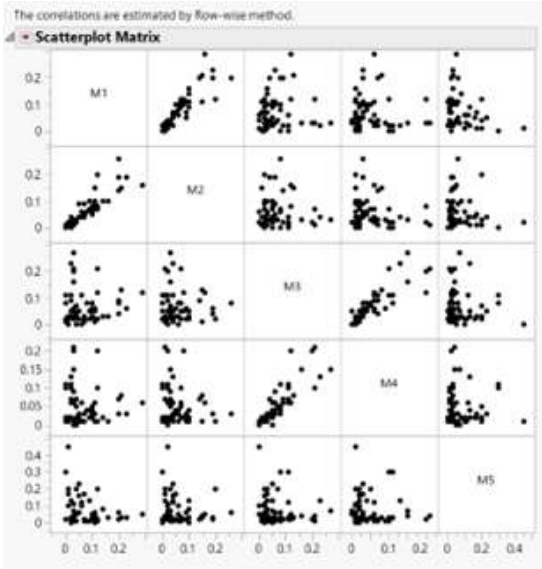


Fig 5 Diagram of correlation matrix of factors

In the spatial dimension, the attractiveness component with the coefficient of determination (0.213) has the least contribution to the students' learning, and the most related to the space component of stillness and movement with the value (0.872) in the functional dimension of supporting activities with the value (1.000)) has the largest factor contribution in students' learning and the least is related to the type of furniture in the corridor with the coefficient of determination (0.224). In the physical dimension, the bulletin board component with the value (0.132) has the least effect on learning and the dimensions of the corridors with the value (0.952) has the largest factor contribution in students' learning.

Table 3 Multivariate regression of environmental components of educational corridors effective in learning

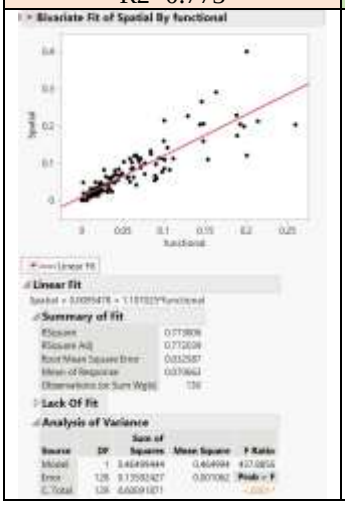
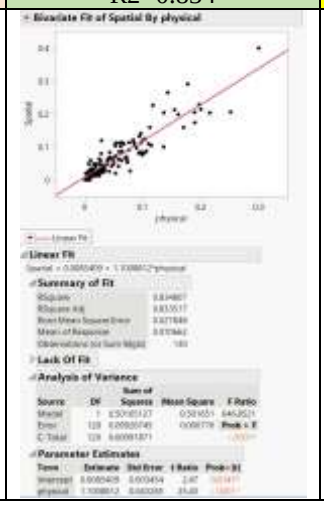
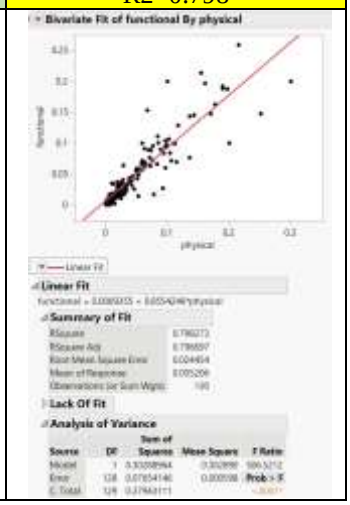
Dimensions	Variable	Coefficient of determination	The significance level	F	β	t	Degrees of freedom
Spatial	Spatial dispersion	0.762	0.001	342/411	0.741	571/44	383
	Multi-functional spaces	0.372	0.004	446/444	0.429	365/31	383
	Space of stillness and movement	0.872	0.011	752/985	0.623	255/31	383
	Entrance space to the corridor	0.685	0.012	223/211	0.685	479/58	383
	Spatial hierarchy	0.597	0.008	773/225	0.621	982/21	383
	Spatial circulation	0.436	0.008	681/653	0.652	134/11	383
	Intriguing spaces	0.852	0.006	654/724	0.612	425/24	383

	Flexible joint space	0.665	0.005	621/741	0.381	132/23	383
	attractiveness	0.213	0.017	325/512	0.484	121/48	383
	access	0.425	0.014	748/276	0.464	963/47	383
	natural light	0.414	0.021	125/302	0.421	564/43	383
	Connection with nature	0.421	0.022	034/519	0.631	448/49	383
Functional	Support activity	1.000	0.002	125/521	0.124	214/15	383
	Teaching drawings	0.915	0.001	258/149	0.311	216/22	383
	The type of furniture in the hallway	0.224	0.004	214/315	0.325	552/22	383
	Mobile educational equipment	0.723	0.011	371/458	0.425	354/18	383
	Continuous activity with inside	0.884	0.012	695/325	0.223	341/32	383
	Routing	0.841	0.011	937/621	0.529	324/23	383
	Installation of various gargards	0.778	0.013	210/521	0.679	839/28	383
	sound	0.714	0.014	312/520	0.628	581/48	383
physical	The type of corridors	0.542	0.012	382/752	0.542	566/48	383
	Multiplicity of classes	0.541	0.011	317/645	0.574	698/29	383
	Geometric patterns	0.654	0.014	235/456	0.456	214/32	383
	Application of architectural decorations	0.221	0.013	125/423	0.202	807/16	383
	Flooring	0.521	0.021	405/121	0.301	458/13	383
	Type of material	0.522	0.001	415/161	0.517	458/36	383
	The color of the walls	0.524	0.004	325/512	0.603	542/20	383
	Form	0.619	0.011	748/276	0.518	310/39	383
	Bulletin	0.132	0.012	125/302	0.361	725/28	383
	Corridor dimensions	0.952	0.008	034/519	0.919	811/26	383
	Type of enclosure	0.532	0.008	125/521	0.765	231/23	383
	Movement paths	0.852	0.006	258/149	0.338	128/21	383
	Available	0.741	0.005	325/512	0.716	821/65	383

	windows						
	Plated type	0.931	0.017	748/276	0.985	316/55	383
	Beautiful wall design	0.862	0.014	125/302	0.326	411/43	383

In the next step, graphical correlation with curve fitting is used to predict each dimension by other dimensions. The results show that the dimensions have a high correlation with each other, and by addressing one aspect, other dimensions can be influenced and controlled. The order of the high degree of relationships is shown in the Table 4, which includes first (spatial and physical) with a value of 0.834, then (physical and functional) with a value of 0.798 and finally (functional and spatial) with a value of 0.773.

Table 4 Correlation of the environmental components of educational corridors effective in the learning of architecture students

R2=0.773	R2=0.834	R2=0.798
		

Because it is not possible to use all the components together, in order to increase their efficiency, it is necessary to find out which one of them increases the learning effect. In PN modeling, it is found that the use of components in the following categories increases learning by 80%, 65%, and 43%, respectively:

1- Spatial hierarchy, spatial dispersion, multi-functional spaces, continuous activities with the interior, supporting activities, embedding diverse functions, curious spaces, form, ----------(80%)

2- Embedding various functions of access, color of walls, attractiveness, multiplicity of classes, use of architectural decorations, type of corridors, spatial distribution, ----------(65%)

3- Flooring, types of spatial circulation materials, multifunctional spaces, connection with nature, natural light----------(43%)

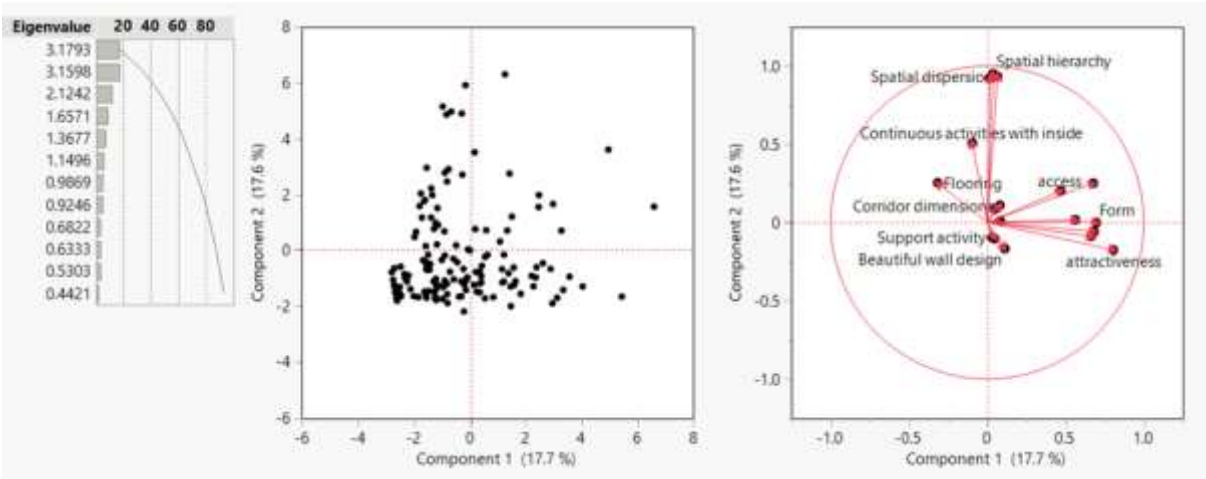


Fig 5 Modeling the environmental components of educational corridors effective in learning

8. Discussion

In this research, it was found that 38 codes are extracted and 34 codes are selected. The emphasis of the experts is on the multi-functional aspects of the space. This gives the space the ability to transform into different educational situations. These spaces emphasize various aspects that include three general functional, spatial and spatial dimensions. To make it easier to recognize the type of effective components, we put them in these three categories, the results of descriptive statistics are inconsistent with inferential statistics, and the results of inferential statistics should be paid attention to for accurate inference. The moving average support of the data distribution shows the accuracy of the tool and makes the results more accurate. The component of supporting activity in space can increase the learning of final year architecture students in such a way that if an activity is defined in space, all spatial and physical aspects should support it. According to experts, physical and spatial aspects have more components than functional ones, but based on the averages of inferential statistics, the largest contribution is related to performance. Spatial components can create more correlation with other components individually, and by using them, other components can be improved in order to increase students' learning. But contrary to popular belief, the objective components that have an objective aspect in the space have a lower average and the bulletin board component has the least effect in improving other components. Also, the dimensions and size of the corridors, support for activities, the combination of stillness and movement have an important role in the formation of the learning of final year architecture students. Based on the graphic correlation model, with the accurate application of one of the dimensions, other aspects can be improved in order to increase learning. This case can lead to the revitalization of educational spaces using development stimulating projects. Also, with the method of extracting a limited number of components, it is possible to significantly improve the learning rate by applying the components accurately.

9. Conclusion

The educational environment and its constituent elements can lead to an increase or decrease in the level of education in individuals as a restraining force and as a facilitating factor. Academic

spaces in the field of architecture are not limited to walls, rooms, or their physical elements. The educational corridors in these spaces can carry a message for students and impose customs and habits on them as transmitters. The educational environment is always a place where learning takes place. It happens and it should be designed in such a way that young people and students can separately understand the environment in line with education. This research showed that environmental factors in educational corridors can be classified into three functional, spatial and physical categories. And according to the findings, it is clear that the type of performance in these spaces can improve the students' learning more. In this research, the spaces that support the type of activity in the space give the students the knowledge that they should consider the benefits of it at the same time as designing a diverse space. should be taken that can be supported based on the body. The following solutions can be provided for the design of the environment in the educational corridors;

- Designing multifunctional spaces in educational corridors to achieve various activities and create spatial diversity
- Using flexibility indicators in fixed and movable furniture in different spaces to create different uses
- Creating space enclosure and continuity between intermediate spaces and educational spaces by using the combination of inside and outside space.
- Creating spatial rhythm by using spaces of stillness and movement and creating spatial hierarchy by using rhythm in space

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Comparison of Geometrical Proportions in the Tomb Monuments of the Contemporary Period with an Emphasis on Various Systems of Global Proportions

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Research Article

Abstract

Throughout history, in order to honor and record valuable events such as themes, conquests, events and personalities, monuments were formed that have a meaning in their heart. These buildings have been influenced by various factors. Paying attention to the body and also the physical form to engage the senses of the visitors has been a main pillar in the design of such buildings. One of the ways to create brevity in such buildings is the use of geometry and the use of proportional systems to create pleasure and a pleasant feeling in the audience. This research, using causal-comparison method and using the tool of collecting questionnaires, seeks to see how much proportional systems have been used in the design of the overall form and its components from each of the mentioned and selected monuments. have used, the range of measurement is selected with the preference system and with the opinions of thinkers, and the people to be measured include space users and users who are selected by random sampling with a number of 384 people according to Morgan's table. JMPSAS16 software is used for ease of numerical and graphical analysis. The results show that the largest factor contribution in the application of geometric proportions in the components and overall design is related to radical ratios with the value of (1.000) for the components and (0.905) for the overall design, and the lowest is related to Ken and Shako with the

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value (0.167) for components and (0.195) for the overall plan. The important point is that the platonic rectangle with the value of (0.915) for the components and (0.914) for the general plan has a high factor share, but due to the lack of significance for both parts, the results of attention to it are not reliable.

Keywords: Geometric Proportion; Tomb Monuments; Contemporary Period; Systems of Global Proportions

1. Introduction

Different views of architecture have existed as long as humans have existed and even before that, which has seen many imaginations. In this process of transformation and smooth evolution, the presence of some metamaterials has made them eternal and divine in the valley of architecture. Since the birth of architecture, geometry has been, is and will be. The knowledge of geometry, like many human sciences, has a long history, which has always been used in architecture to enhance the material and convey the spirit, meaning and special effect. This type of use for creation by mankind can be influenced by the thoughts and ideas of philosophers and great thinkers, as Plato says that God is an "engineer" and before him Pythagoras and after him Plotinus also believed that mathematics is because of its sensible area (and not Perceptible) has a theological aspect and the principles of God created the world based on an amazing mathematical order based on two right triangles (Saki, and Pakzad, 2014: 399). The issue of using proportions has been discussed since the beginning of human creation and his awareness of the issues and environment around him and has been researched and examined by various artists and scientists since the beginning of time. The purpose of all theories of proportions is to create a sense of order between the components of a visual composition. (Grotter, 2004: 103) Architects have succeeded in creating order, harmony, compliance with the principles of hierarchy and beauty in a set of buildings with different uses in the vicinity of each other by using good proportions and geometry throughout the ages. Systems of mathematical proportions originate from the Pythagorean hypothesis which says: everything is a number and from the belief that some numerical ratios show the harmonious structure of the universe (Dick Ching, 1998:106).

The system of proportions creates a set of visual constant ratios between the components and the whole of a set. In the past, the design of different components of buildings was done by looking at proportional rules and balanced proportions, and it seems that the building has a part of its beauty. It owes to these rules and the skill of using these rules. But nowadays, such skills are not taught separately in architecture schools. The design does not limit itself to the use of geometric proportions. Monuments are built to honor and remember various issues such as a character, an event with a meaning, these monuments are influenced by factors such as the importance of the subject or character, density of the site, visual obstacles, political, economic power, etc., they can have different scale and architecture, memorial architecture can be divided into two categories, burial and non-burial. The importance of these buildings is their fundamental impact on the development and identity of many cities in Iran, which strengthens the sense of place, meaning and personality in today's cities, and they can be a symbol of identity. become that city. Geometry is one of the important elements in the design and general plans of these buildings.

Architects of the contemporary era always try to use proportional systems known at the world level in the design of such buildings, which can make these buildings attractive in the overall scheme and components. This research aims to investigate the contribution of each of the systems

of geometric proportions in the formation of the contemporary period tomb monuments and tries to answer the question of how much each of the proportional systems plays a role in the formation of the contemporary period tomb monuments.

2. Theoretical Foundations

2.1. Proportions

Proportion, which in Euclid's view refers to the quantitative comparison of two similar things, has been the basis of the creation of the whole nature, including the heavens and the earth, and especially humans. Proportions have always been used in the design of buildings in different periods and ancient civilizations. Proportion in the object always makes the object look more balanced. Proportions have been used in architecture from materials and materials, climatic conditions, technical and executive factors to the thoughts governing people's lives, and space has been designed as a suitable background for human growth and excellence. Proportion is one of the basic principles of an artwork that expresses the harmonious relationship between its components (Ansari, Okhot, and Taghvaei, 2011: 46). In another definition, proportionality is: the relative and analogical relationship between different parts and the whole of an element. Proportion, while being a determining factor for harmony, is one of the issues that has always been discussed in architecture. Proportion is a subjective value and can only be checked in relation to the shape. Proportion in architecture means a ratio that expresses the relationship between two or more sizes (Grotter, 2004: 360). Measuring the size of two things produces a ratio. According to Euclid's theory: Quantitative comparison refers to two similar things. While proportion is said to be the equality of proportions. Proportions are a set of ratios, the ratio is a comparison of two qualities or quantities, such as size or amount, and therefore ratios are considered to represent a unit of a difference or difference (Carrier, 2005: 7). In the field of architecture, proportions include the comparative ratios of various quantities and qualities of heterogeneity, and hence its understanding is more complicated. If we put proportionality as an example of perception activity based on the recognition of difference (Carrier, 2005: 9).

3. Theories Related to Proportional Systems and Measurement Units

All theories of proportions aim to create a sense of order between the components of a visual composition. The proportional adjustment system creates a set of visual fixed ratios between the components of a building and also between the components and the whole. Proportion regulation systems go beyond functional and technical determinants of architectural form and space, and present aesthetic arguments about themselves (Dick Ching, 1998: 298). The proportions in the world thought can be divided into 4 categories: 1- Golden proportions 2- Renaissance theories 3- Le Corbusier's modular 4- Human proportions

3.1. Golden Proportions

The ancient Egyptians used proportions that they called theological proportions. Later, these proportions were called the divine proportion by Vitruvius, an Italian architect of the second century. But at the end of the 19th century and the beginning of the 20th century, when gold became the standard of economic measurement, these proportions became popular with the term golden proportions (Lasayi, and Mparma, 1984; Ayat Elahi, 1998). The law of golden divisions of line segment by Euclid, a prominent Greek philosopher and mathematician, in the third century BC.

It was discovered (Haji Ghasemi, Navai, and Rasouli, 2012). Also, after some time, the Greeks realized the dominant role that the golden ratio played in the proportions of the human body. Therefore, they reflected these proportions in the building of their temples. In this ratio, a line is divided into two unequal parts, where the ratio of the length of the smaller part to the larger part is equal to the ratio of the length of the larger part to the whole line (Haji Ghasemi, Navai, and Rasouli, 2012: 93). The golden ratio is the ratio of 1 to 61803.1. Whenever a shape or volume has allegorical or accepted dimensions and sizes, it is called proportional or having golden sizes (Carrier, 2005: 71). Sublime and golden proportions have become common in every culture according to the beliefs and likes of that culture and thought, and it has proven its beauty as a result of its many uses. Be considered. In the Bible, there is also a reference to the golden ratio, for this reason, this ratio has been called the "divine ratio" since ancient times, and there is a group of people who believe that this ratio has a special role in the creation of the universe. Proportions in their general form rely on the science of geometry and mathematics in their place and in their specialized form have an undeniable value in the basics of understanding art and are considered as fundamental considerations (Carrier, 2005: 9). Among the golden measures, we can mention the rectangle 2√, 3√, 4√ and... and Fibonacci numbers (Carrier, 2005: 71). Architects also used this law during the Renaissance period. Le Corbusier set his modular system based on golden proportions. The golden ratio, which has been widely used in Islamic architecture, is the ratio obtained from pentagonal dimensions (Ansari, Okhot, and Taghvaei, 2011: 71). If three points are on a straight line, the ratio of the large segment to the small segment is equal to the ratio of the length of the entire line segment to the length of the large segment. In the second century AD, Vitruvius called this geometric ratio (golden ratio) theological ratio. Lahoti ratio: It is a ratio that divides a line segment into two proportional parts so that the ratio of the smaller part to the larger part is equal to the ratio of the larger part to the whole line segment.

Consider a square ABCD with a side length of one unit (Figure 2). Point O is the middle of side CB. Draw an arc to the center of this point and to the radius OA to cut CB at point Q. The rectangular square PQCD is a "golden rectangle" and its length-to-width ratio is 1/618.

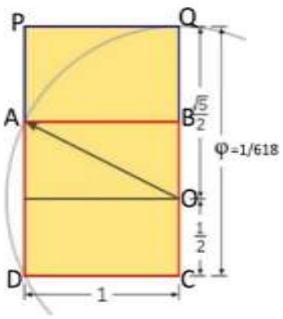


Fig 1 How to geometrically draw a golden rectangle with the help of a square

It has been said that such a rectangle is more beautiful to the human eye than other rectangles. For this reason, it has been widely used in architecture from ancient times until today, and even today, when they want to make something rectangular that is eye-catching, they make it in the shape of a golden rectangle, that is, if we divide its length by its width, a number close It is obtained as 1/6.

The golden ratio of the line segment is represented by the 21st letter of the Greek alphabet, T (Lawlor, 1989). Phi Dias, a Greek sculptor, studied the golden ratio in detail, and for this reason,

this ratio is also known as Phi (Φ) (Kashifpour, 2009). Dividing the line segment into two proportional parts can be used to make: 1) golden rectangle and spiral, 2) golden pentagon, 3) golden triangle.

1. Golden rectangle and spiral:

In making the golden rectangle, like 2√, the index square of image 3 is used. With the difference that to draw a golden rectangle, we make an arc equal to the diameter of the square from the diameter of half the index square, the obtained point shows the place of formation of the golden rectangle, which points (c, e, f) are the same as points A, B, C on the segment they are the golden line. The golden ratio can be used in different ways. For example, by multiplying one of the sides of a square by the number 1.618, we get a rectangle with harmonic proportions.

Fig 2 Rectangle with harmonic fit

If we continue to use the golden ratio formula on this new rectangle, we will eventually get a diagram with progressively smaller squares like the one below.

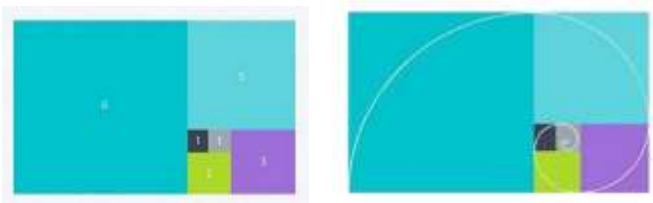


Fig 3 How to form the squares forming the golden spiral

If we draw an arc from one corner to the opposite corner in the golden ratio diagram above, we have drawn the first golden spiral curve or Fibonacci sequence. The Fibonacci sequence is actually a series in which each number is equal to the sum of the two previous numbers. Starting from zero, this sequence is: 0, 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, 144, ... by adding an arc to each square, finally to the golden spiral diagram. The attractive feature of the Fibonacci sequence or the golden spiral is that when we divide each of its numbers by the number before it, we reach a number close to 1.618, which is known as the "golden ratio". The Greeks represent this ratio with the letter "phi" and know it as "divine ratio". The Fibonacci pattern, or characteristic description of the golden ratio, can be seen anywhere in the forms of nature, music, and art. One of the mathematical products is the sacred spiral ratio, which is commonly found in nature (Rawles, 1997). In other words, Phi shines in the natural world like bright streaks of an invisible signature from God.

From the summation of the material presented about proportional systems, it can be concluded that the proportional adjustment systems can be examined on two scales in Iran and the world, and it can be concluded that the Iranian-Islamic proportions can be called balanced proportions 2√ And 3√ and 5√ introduced that among these 5√ is introduced under the title of golden ratio and

proportions on a global scale include two divisions of golden proportions and human proportions, which renaissance theories are based on golden proportions and the modular system Le Corbusier deals with both the golden ratio and the human ratio, and in general with the golden number Φ, which is equal to (√5+1/2), and it can finally be claimed that all proportional systems with one of the 4 √2 criteria and √3 and √5 and the golden number Φ can be analyzed. Therefore, this result can be seen in the diagram below. In summing up the material presented in this section, it can be claimed that according to the science of geometry and proportions that were expressed and identified in this section, due to the close relationship between these Science exists with nature (5√, golden ratio) and from another point of view, nature has always been praised by humans, so one of the criteria that helps the designer to arouse the viewer's sense of pleasure (meaning the sense of visual pleasure) is to watch an architectural body. It is slow to design.

2. Golden Pentagon:

As mentioned earlier, the number √5 represents the pentagonal geometric shape. Now, a regular pentagon surrounded by a circle is a golden pentagon, which with another pentagon, upside down, makes a regular golden decagon (Ayat Elahi, 1998; Nikghadam, Niloufar, 2012). In a pentagon, the diameters are divided into two proportional parts like a golden line segment (Nikghadam, Niloufar, 2012).

3. Golden Triangle:

As it was said, the 3√ rectangle is called the Platonic rectangle that forms an equilateral triangle (Barratt, 2005). It is divided again into two other golden triangles (Saki, and Pakzad, 2014). In other words, the isosceles triangle in the picture related to the golden pentagon in the picture is the same golden triangle seen in picture 16-2, which can be divided into two other golden triangles.

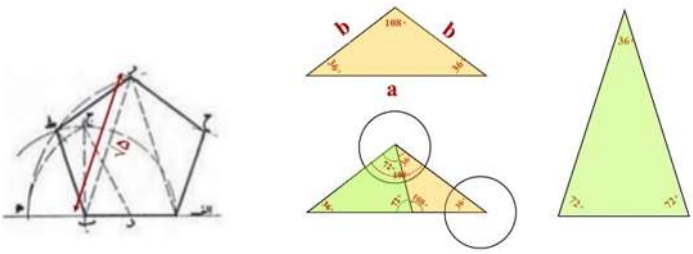


Fig 4 Golden triangle and golden pentagon (Source. Saki, and Pakzad, 2014)

3.2. Renaissance Theories

Pythagoras realized that the sound harmony of the Greek music system can be expressed by the following simple expansion: 1, 2, 3, and 4 and their ratios as 1:2, 1:3, 2:3, and 3:4. This ratio led the Greeks to believe that they had found the key to the mysterious harmony that pervaded the universe. Pythagorean believed that everything is arranged according to numbers. Later, Plato completed the science of calculating Pythagorean numbers as the science of proportion. He squared and cubed this simple numerical expansion to obtain double and triple expansion. According to Plato, these numbers and their ratios not only understood the harmony of sounds in Greek music, but also showed the harmonious structure of the world. Renaissance architects, believing that their

buildings should belong to a higher order, referred to the Greek system of mathematical proportions. The Greeks believed that music is geometry translated into sound, Renaissance architects believed that architecture is mathematics translated into spatial units. By applying the Pythagorean theory about the intermediate ratios of intervals in the steps of Greek music, they completed the infinite progression of ratios that formed the basis for the infinite ratios of their architecture. These sets of ratios did not only show themselves in the dimensions of a room or a view, but also appeared in the connected proportions of a string of space or the whole plan (Dick Ching, 1998: 312). As can be seen in the figure below, using the golden ratio and √2, this set of ratios can be seen in the dimensions of a room, facade, and in the interconnected proportions of the space or the whole plan, which Palladio 7 types of the most proportional suggested the rooms in 4 books on architecture (Bemanian et al., 2012: 50). It should be noted that the rectangle is the most common shape in design, which is expressed by the ratio of width to length, for example: 3:2, 5:3, 8:5 and so on (Lasayi, and Mparma, 1984).

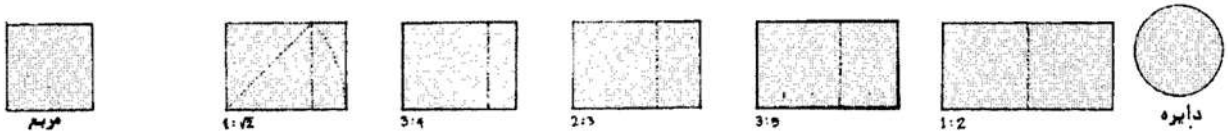


Fig 5 Palladio's theory about seven types of the most appropriate rooms (Mays, 2008)

3.3. Le Corbusier’s Modular System

Le Corbusier considered the measurement tools of Greece and Egypt, which were part of the mathematics of the human body and were the source of harmony governing human life, very rich, for this reason, his measurement tool, the modular system, is based on mathematics (golden ratio and Fibonacci series) and completed the proportions of the human body (functional dimensions of the building). Le Corbusier began his studies in 1942, and in 1948 he published a book called Modular, a Human-Scale Pion of General Application in Architecture and Mechanics. The second volume, Modular 2, was published in 1954 (Dick Ching, 1998: 316). Le Corbusier saw the modular not only as a set of numbers with fixed agreement, but as a system of measurement to which lengths, sides, and volumes were subservient, and which could establish proportion and human scale everywhere. The main grid consisted of three sizes: 43, 70, and 113. (Their ratio was adjusted according to the golden ratio) (Ansari, Okhot, and Taghvaei, 2011:50). Le Corbusier calculated the length of an average human, which was equal to 183 hundred meters, to get his proportions. These ratios are on the one hand: 86, 140, 226 (with raised hand) and on the other hand, 70, 113, 183 (up to the top of the head) (Dick Ching, 1998: 351).

113=70+43 183=70+113 226(113*2) =43+113+70

3.4. Human Proportions

The system of adjusting proportions according to human proportions is based on the dimensions and proportions of the human body. In this system, they use the theory that the form and spaces in architecture include and occupy the human body and therefore should be determined by its dimensions (Dick Ching, 1998: 351). If the size of the middle part of the body to the sole of the foot is considered as one unit, the height of the stature is equal to 1.618, which is the same number as Φ (Kashifpour, 2009). According to the Holy Qur'an, man has within himself all that is reflected in

the world "the best proportion". Man is the core of God's creations; He has the most harmonious proportions, reflecting the harmony of the divine (Guenon, 1995). "Indeed, we created man in the best form" (proportion) (Holy Qur'an, Surah 95, Verse 4). Leonardo da Vinci depicted the geometric dimensions of the human body by showing that humans clearly display the dimensions of the golden ratio in their bodies based on the ratio of 1/618. The Vitruvian Man (Fig. 6) painted by Da Vinci based on Vitruvius, who wrote that human dimensions should be related to architecture. Vitruvius believed that if human dimensions could be joined with buildings, they would be complete in their geometry (Guenon, 1995).

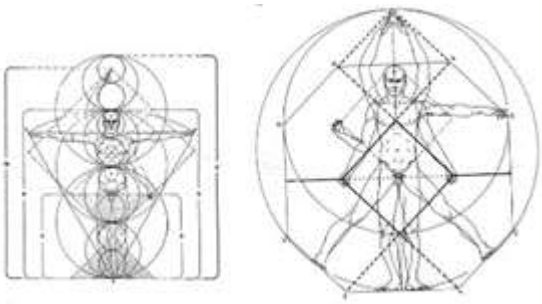


Fig 6 Vitruvian Man (Source, Dabbour, 2012)

According to Robert Lawler; "The human body includes its dimensions in all important geometric geodesic sizes and functions. The dimensions of the ideal human are at the center of a circle of constant cosmic relations" (Lawlor, 1989). Leonardo da Vinci in his famous drawing of the human body from the ratio Golden has benefited. For example, points of the body that have the golden ratio: the ratio of human height to the distance from the navel to the heel, the ratio of the distance from the fingertips to the elbow to the distance from the wrist to the elbow, the ratio of the distance from the shoulder to the top of the head to the size of the head, the ratio of the distance from the navel to the top of the head To the distance from the shoulder to the top of the head, the ratio of the distance from the navel to the knee to the distance from the knee to the heel. From the comparison of Le Corbusier's modular proportional system and human proportions, it can be seen that from dividing Le Corbusier's numbers to each other using the golden ratio of the line segment (BC/AB = AC/BC), that is, 2.52 = 113.70 = 43.70, which is approximately It is equal to $\sqrt{5} = 2.23$, and in the system of human proportions, human height is considered as the golden number Φ, which is equal to $\sqrt{5}+1/2$ or $\Phi = 1.6180339000$.

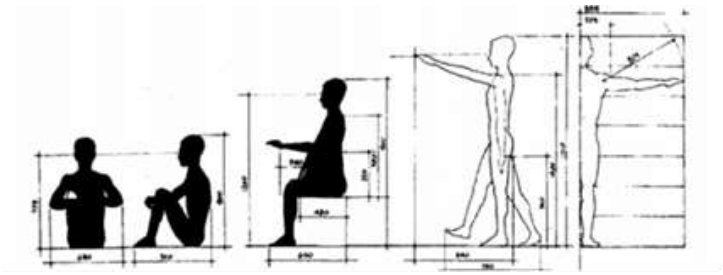


Fig 7 Human proportions and sizes determined by the human body (Neufert, 2018)

From the summary of the material presented in this section, it can be concluded that the unit of measurement of proportions can be divided into four categories of column construction, Ken and

Shako, modular and pimon, which in the column construction method, proportional criteria are based on the diameter of the column and It has different proportions in different ways as mentioned, and in Ken and Shako, it is a single Ken, and the division criterion is based on squares with a diameter of one Ken, used to identify the proportions, and in the modular system, basic and multiple modules are used, and the small pimon and large is also measured based on nodes. Also, it is concluded that the Ken unit is approximately 1.5 times the size of the large pimon.

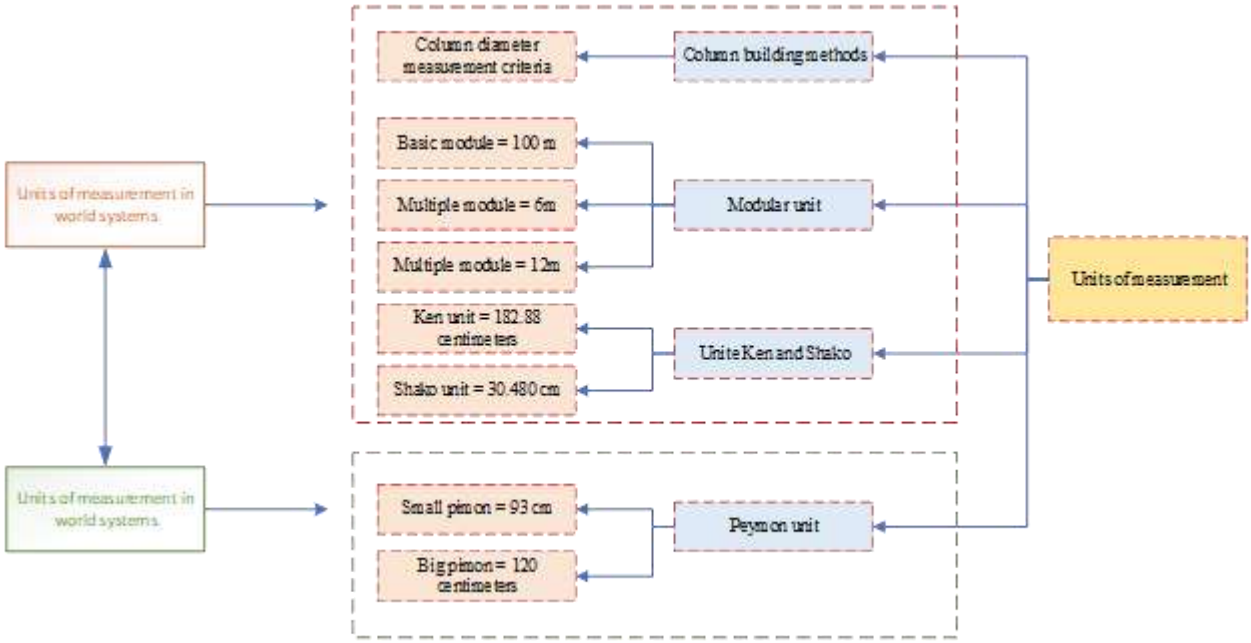


Fig 8 Diagram of measurement systems (author)

4. Research Methodology

The research method of the thesis is of a developmental-applicative type, and with a comparative causal method, it seeks to extract the difference in the intensity of the effect of the factorial contribution of these geometric proportions in the formation of contemporary period tomb monuments. For this purpose, the introduction and definition of geometric proportions are introduced and defined in the theoretical basics section, then a questionnaire with a Likert scale is used for the degree of application of each of the proportions. Random sampling and using Cochran's formula, the sample size in the population was calculated, which was 324 people. The results are entered into the ORIGINPRO2022 software for convenience in numerical and graphic sections. Descriptive and inferential statistics are reported. For validity, the CVR formula is used, the value of which is 0.742 for 20 experts.

5. Study Area

In this research, due to the vastness of the monuments, it is the Delphi system with three phases of brainstorming, limitation and selection. In the selection stage, the panel of experts is asked to rate the introduced buildings. The selected buildings are shown in Table 1.

Table 1 Introduction and explanation of the Kendall coefficient of selected monuments

Building name	Kendall Coefficient	Description	Images
Tomb of Saeb Tabrizi	0.788	Professor Hossein Maarif Isfahani designed the building plan and sent it to Tehran. That plan was completed with the opinion of engineer Mohsen Foroughi, the son of Zakal Molek, and after four years, the building of the tomb was completed in 1346. About seven hundred thousand Tomans were spent for this magnificent building, one eighth of which was donated by the interested people of Isfahan and the rest was paid by the National Association. It was decided that the opening of Makarn tomb will be done with the formation of the Congress of Archeology (May 1347); But it was postponed until the middle of Mehr 1347 without a specific reason	
Tomb of Kamal al-Mulk	0.762	The tomb of Kamal al-Molk is a building in the city of Neyshabur, Iran, which is the burial place of Kamal al-Molk. This building is located near the tomb of Atar Nishaburi in Shadiyah neighborhood. The designer of this monument is Hoshang Sihoun and it was unveiled in a ceremony on April 1, 1963-12 April 1342 in the presence of Farah Pahlavi. The builders of this tomb were some Nishabori workers who were appreciated by the then government at the unveiling ceremony.	

Tomb of Nader Shah	0.786	It is a building in the garden complex of the Naderi Museum in Mashhad, which was designed and built by Hoshang Sihon in 1342 in memory of Nader Shah Afshar. The building of Nader Shah Mausoleum consists of the central part, which is Nader Shah's burial place, and two museum halls, one of which displays the weapons museum of different periods of Iranian history, and the other displays the weapons museum and artifacts related to Nader Shah's era.	
Abu Ali Sina tomb	0.781	The design of the mausoleum was adapted by the engineer Hoshang Sihon in the architectural style of the period and century in which Bu Ali Sina lived, based on the oldest historical Islamic building, Qaboos Dome Tower in the city of Kavus Dome. The National Artifacts Association then collected the rest of the cost by selling stamps and collecting other donations and started building the tomb. On March 22, 1326, at the suggestion of the Ministry of Culture (during the ministry of Dr. Ali Akbar Siasi), the Board of Ministers allowed three hundred thousand lottery tickets to be sold at the price of two tomans each time, for the construction of the tomb, in three occasions with an interval of three months, and two thirds of the income obtained the cost of Abu Ali Sina's millennium celebration and the construction of his mausoleum. The construction of the new cemetery was completed in 1333.	

Ferdowsi Mausoleum of Mashhad	0.706	Ferdowsi tomb has been built and destroyed many times. In the reports made by Iranian and foreign researchers in the last two centuries, a humble building covered with wheat fields has been seen. Finally, at the beginning of the 14th solar century and at the same time as Iran's new nationalism, efforts were resumed to build a tomb worthy of Ferdowsi. The current area of the tomb complex is nearly six hectares and includes the tomb garden, a pool and a statue of Ferdowsi by Abolhasan Sediqi in front of it, a monument, office buildings, a library, a museum, the tomb of Mahdi Akhwan the Third and the tomb of Mohammad Reza Shajarian. The interior architecture of the building also includes tiling, prominent stone motifs from Shahnameh stories and stone inscriptions from Ferdowsi's poems and others.	

In this research, it was found that the most valuable monuments in the monuments are related to the tomb monuments. that examining the geometry and proportions of Hessian in its components and in its general plan can be helpful.

6. Research Findings

6.1. Descriptive Statistics

According to the results obtained from the descriptive statistics, 239 people (73.76%) of the sample are men and 85 people (26.24%) are women in the age group of 20-30, 30-40, 40-50, 50-60. have been years The working method is such that a question is formulated and provided to spatial users for the effect of each geometrical proportion. Each question has an answer between 1 and 5 (very little to very much). The sum of the scores of indicators of a component means the score given by each person to the desired quality, so the score that can be obtained for each quality is between 1 and 5. The results of descriptive statistics and data distribution show that the highest frequency is related to the radical ratio with a value of 1916 in the components in Bu Ali Sina tomb, and the highest frequency is related to radical ratios with a frequency of 1901 in the Bu Ali Sina tomb. The lowest amount of use of Ken and Shako proportions in components with a value of 324 is in Bo Ali Sina's tomb and the lowest in the overall design is related to Ferdowsi's tomb. The largest range of changes is related to general plans and the least is related to components. The most attention in the application method is related to radical correlation and golden ratio, and the lowest range is related to basic rand coefficients. The support of the moving average of the data distribution shows the high accuracy of the tool and the correct measurement of proportions.

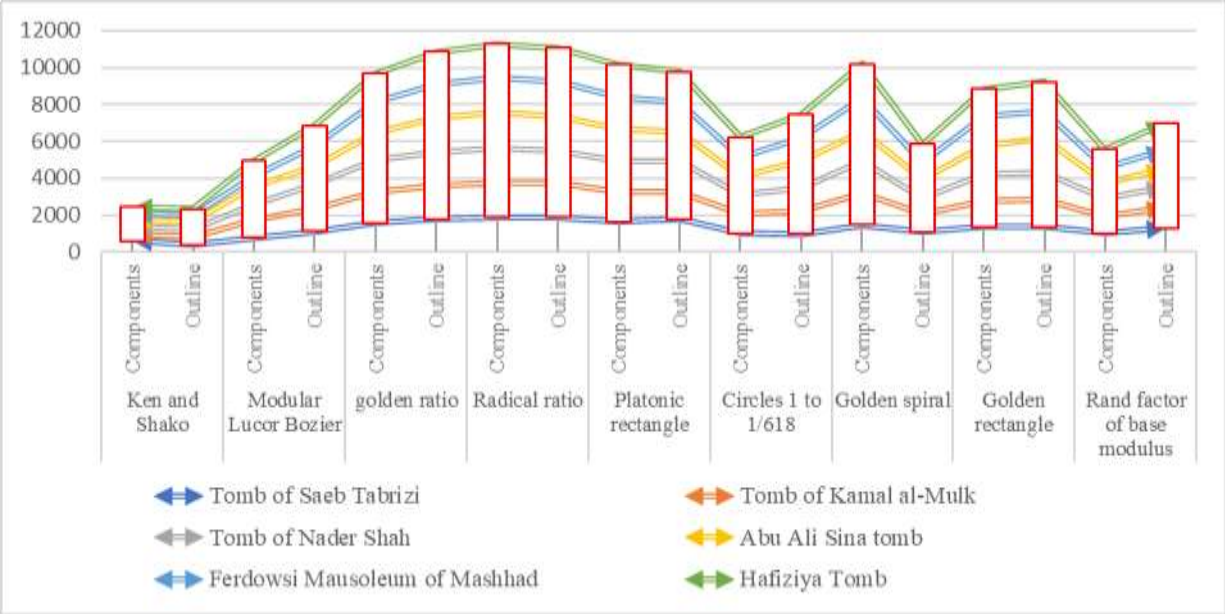


Fig 9 Distribution of the use of geometric proportions in tomb monuments

6.2. Inferential

Pearson Correlation

At this stage, after extracting the selected geometric proportions with the Delphi method, a questionnaire is compiled and randomly distributed among space users, architects and experts. It should be noted that the relevant documents from the monument are shown to the people filling the questionnaire. The results are entered into the ORIGINPRO software, predictive relationships (regression) and correlation relationships are used for analysis. Two-Sample Kolmogorov-Smirnov Test is used to check the parametric and non-parametric type of data.

Table 2 Kolmogorov-Smirnov test to check the normality of the variables of proportions in tomb monuments.

Variable	Average	Standard deviation	Z Kolmogorov Smirnov	p
Geometric proportions	28.21	5.5	0.708	0.004

As can be seen in the above table, the Kolmogorov-Smirnov test is significant for the score of geometric proportions (p=0.004) and therefore their internal and external output has a normal distribution and parametric analysis should be used for it.

Table 3 Pearson's correlation of types of geometric ratios to each other

		Ken and Shako		Modular Lucor Bozier		golden ratio		Radical ratio		Platonic rectangle		Circles 1 to 1/618		Golden spiral		Golden rectangle		Rand factor of base modulu	
		X_1	X_2	X_1	X_2	X_1	X_2	X_1	X_2	X_1	X_2	X_1	X_2	X_1	X_2	X_1	X_2	X_1	X_2
Ken and Shako	X_1	1																	
	X_2	0.362	1																
Modular Lucor Bozier	X_1	0.372	0.424	1				$X_{1=}$ Components											
	X_2	0.872	0.423	0.781	1						$X_{2=}$ Outline								
golden ratio	X_1	0.685	0.454	0.732	0.411	1													
	X_2	0.597	0.341	0.662	0.421	0.741	1												
Radical ratio	X_1	0.436	0.578	0.748	0.789	0.923	0.831	1											
	X_2	0.852	0.514	0.864	0.521	0.929	0.124	0.741	1										
Platonic rectangle	X_1	0.665	0.542	0.662	0.542	0.685	0.311	0.429	0.872	1									
	X_2	0.213	0.541	0.652	0.545	0.621	0.325	0.623	0.685	0.424	1								
Circles 1 to 1/618	X_1	0.425	0.654	0.665	0.411	0.652	0.425	0.685	0.597	0.423	0.424	1							
	X_2	0.414	0.221	0.483	0.309	0.612	0.223	0.621	0.436	0.454	0.423	0.714	1						
Golden spiral	X_1	0.101	0.121	0.464	0.517	0.381	0.529	0.652	0.852	0.521	0.454	0.883	0.755	1					
	X_2	0.421	0.522	0.452	0.517	0.484	0.679	0.612	0.665	0.542	0.521	0.619	0.842	0.235	1				
Golden rectangle	X_1	0.615	0.524	0.463	0.607	0.464	0.628	0.381	0.213	0.545	0.542	0.836	0.518	0.211	0.716	1			
	X_2	0.762	0.619	0.472	0.619	0.421	0.542	0.484	0.425	0.411	0.545	0.920	0.345	0.744	0.985	0.162	1		
Rand factor of base modulus	X_1	0.372	0.162	0.661	0.562	0.741	0.574	0.464	0.414	0.309	0.411	0.654	0.583	0.821	0.326	0.902	0.919	1	
	X_2	0.872	0.902	0.452	0.823	0.429	0.456	0.372	0.421	0.517	0.309	0.625	0.919	0.947	0.218	0.532	0.765	0.162	1

The results show that there are correlations, both in the form of a general plan and in the form of components, between all types of proportions in tomb monuments, and almost all of their values are positive. The highest amount is related to Radical ratios with other ratios, the highest of which is between the Radical ratio with the value (0.929) and the Golden ratio and in general between the Golden ratio with the Radical ratio with the value (0.923) and the lowest is related to the ratio Zarin is with Ken and Shako in components with the value of (0.121) and (0.101) in components.

Multivariate Regression and Factor Share Growth Chart

To use the type of linear or multivariate regression, the internal correlation matrix diagram of the variables is used. After drawing the correlation matrix diagram, it was determined that the factors have no linear relationship, so it is correct to use multivariate regression.

Fig 10 Correlation distribution matrix diagram among types of proportions

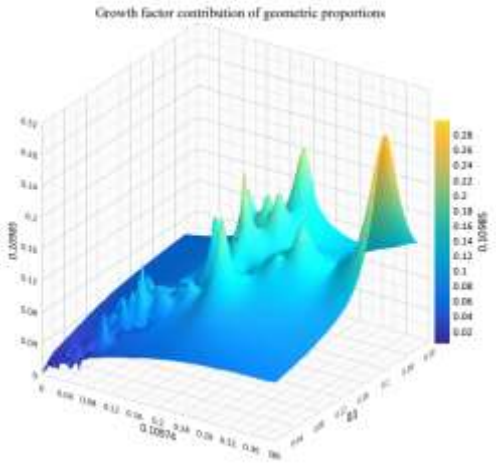
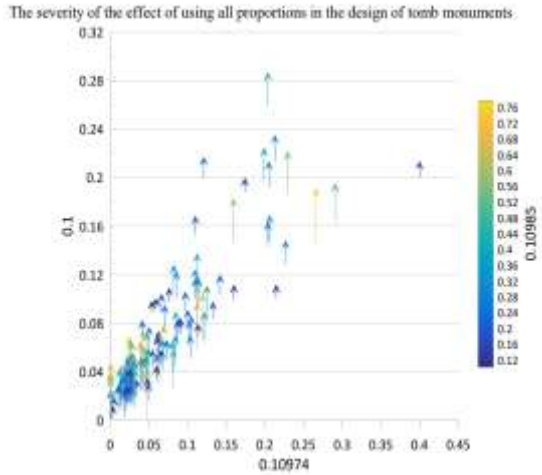
At this stage, after extracting all kinds of geometric proportions, the monuments are evaluated. The results show that the largest factor contribution in the application of geometric proportions in the components and overall design is related to radical ratios with a value of (1.000) for the components and (0.905) for the overall design, and the lowest is related to Ken and Shako with a value of (0.167) for components and (0.195) for the overall plan. The important point is that the platonic rectangle with the value of (0.915) for the components and (0.914) for the general plan has a high factor share, but due to the lack of significance for both parts, the results of attention to it are not reliable.

Table 4 Multivariate regression of geometric proportions in tomb monuments

		Coefficient of determination	F	β	t	(p-Value)	Degrees of freedom
Ken and Shako	Components	0.167	217/314	0.762	451/39	0.001	383
	Outline	0.195	147/523	0.372	328/44	0.002	383
Modular Lucor Bozier	Components	0.653	381/852	0.872	823/36	0.003	383
	Outline	0.680	921/298	0.685	362/39	0.004	383
golden ratio	Components	0.612	257/247	0.597	958/18	0.008	383
	Outline	0.656	321/644	0.436	644/16	0.009	383
Radical ratio	Components	1.000	523/845	0.852	422/21	0.001	383
	Outline	0.905	254/754	0.665	144/19	0.001	383
Platonic rectangle	Components	0.915	541/124	0.213	231/39	0.641	383
	Outline	0.914	241/232	0.425	914/29	0.591	383
Circles 1 to 1/618	Components	0.411	321/201	0.414	221/24	0.011	383
	Outline	0.323	124/443	0.421	248/48	0.021	383
Golden spiral	Components	0.712	134/522	0.421	288/25	0.009	383
	Outline	0.621	265/229	0.615	254/65	0.016	383
Golden rectangle	Components	0.421	412/323	0.424	517/49	0.021	383
	Outline	0.246	211/441	0.423	326/25	0.011	383
Rand factor of base modulus	Components	0.821	541/321	0.454	351/58	0.022	383
	Outline	0.285	991/621	0.341	324/29	0.011	383

In the next step, the factorial growth chart is used for the efficiency of the ratios and to compare the minimum and maximum of the ratios and to determine the accumulation of coefficients for determining the answer letter. The results show that the tendency to use proportions in selected buildings has increased based on cases. The usage trend is increasing, also the distribution of the factor share is close to the average and most of the data follow the fashion. Also, the following diagrams emphasize that there are many parts of these buildings that do not use certain proportions. Therefore, they have a low range and its cumulative percentage is higher in this range.

Table 5 Growth chart of the application of geometric proportions in tomb monuments

Chart of growth and accumulation of factor share	
	

In the next step, PN modeling is used to improve and increase the contribution of each proportion in creating beauty through design. In this step, the responses of users and designers are collected together, and the results are extracted from the numerical average between these two groups and entered into the modeling. The results indicate that if proportions are used together as follows, their effectiveness can be improved to a high extent in order to achieve beauty;

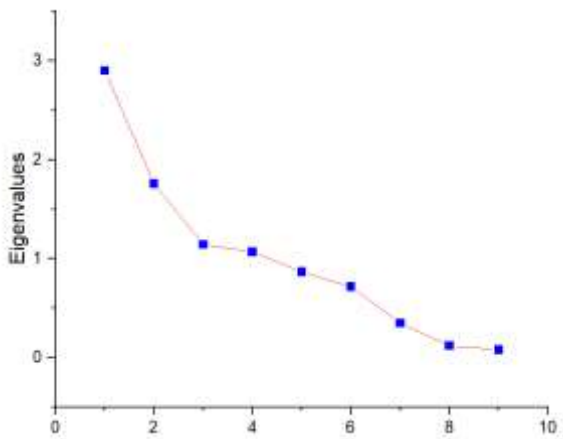
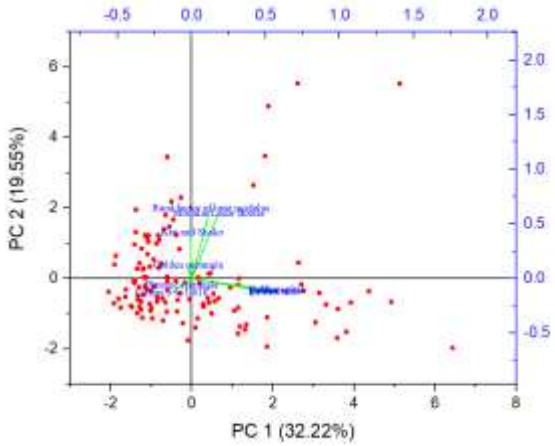
1- Radical coefficients, golden rectangle, golden ratio

2- Base modulus coefficient, Ken and Shako

3- Circles 1 to 618/1, Platonic rectangle, golden curve

Also, in PN modeling, it is clear that the radical coefficients and the golden ratio have a greater contribution to the responses individually, and these two are used with a large difference compared to other ratios.

Table 6 PN modeling of geometric proportions used in tomb monuments

7. Discussions

Based on the results obtained from the analysis of the geometric proportions of the selected buildings, it is clear that native proportions such as radical ratios and nominal numbers are more popular among architects for use in tomb monuments, both in components and in Lee's design. Also, the number of proportions used both in the components and in the overall design is the same, but this value is different in the golden curve. The important point in Pearson's correlation is the positive and significant relationship of proportions both in the components and in the overall plan, but this value is different in the golden curve. The important point in Pearson's correlation is the positive and meaningful relationship between the proportions, both in the components and in the overall plan, that the application of one item promotes the other and there is no inverse relationship at this stage. Also, Iranian proportions have more correlation with each other than international geometric proportions. One of the reasons that can increase the factor share of radical ratios in ratios is the existence of three types of ratios including radical 3, radical 2 and radical 5. It seems that Ken and Sheko have been used very little, and by evaluating them in some parts, it overlaps with other proportions, but the Platonic rectangle has a high and insignificant relationship, which indicates the involvement of conditions or other variables. Based on the growth chart, it can be understood that various proportions have been used in these monuments, which do not have a place in any of the known proportions, and for this reason, the application of proportions is low compared to the total proportions, but the desire to use proportions It is incremental. It is also better to use the mentioned triple compounds to achieve a better proportional composition.

8. Conclusion

Mausoleum buildings are among the most common after mosques. The architecture of contemporary tombs in Iran has a special place. The architects of these buildings, by approaching modern architecture and authenticating ancient Iranian architecture in the design of these buildings, have created valuable works that can be studied and examined in different dimensions. The majority of contemporary tomb buildings were created with the activities of the National Artifacts Association. One of the ways to communicate between native architecture and monuments is to use geometric proportions in the body. The buildings of Yamani, a contemporary tomb, with a combination of materials and looking at the concepts of modern architecture, try to revive the tradition by dealing with physical indicators. This research showed that although some universal geometries are used in these buildings, but these buildings are often They have applied Iranian geometries to revive Iranian culture and identity. This research showed that the application of geometric proportions in the components is much more important than the overall design, and to achieve the desired result, they should be used together in the mentioned manner.

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Screening of Physical and Aesthetic Components in Cultural Buildings of the Last 20 Years in Iran (Case Study: Tehran and Shiraz Cities)

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Research Article

Abstract

Beauty as a physical matter has always been discussed and debated in various designs, and most interior and exterior designers seek to create a unique space from a different environment. This study was conducted to extract and categorize the aesthetics values in the cultural buildings of contemporary Iranian architecture based on fuzzy Delphi. For this purpose, the governing components in the aesthetics variables were extracted through document analysis and library studies of articles and books, and then a questionnaire was used to examine the contribution of each component. From the point of view of the space users, screening was done in the components of the relationship between form and structure in culturally significant buildings. The results indicate that in the environmental dimension, the highest degree of membership is related to the component of performance following the form, and the lowest is related to safety. In the decoration dimension, the highest degree of membership is related to visible details and the lowest degree of membership is related to the Connection method. In the formal dimension, the structure component is a structure and the least related to structural signs and symbols, and the least is related to spatial arrangement. In terms of signs and symbols, Platonic forms and least related to the way of using materials. In the coordination dimension, the balance component, and the lowest is related to resistance variable.

Keywords: Screening; Aesthetic; Physical Components; Cultural Buildings; Contemporary Iranian Architecture

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1. Introduction

The link between architectural form and structure has always existed in Iran's traditional architecture based on many evidences. In this regard, we can refer to buildings such as the tomb of Qaboos bin Ziyar, nicknamed Qaboos Dome in Gorgan, Isfahan Jame Mosque, and Soltanieh Dome. Special technologies are under construction. The evolution of the structure in Iranian architecture has been evolutionary. This interconnected course of history, which was accompanied by a huge support from the experiences of the past, is one of the reasons for the increasing progress of Iranian architects of that time in the field of construction techniques. Some architectural researchers (such as Mario Salvadori) have argued that Paying attention to the structure of the building will inevitably lead to beauty. Of course, it is not correct to say that beauty necessarily depends on the structure of the building, and it may be possible to show that some buildings look lovely with an incorrect structure, while some completely correct structures are not satisfactory from the point of view of beauty. Therefore, the proper expression of the structure is a necessary part of the building's beauty, but it alone is not enough for the building's beauty. In this way, it can be concluded that the knowledge of structure understanding is important as a part of integrated architecture and aesthetics, and the common link and mutual understanding of structure, architecture and beauty is a specialty that can only be obtained from a master architect and designer. It can also be said that balance, stability, performance and beauty are the factors that raise the discussion of beauty in the structure (Ahmadi, 1996: 17). The structure can be visible in the building or generally hidden among the architectural components, when the structure of the building is visible, the beauty of the structure becomes necessary. The beauty of the structure also follows the beauty of the architecture, and in such a situation, the structural system can act as a determining feature in architectural design.

The structure is one of the tools for the emergence of the architectural form, and nowadays most of the prominent buildings have prominent designers who are fully aware of the structural and construction issues and fully understand the behavior of the structural system. The aesthetic appeal of a building is a key concern in architecture and is usually considered a subjective/individual characteristic. However, some buildings are admired all over the world, but there are also buildings that are criticized. It is possible that there are certain features of the building form that made the buildings and structures attractive and beautiful in the eyes of the people. Architectural form refers to the visual characteristic of a building that gives it a unique identity and distinguishes it from other buildings. As the main perceptible feature, the architectural form is the main dimension in the aesthetic pleasure of a building. Therefore, aesthetics in architecture is constantly trying to arouse human feelings with the help of forms. In general, he intends to create something beautiful or present a kind of good architecture, which means good means that it completely solves all human needs and is aesthetically responsive (Engle, 1998: 14). Considering that architectural aesthetics, as a combination of both artistic and engineering technologies, has attracted more attention, it has been the most important priority of architects how to balance them to achieve real structural aesthetics, with the integration of technical and try artistically Since beauty has objective and subjective aspects, beauty in architecture can be examined in two parts, form and meaning. This research has been carried out with the aim of extracting and screening the effective components in the contemporary landmark buildings of Iran.

2. Research Background

In this article, in order to avoid procrastination of words and writing and also to take advantage of the useful parts of each research, they are discussed in the form of a Table 1 and the research done in the two areas of books and articles is discussed

Table 1 Research background of the studies conducted on the research topic

Name and surname, year	Title	Results
Nejati Fatemeh, Habib Farah and Shahcheraghi Azadeh (2017)	The role of the structure in beautifying the architectural space	It states that construction requirements, along with functional requirements and aesthetic issues, have different effects on the building. The review of the literature related to this research in all parts of the world shows that if one of these subgroups of these three criteria is effective and efficient in relation to the building, it can be considered one of the most successful buildings in the world. The formation of flow and circulation of forces affects the aesthetic structure of the structure.
ka Aisha Janat and Nidhis. P. J . (2016)	Aesthetic judgment and visual impact of architectural forms: a study of library buildings	The data obtained in this research show that there are certain characteristics of the building form that the current society prefers and that the aesthetic appeal of the building and its expected performance have a high positive correlation.
Vladi Mir Mako (2012)	Aesthetics in architecture: contemporary search research	It generally provides an overview of research on aesthetic issues related to architecture, urban design, and the environment. For this purpose, the article is focused on the period of the last twelve years, as a period of intensive research on the mentioned cases using new philosophical positions and intercultural values.
Baqaei, Ajang (2007)	The role of the structure in the aesthetic structure of contemporary architecture	Based on this research: First, the formation of architectural space and structure is simultaneously accompanied by visual expression. And secondly, the semantics and symbolism is such that the form of the structure is the basis of the beauty of the architectural space. So this method can create a new aesthetic structure. It also states that the connection between the form and the structure creates a special sculpture that is the result of creativity in the structure, form and special technologies in the construction.
Vinsha Nankishore et al (2017)	Aesthetic application in architecture and design	Space is the beauty of architectural design through aesthetic and emotional features, this is also important in architectural design. The emotional process of visual spaces depends on the aesthetic elements of architecture such as emotions, color, light, material, texture, shape, form, size, and also their mutual relationships. Design is the creation of a plan for the creation of an object, system, or human measurable interactions such as feelings, emotions, according to its form, function, activity, and order. The design process requires aesthetic, functional, economic and socio-political dimensions of the entire design issue.
Fangxin Ouyang and Hulian. Chen (2017)	Technological aesthetics of modern architecture as structural expression	As comprehensive arts, architecture includes structural design based on mechanics and architectural design with emphasis on aesthetics. Due to differences in their foundations and limitations and binding principles, they are not naturally united and require architects to mix both architectural design and structural design.
Fazler. Khan (2020)	Structural aesthetics in architecture and its social and	The aesthetic aspect of a building was intrinsically tied to the technology and materials of construction in early times. Unfortunately, the evolution of the architect in the modern sense of

	technological relationship	the word, which means creativity, is responsible for different professionals, that is, the architect, to see the planning and aesthetics, and the engineers to see the strength, stiffness and performance of that building. This unnatural separation of roles has been responsible for many inconsistencies between form and aesthetics on the one hand and function and technology on the other. Aesthetics was often posed as a question, an arbitrary concept of beauty rather than an inherent beauty inherent in the overall concept of a project.
Khan, Fazloor (2020)	Structural aesthetics in architecture and social communication and its technology	Structural engineering is primarily based on logic, reason, mathematics and understanding the properties of building materials and finally the forces of nature. There is very little room for the structural engineer to indulge in romantic aesthetic forms. But nature has its own inherent aesthetics. Each of the building materials, when used efficiently, simply and in a sensitive way, leads to structural solutions that have its strength and visual presence.
Ayvazian, Simon (2008)	Aesthetics and its origin in architectural criticism	The understanding of beauty is a divine gift and a mental base that leads to objectivity, and art without it is a body without a soul and devoid of attraction. In this research, architecture is viewed from such a perspective, which is a mixture of all arts. In this way, the manifestation of the spirit of its beauty - which has a spiritual connection and an external effect - is explained in the form of any trend (from traditionalism to realism and modernism) and its criticism and evaluation methods - based on known components - are pointed out.
Katayoun Taghizadeh, Mahmoud Gulabchi, Laden Vojdanzadeh (2017)	Form-changing architecture book	The construction of buildings that move like a living being has created a new philosophy in the field of architecture that exhibits dynamism and flexibility not in concept but in form. Therefore, the flexibility of form in today's architecture is a necessary and inevitable thing and it is the guarantee of its survival and meeting the demands and needs of the users of architectural spaces. Also, in many cases, such architecture requires the use of a suitable, flexible and dynamic structure, so that the physical space of such an insight is formed from the interaction of architecture and structure and provides the changing needs of the user. In order to achieve this goal, in addition to architectural design, it is one of the most important requirements to understand the behavior of structures in all stages (initial design to construction).
Ali Mokhtarian (2016)	Book of aesthetics of historical monuments	Investigate the beauty of these buildings, including the form, volume, and decorations used in them, and explore them according to the concept of beauty. Decorations used in historical works are one of the indicators that have been given less attention and have not been specifically addressed and its types have also been less introduced. This topic is one of the topics that is somehow related to the beauty of the building and the "aesthetics of the historical building" and has a great impact on the transmission of the value, cultural and architectural concepts of the buildings to the future generations.

Based on the conducted researches, it is clear that until now no research has been done on component extraction and their examination and screening with Delphi system has not been analyzed in a specific way.

3. Theoretical Foundations

3.1. Definition of Beauty

Beauty is a manifestation of a phenomenon that, after being perceived by the senses and transferred to the center of thought or observation of the perceiver, evokes reactions based on accumulated experiences in the audience. In the essence of beauty, Gruter states that when a person encounters an object or phenomenon, he receives messages from it that affect his inner feelings and shape the nature of that phenomenon in his mind (the aesthetic time geometry of a message When it reaches a certain limit, the person recognizes the body from which he received the message as beautiful. This specific limit is the amount of information that forces the receiver to form a schema and thereby improve his level of perception to a higher level. from the perceptual levels, and it can also be said that a beautiful thing makes a rich perception possible for us and this gives us satisfaction. The question of the truth of beauty, how it is perceived, its sources and effects on humans during the history of human thought has always been discussed. Various schools have given answers to these questions based on their epistemology and worldview. One of the oldest views on beauty is the view of ancient Greek thinkers, the written discussion of beauty in ancient Greece from Pythagoras began (Zamiran, 2001: 43).

3.2. Aesthetic Definition

Aesthetics is a branch of philosophy that is dedicated to conceptual and theoretical research in the field of art and aesthetic experience (Gidein, 2010: 16). In fact, aesthetics is one of the five classic philosophical disciplines, along with the theory of cognition, logic, ethics and metaphysics, which is defined as the theory of reflection in aesthetic judges. Of course, this term has been studied throughout history by adopting different viewpoints and has taken on different meanings based on different schools of thought. Until, in the 18th century, the German philosopher Baumgarten changed the meaning of this term to the pleasure of the senses or the satisfaction of the senses, and since then, aesthetics has risen as an independent system alongside logic and ethics and was added to the philosophical vocabulary, although at the end of this century, this term was also removed from the monopoly of philosophy and became an inseparable part of common language (Mozini, 1997: 73).

4. Factors Affecting Beauty in Architecture

4.1. Environment

Between every living being and its surroundings, there are relationships that are not formed by birth. These relationships are mostly acquired, which means that humans must learn the concept of objects in relation to their environment, this knowledge gives us the power to control our environment even without everything being directly exposed to our perception at any moment. Mariobuta Communication The building should describe its surroundings as follows: the architectural work has a special environment related to itself. In a simpler way, this special environment can be called the foundation of the building. It can be said that this platform and its architecture are in constant bilateral contact and are always connected to each other (Heidegger, Hacking-Thomas, and Cowan-Donald, 2017).

4.2. Space

Space is not something that has a precise and specific definition, but it can be measured. Aristotle compares space with a container and considers it an empty place that must be around it in order to exist, and as a result, it always has an end (Schultz, 2013: 44).

4.3. Form

The aesthetics of the form or face is a clear and sensual manifestation of an object, and this is an expression that exposes itself to judgment. Louis Kahn says: the face is not the same as the shape, the shape is related to the design, but it deals with the display of inseparable components, the form is chosen in such a way that it matches the content and idea of the design. The form depends on various factors (Zamiran, 2001: 24).

4.4. Coordination

Harmony is a term that is talked about in most of the natural and intellectual sciences. In aesthetics, harmony means the order that exists between the constituent parts of a phenomenon. In ancient Greek mythology, Hamona is the daughter of Aras, the god of war, and one of the main elements. Aesthetics is architecture and its scope is not limited to the dimensions of space in any way. Harmony in visual perception is not separate from visual balance. Physical and psychological perception systems all tend to reach a state in which the level of tension is as low as possible (Ayvazian, 2008: 64).

4.5. Signs and Symbols

For example, in the first place, the apparent dimension of the circle can be a part of a pattern, and in this example, it is a part of a decorative thread and does not have any kind of semantic content. Each form has its own movement. The circle is a form without direction, the lines of the circle structure are radially from the center of the circle to its circumference and vice versa from the circumference to the center. These attributes give the circle expressive power, the effects of which can be seen in its use in architecture. This is the first aspect of the semantic analysis of the circle form. The use of this form in architecture has universal validity. This means that it includes attributes that can be understood without prior knowledge or special knowledge. Here, it is the type of form that has been subjected (semantic content) and this means that the form of the supplier circle and it expresses spirituality.

4.6. Decoration

An important main pillar in architecture, which has more of an appearance than a meaning, and perhaps does not have a meaning at all, is the emphasis on form (Sadeghi, 2015: 44).

4.7. Structure

The structure today is created by knowing the forces and their analysis, load transfer systems or systems, and the behavior of the materials and components of the structures can be determined through theoretical relationships. Also, the development and advancement of computer facilities has made it possible to analyze the behavior of structures before construction. The way of creation, the distribution of forces, as well as the investigation and study of the behavior of materials and their

bearing and load capacity, and the behavioral classification and load system of various devices, constitute the topics of structural science; Therefore, now the structure serves the world of science as a specialty, and in the field of architecture, it enables architects to improve and expand the quality and scale of their constructions and make architectural evolution possible (Sadeghi, 2015: 16). The investigation of the structure shows that the structure is formed based on technical rules, but it also conforms to the building plan, therefore, in this situation, the structure provides facilities to the space and is compatible with its logic and provides a resistant form. The structure may be visible, hidden or semi-visible. Elvadoori states that the structure has requirements including balance, stability, resistance, performance, economy and form: balance, which is the most important thing, means the state of non-movement and stillness in the whole and the components of the building. If the forces acting on the object are in balance with each other, the object will not move in that direction and this situation is called equilibrium. In fact, equal and opposite forces cause balance in the desired direction. In this condition, the external forces and the internal and external reactions of the body are in balance. Resistance in a structural element (which is related to internal forces) means that the components of the structure are flawless and the ability to bear the loads applied to these components. This concept, which is directly related to the material of the instruments, means the tolerance of an element of the instruments under the forces. Stability means the building's resistance against overturning (against external forces) without its components being separated, which is called geometric stability. Geometric stability is related to the number and types of connections and how they are used (simple connections or rollers and complex connections such as joints). On the other hand, there is resistance stability (internal stability) which is the concept of bearing load of material particles of the body under the influence of forces. The performance of a structure means its proper bearing; That is, there is no more or less in the structure, and the materials are used economically and correctly, and this is the force that creates forms (Mirkhalili, 2014: 46). Economy is one of the requirements of a structure, and it is a suitable structure in which the forces flow easily and there is no more or less planning in it. Although structural efficiency is a major issue, other factors such as production, control and construction should also be considered in the selection of system builders. The economy of the building is affected by the available technology and the speed of construction. The form of the structure, as one of the design components, plays the main role in creating the form; Therefore, the form of the structure itself is considered one of the structural components. Shaping forms is the creation of beauty through cutting and appropriate size, in order to facilitate the flow of power, which is important. Such forms are visually beautiful and effective. Power is the basic pillar of the structure and its most important part. In fact, the structure is a geometric order for the transfer and flow of forces.

4.8. Structure and Architecture

The presence of the phenomenon of technology should be seen and measured. It is interesting that it does not matter in what time and place we examine the architecture, because in order to measure the architectural works in different periods and the amount of presence of the structure and the relationship between the structure and the form, the type and level of technology of that time period must be measured. For this purpose, technology has two complementary and distinct aspects that affect the amount of form and structure innovation (Mirkhalili, 2014: 114).

- Construction and implementation technology
- Material technology

In the technology of construction and implementation, various factors such as the science of calculating the stability of the building and how to deal with the design geometry are important, and

the implementation of any type of geometry and pattern is based on the amount and type of science that is effective in the stability of the form. Whether it was in the Gothic, Timurid, or Seljuk periods, or in the form of the science of calculating the stability of the structure, which today computer technology is able to do, it has had a strong and significant impact on the shape of the structure in both its historical and contemporary states.

From the beginning of the documented history of architecture, the three categories "structure, architecture and construction technology have been the same in their original meaning at any time, and the person who was called "architect" had expertise in all three areas of expertise and knowledge, or in today's word, expertise (Grout and Wang, 2013: 174). This expertise and insight in all three fields emerged due to the continuity of the nature of the fields. The distinction that exists between these three fields today emerged when the awareness and knowledge related to these three fields grew and expanded and became complex. Undoubtedly, the issue started with a problem called construction technology, and the necessity of the construction issue started with the need to have shelter for humans. So, this early man's intelligence regarding what he needed and his basic understanding of the structure caused the shelter to remain firmly in place. So, the first constructions by human hands in terms of historiography have been structural instruments combined with the knowledge of construction. Human hands are valuable in terms of having knowledge of construction and insight, although experimental and elementary, from the behavior of the forms of instruments, it can be concluded that having creativity is necessary for leaps in the problem of construction. And the structure is relevant even if we do not enter into its artistic field, the connection of the three elements of architectural structure and construction technology continued in the historical fields, and since the artistic nature of man also entered the field of construction and with the help of creativity, humans in every era were able to use the technique achieve the specific construction of the same period (Hejazi, and Mehdizadeh Saradj, 2014: 49). Three important factors: 1- the emergence of a structural idea and the transformation of that idea into a form, 2- creativity and innovation, 3- the new dimensions of aesthetics are the result of the creative alignment of structure and architecture.

It is necessary to refer to words that do not have a proper equivalent in Persian, and this word is the result of meanings and concepts that refer to the important points of this speech. Tektanics refers to a quality of architecture, which means building things that are both beautiful and useful. In general, there is another quality in architecture, which we call mastery of construction, or a master in construction, and this quality also gradually brings building technology closer to art. It links architectural structure and construction technique to a common quality. which has created brilliant periods in architecture (Hashemnejad and Soleimani, 2008).

In the Gothic and Seljuk periods in Isfahan Jame Mosque and in the small dome, known as the dome, the construction date of this dome is about 1088 AD, which is praised by the researchers of the world. And in the Gothic period, the transmission system is exactly logical with the structural forms and the spirit of the Gothic space, and the invention of the famous Gothic backs, which is a type of identity and style for that period, confirms this fact that the structure and the aesthetics of architecture are linked construction methods. Power is clearly and clearly shown by the forms and performance of style (Heidegger, Hacking-Thomas, and Cowan-Donald, 2017).

The new and modern design is based on the study of the solutions of the power transmission organism in the materials that create the architecture (for example, in Gothic, the same stones as the main body, and in new architectures, the same new structures that form the architectural forms, this method can be a kind of "organic structural solution" This solution is based on parts and independent implementation, which at the same time performs the task of power transmission, also

defines and makes the architectural form visible, as a result, by using the organic integration of the structure and the architectural form and the solutions based on The basis of steel structures and metal alloys or concrete is the integration of the architectural form and the power transmission organism (Jafari, 2015: 244). And this is the similarity in the architecture aligned with the structure and Gothic architecture, which is the use of stones and stone materials and the type of arrangement. and the forms based on the directions of energy consumption, the theories and experiences of Violet Ludok in the middle of the 19th century based on the Gothic lessons; he used steel structures in the form and volume and theme or internal views, the shape of his structures, whose form is according to the flow of forces and brings a kind of architectural integrity. The following is a theoretical summary Fig 1;

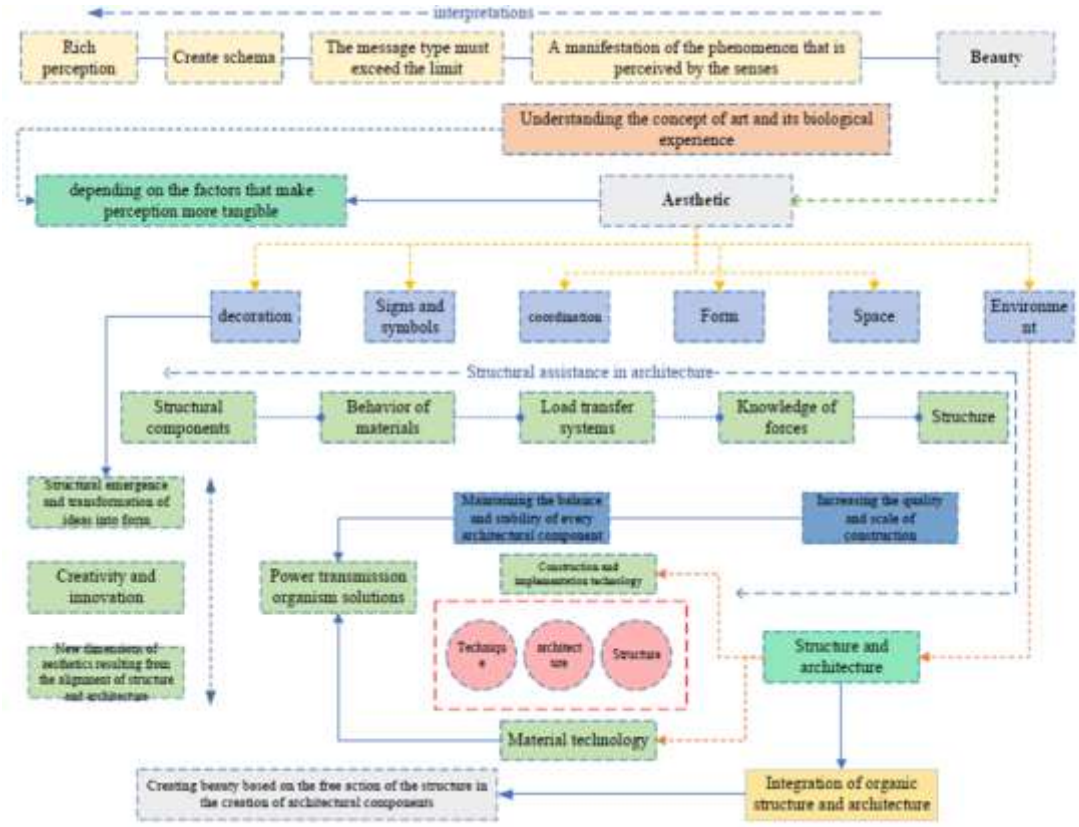

Fig 1 Theoretical summary diagram related to the aesthetics of structure and architecture

5. Research Methodology

The research method of the mentioned study is applied in terms of its purpose and in terms of the combined method (qualitative-quantitative). In terms of the type of Delphi research, this research is decision-making and in terms of the Delphi approach, it is a confirmatory phase, and it is done in one stage, which is used to screen the factors. It is a combination because until now some components have not been stated and examined in the theoretical field. In the qualitative stage, it is necessary to conduct a semi-structured interview with the thinkers and by reducing the data, we arrive at the conceptual codes in the open field, then we start to center the components based on the dimensions governing the aesthetics of architecture.

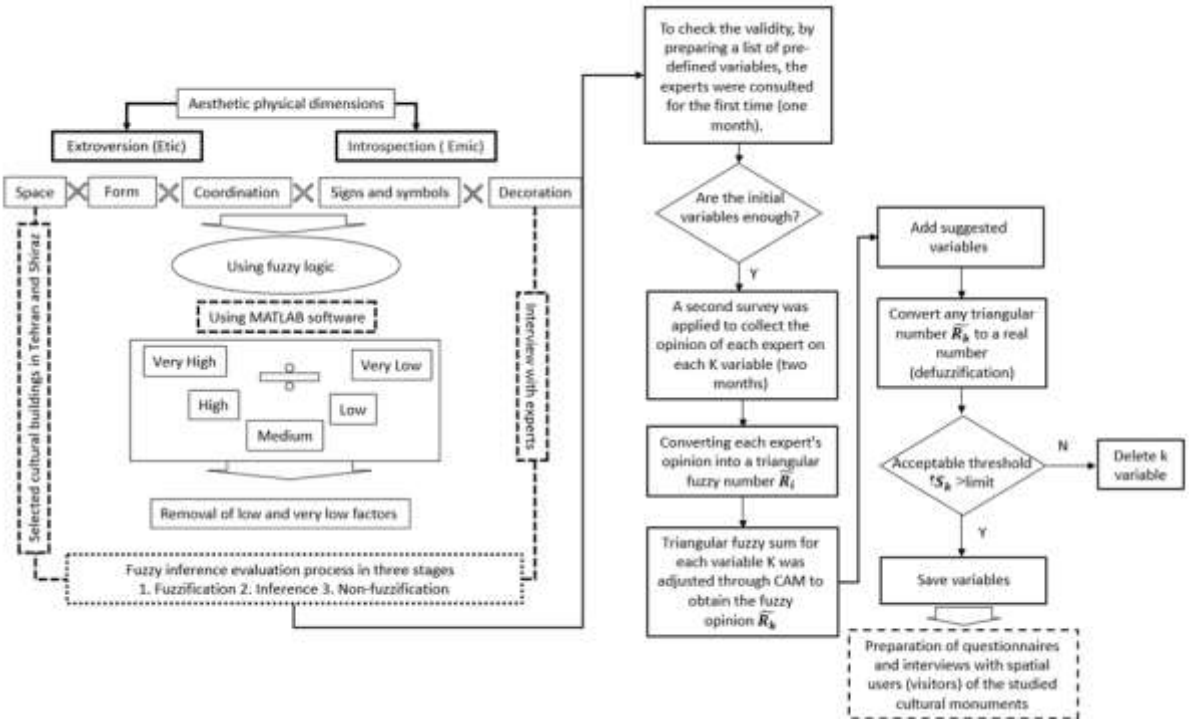

Fig 2 The steps of performing the fuzzy Delphi research method

In the next step, to check and evaluate the need for a field method with a questionnaire, experts were first interviewed to compile the questionnaire. Choosing the circle of experts is a very important part of the Delphi method. The awareness of this group is a good guarantee for the high quality of Delphi results; Therefore, the members of the Delphi circle in a study are selected based on specialization, not based on a random selection process. As a result, the researchers first selected a list of 14 university professors who have extensive knowledge and vision in the field of aesthetics and the relationship between structure and architecture and who have scientific-research articles and ISI. In the first stage, a semi-structured interview was arranged. In these interviews, the researcher tried to explore the approach and its relationship with the field of urban planning and architecture and identify the experts' view on the subject of aesthetic components of the relationship between form and structure in culturally significant buildings from their point of view. Also, due to the vastness and abundance of the cultural index buildings of contemporary Iranian architecture, by using the desirable sampling method and the preference system, several cultural buildings that have a high Kendall agreement coefficient and, according to the professors, have high characteristics of the relationship between structure and architecture are selected. become

In the second survey, it was used to collect the opinion of each specialist about each K variable. If a variable is suggested, it is added to the list and additional variables are deleted. Finally, the desired questionnaire was compiled. The structure of the questionnaire including questions related to the main question of the research; That is, the examination of the effect of each of the components of the beauty of the structure and architecture in the cultural landmark buildings of the contemporary period and in the direction of responding to it. According to experts, sense of place codes and variables were classified into 6 thematic categories. These categories were: environment,

space, form, harmony, signs and symbols, decoration. Then, the extracted variables were examined by a group of fourteen experts in the form of a closed questionnaire with five-point Likert answers. According to the selected components, the questions related to each factor include points, from their sum, we reach the score related to the aesthetic components, which is examined separately for each element, according to this analysis, we come to the conclusion that whether One of the mentioned components is effective or not in the beauty of cultural landmark buildings and also their effectiveness is determined qualitatively. In order to do the calculations, a score of 5 for "very high impact" and a score of 1 for "very low impact" were considered by each expert. In order to minimize the cost and time, the questionnaire was distributed among a random sample of the statistical community of space users. The sample size was selected using Morgan's table, which includes 384 people who were randomly distributed in selected cultural index buildings according to the population. In order to measure the reliability and validity of the measurement tool, the pre-test method was also used.

5.1. Measurement Range

The introduced examples of buildings built are contemporary cultural buildings in the last two decades. Be one of the pioneer and famous architects. Also, based on the results of theoretical consensus, two buildings from outside Tehran and from Shiraz have been introduced, and one of the three has not been selected. In this research, sampling is based on the table of entry and exit criteria for the research:

Table 2 Entry and exit criteria in qualitative research

Selection criteria for interview	The criteria for leaving the building research	Entry criteria for building research
Be a faculty member	Not located in the city	There should be a theoretical consensus in choosing it
Familiarity with tectonic topics	Its residents do not have enough information about it	An important cultural collection is a beautiful opinion
Have an article about one of the title variables	have certain limitations in design	Its information is accessible
Have a cultural building design	Part of it is designed by someone else	In the preference system, its Kendall coefficient score should be higher than 0.5
It should be under the field of architecture or urban planning or civil engineering	Be restored	Various materials are used in it and it has technology in the application of materials

Also, the way to choose them is based on purposeful sampling and based on the researcher's observations. The snowball sampling system is used in the interview and selection of the expert panel in future research Delphi. The result of the selection for the correctness of the action and the validity of the form comes from the university professors of the question. In the quantitative stage, the distribution of questionnaires was random. The characteristics of the selected buildings are shown in Table 3.

Table 3 Selected buildings and Kendall w of selected buildings to enter the research

Name of cultural monument	Description	Kendall coefficient	Images
The Book Garden Collection 2006	It is a collection of books and scientific entertainment stores in Abbas Abad area of Tehran. This garden is adjacent to the National Library of Iran from the east, from the north-east with the academies of science, Persian language and literature, from the north-west with the art garden, and from the west with the holy defense museum garden. A part of this garden belongs to Abba company, under the management of Raiseh Ali Moghadam, Amin Azizi and Abbas Elhiari. The area of the Tehran Book Garden is 110 thousand square meters, of which 65 thousand square meters are exhibition buildings, conference and administrative halls, and the rest is green space and It forms an artificial lake. The interior of Tehran Book Garden consists of four main sections named Baharestan (children and teenagers), Khyalestan (digital technologies), Nagarestan (cinema halls) and Sarvestan (general and adults) and is built on two floors.	0.812	

Tehran Theater Campus 2005	It is the largest theater complex in Iran, which is located in the 15th district of Tehran. The building of Khavaran Theater is built on a land of 2800 square meters with an infrastructure of about 16000 square meters. Khavaran Theater is a specialized center for theater. This center was built in the neighborhood of Khavaran Cultural Center. Tehran Municipality has reported that this demonstration center will start working in the middle of June 2013. This art and cultural center is going to be used as a host for international drama festivals. Khavaran Theater has a capacity of 1000 people and has the capacity to hold musical theater, traditional theater, symphony orchestra performance and music concert. This center has 4 experimental theaters with a capacity of 150 people and a special hall for puppet shows.	0.642	
Mellat Gallery Cinema Campus (2013)	It has been built in district 3 of Tehran Municipality and on a long land with an indefinite shape with an area of 6,000 square meters and an infrastructure of 15,000 meters in the southwest end of Bostan Mellat (Melat Park). Mellat campus has 11 theaters for cinema and one hall for various cultural gatherings. This complex has suitable spaces for holding various festivals and exhibitions. There is a gallery with advanced lighting facilities to hold various art exhibitions in the Mellat campus complex. There is a food court with a variety of Iranian and foreign dishes in a beautiful environment and a unique view in this complex.	0.743	

The National Library of Iran (2004)	The building of the National Library is located on Shahid Haqqani Highway and the National Archives of Iran Building is located on Mirdamad Street in Tehran. This cultural complex has 12 provincial branches across the country. The Membership Department of the National Library and Documents Organization of Iran is responsible for checking and confirming the membership conditions for clients and determining their membership levels. The building of the National Library is located on Shahid Haqqani Highway and the National Archives of Iran Building is located on Mirdamad Street in Tehran. This cultural complex has 12 provincial branches across the country. The Membership Department of the National Library and Documents Organization of Iran is responsible for checking and confirming the membership conditions for clients and determining their membership levels.	0.584	

Azadi Cinema Campus (2016)	After many struggles, the renovation project of Azadi cinema was started on the 29th day of April 2016 in a ceremony attended by Mohammad Baqer Qalibaf, a number of senior managers of Tehran Municipality and cultural institutions of the country. The executive operation of Azadi Cinema renovation started seriously in 2005 with the participation of Tehran Municipality and ended at the end of February 2006. The new commercial-cultural complex of Cinema Azadi has 5 halls, including one hall for 600 people and four halls for 200 people, two restaurants, three coffee shops and 4 commercial floors named Azadi Cinema Campus. Currently, the management of this cinema campus is under the responsibility of Reza Saidipour, which is the most visited cinema in the country with more than 120,000 visitors per month.	0.416	

Tamasha Cinematic Campus (2013)	A cultural-artistic complex located in the 18th district of Tehran (the beginning of Madain Blvd. and a few tens of meters from Maalem Square), equipped with a hall for 318 people and two halls for 150 people, a restaurant, a tea house, and a skate hall planned on the last floor. The toy house is a service-commercial complex including 70 stores, parking, etc., which was opened in the winter of 2006 with the presence of the mayor of Tehran. The complex is built on four floors and in an area equivalent to 4000 square meters and an underground surface of 7400 square meters (2500 meters underground) and it has one hall with a capacity of 318 and two halls with a capacity of 150 people. Iran has been considered. The process of designing and building the complex has taken three years of time and forty billion Rials in cost, and according to the claims of its creators, they have tried to use the world's latest technology in all fields during the entire process of design and implementation until operation.	0.511	

The Green Land of Sadra (2012)	"Sarzamin Sabz" is a multipurpose complex with an area of 461,787 square meters, located in the new city of Sadra. The city of Sadra was planned in the seventies and is located eighteen kilometers northwest of Shiraz. So far, the "Green Land" complex has played an important role in strengthening the tourist attractions of this new city. This complex is designed with the purpose of bodybuilding on the theme of an exhibition, which has facilities such as gallery restaurant, gallery cafe, entertainment, sports and business center. The design process is formed with the approach of expressing clearly that this idea can be extended to different aspects of the project, including materials and functions. Therefore, in the collection of Sarsazmin Sabz, a single body is assigned to each activity, and the collection of these volumes together creates a single whole. "Adaptation" and "mixing" are the most important issues that come to mind in different scales of the state of this collection. The placement of buildings in the bed, their arrangement next to each other and the placement of the whole complex in the natural bed of Sadra city are examples of this statement.	0.715	

Cultural and Cinematic Art Collection of Aftab City (2016)	In recent years, large movie theaters have been replaced by collections of several small theaters. In many cases, other public uses such as entertainment and commercial centers are built next to these complexes. This is a good opportunity for cinemas as a cultural space to play the role of a suitable platform for citizens' interactions in these collections. Therefore, one of the basic goals in designing the Artshahr Aftab complex has been to create a multi-purpose landmark as a center for social interactions and artistic and cultural events. In a sense, we have been looking for a cultural hangout that can facilitate communication between all sections of the society (children, elderly and disabled, etc.)	0.411	

5.2. Fuzzy Delphi Method

Fuzzy logic is a mathematical theory used to express the complexity of unstructured problems. Fuzzy set is a function that can show the possible value of a set number between zero and one as a degree of membership. In general, the evaluation process of fuzzy inference includes three stages: 1. Fuzzification, 2. Inference, and 3. De-fuzzification (Wu and Fang, 2011: 758). The purpose of this research is to reach the most reliable agreement of a group of experts on a specific topic, which is done by using a questionnaire and asking experts' opinions, repeatedly, according to their feedback. In fact, this method is a complete examination of the opinions of experts, with three main features, unbiased answers to questions and receiving their feedback and their statistical analysis, answering questions in the Delphi method, the subjective data of experts is transformed into almost objective data using statistical analysis. This method leads to consensus in decision making. The Delphi method has been used in many fields of prediction, decision-making and screening (Stone Fish and Busby, 2005: 241).

Some of its applications are: technological foresight, service analysis, factor screening, etc. In the world around us, issues cannot be divided into two or more white or black categories, but each issue fits into a spectrum (Linstone and Murray, 2002). Using definite numbers in solving problems such as prediction and classification will lead to results that are out of reality. The use of this method in order to make decisions and reach consensus on issues where the goals and parameters are not clearly defined. It leads to very valuable results (Cheng and Lin, 2002: 77). In this method, thinkers present their ideas in the form of minimum possible, most probable value and maximum (triangular fuzzification).

5.3. Fuzzification

The main necessity in designing a fuzzy system is the selection of membership functions for linguistic variables. The importance of the obtained effect was defined by linguistic values (very low VL, low L, medium M, high H and very high VH). To screen the factors in the open spaces of the residential complex, the factors that are placed in low and very low floors will be removed from the list of factors affecting the sense of place.

Table 4 Membership functions related to the profile and the importance of the effect to obtain the degree of membership

Function type	Membership function
Very low	$\mu_{VL} = \begin{bmatrix} 1 & 0 \le x \le 0.2 \\ -6.25\,x+2.25 & 0.2 \le x \le 0.36 \end{bmatrix}$
low	$\mu_{L} = \begin{bmatrix} 6.25x-1.25 & 0.2 \le x \le 0.36 \\ -6.25\,x+2.25 & 0.36 \le x \le 0.52 \end{bmatrix}$
average	$\mu_{M} = \begin{bmatrix} 6.25x-2.25 & 0.36 \le x \le 0.52 \\ -6.25\,x+4.25 & 0.52 \le x \le 0.68 \end{bmatrix}$
high	$\mu_{H} = \begin{bmatrix} 6.25x-3.25 & 0.52 \le x \le 0.68 \\ -6.25\,x+5.25 & 0.68 \le x \le 0.84 \end{bmatrix}$
Very high	$\mu_{VH} = \begin{bmatrix} 6.25x-4.25 & 0.68 \le x \le 0.84 \\ 1 & 0.84 \le x \le 1 \end{bmatrix}$

5.4. Conclusion

The most important part in the fuzzy inference method is to build the law base. The purpose of writing these rules is to define diverse propositions that are obtained by combining different states defined for each profile (base and complement) (Poor Ghasemi et al., 2008: 381; Shakibaei, 2008: 151).

5.5. Defuzzification

De-fuzzification is a unit that has functioned from a fuzzy set to a definite value. In this study, the final deterministic value, in fact, the center under the surface of the curve in the final fuzzy sets, was obtained (Amini Fashkhudi, 2014: 39-45). The final value of the output is calculated from the following equation, where y is the output value, μ(y) is the degree of membership of the output y, and $\bar{Y}$ is the true value of the output.

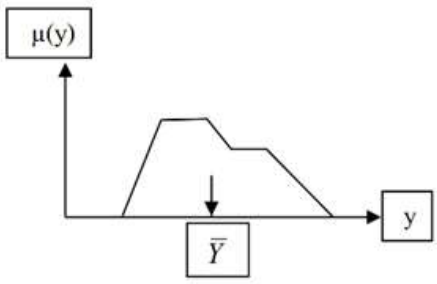

Fig 3 The method of defuzzification the center of gravity (Monem et al., 2007: 34)

5.6. Statistical Population of Participants

The statistical population is the thinkers and experts in the field of architecture and urban planning, who are experts in the field of architecture and urban planning, and 33 of them are selected as the sample size. The first person is selected in a targeted manner and the next ones are selected in a snowball manner.

Table 5 The sample size of selected experts and elites

Number	Field of activity	Position
5	Urban planning	University professor
8	architecture	University professor
7	Urban	University professor
6	Cultural buildings and town design	Professional designers
4	Urban sociologist	University professor
3	Behavioral psychologist	University professor

At this stage, the criteria for entering the research are selected for the selected people, which include the following items, and if they are selected as a snowball sample and do not have the following items, they will be removed from the list;

- Have an article in the field of physical aesthetics or tectonics in architecture or urban planning
- Have a design experience in transnational cultural projects at the provincial level.
- Familiarity with scoring methods in fuzzy Delphi methods and its concepts.
- He has visited cultural landmarks with national value

6. Research Findings

In this research, after semi-structured interviews, the texts are extracted and entered into the ATLASTI software in the form of textual data, and the data is subjected to data reduction with the approach of description and interpretation as well as live coding. The results after extracting the number of 44 codes were open, of which 8 codes were removed due to non-compliance with themes and concepts. The most prominent code includes the method of connection with the number of 28 and the least prominence related to the mass of space with the number of 6. Then, they are categorized based on the pre-prepared code that includes the central code of environment, coordination, signs and symbols, decoration, form and space. The results are depicted in Fig 4.

In this study, the importance of the factors that make up the sense of place was calculated using Matlab software, and they were classified based on the degree of membership, and the findings of the aforementioned method are shown in the following Fig 5.

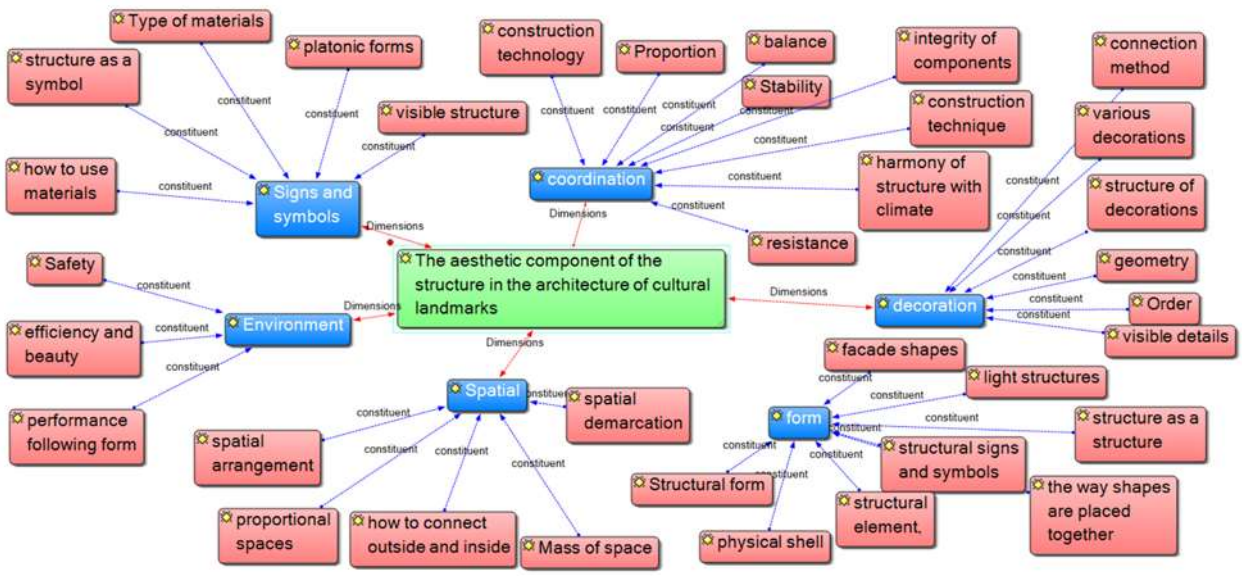

Fig 4 Open and axial coding of concepts in ATLASTI software

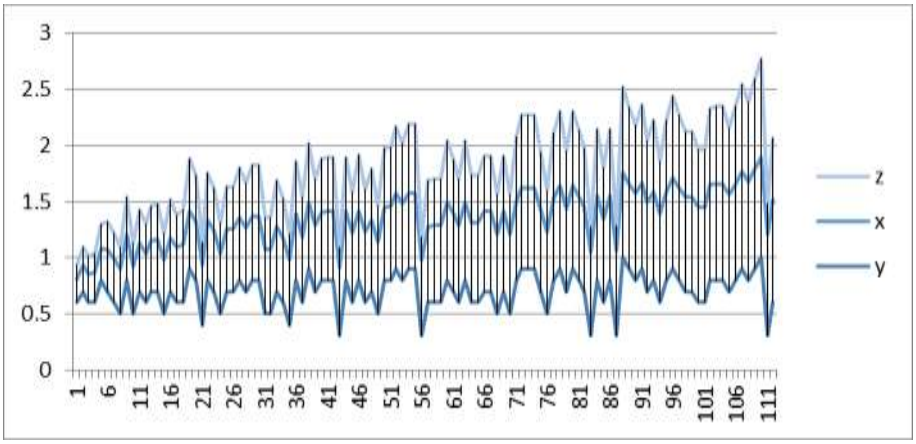

Fig 5 Classification diagram of the importance of each linguistic variable

According to the above figure, the importance of the effect of each language variable is shown in the table below. In order to evaluate the fuzzy model, the aesthetic components of the structure in architecture and the features whose quality was determined by expert experts according to the desired quality index were calculated using the software and used as the output of the fuzzy model. In fuzzy logic, a work belongs to two membership functions with different degrees of membership. Finally, the highest degree of membership determines the importance of the effect of the type of linguistic variable. When the variable x is increasing, the amount of the effect value is changing and increasing from a very low attribute (very low linguistic variable) to a very high attribute, which is shown in the table below; That is, as we move towards increasing the variable x, the value of the language variable increases in each class, which is seen in the output of the matrix as a class, for example, if the variable is x=0.53, it belongs to the middle class and If the variable is x=0.67, even though it has increased numerically, it still belongs to the middle class. The fuzzy Delphi method of

this fuzzy logic solves this problem, and its output is meaningful based on the degree of membership, and for example, if the output of the fuzzy logic is Yˆ = 0.67, then the fuzzy logic determines the degree of membership for two membership functions. It improves slowness and uncertainty.

In the environmental dimension, the highest degree of membership is related to the component of performance following the form with a value of 0.55 and the final class M, and the lowest is related to safety with a degree of membership of 0.37 and the final class L. In the decoration dimension, the highest degree of membership is related to visible details with a value of 0.87 and the final class is VH, and the lowest degree of membership is related to the component of the method of connection with a value of 0.59 and the final class is M. In the formal dimension, the structure component is a structure with a value of 0.87 and the final class VH is the most and the least related to structural signs and symbols with a membership degree of 0.77 and the final class H and the least is related to spatial arrangement with the final class VL and a membership degree of 0.21. In terms of signs and symbols, Platonic forms with membership degree of 0.89 and final class VH are the most and least related to the way of using materials with membership degree of 0.44 and final class L. In the coordination dimension, the balance component with membership degree of 0.78 and the final class H is the highest and the lowest is related to resistance with the value of 0.41.

Table 6 Degree of membership and final category of components

Fuzzy Logic							
Dimensions	Component	Degree of membership	Final floor	Dimensions	Component	Degree of membership	Final floor
Spatial	Appropriate spaces	0.53	M	Environment	safety	0.37	L
	Spatial arrangement	0.21	VL		Function follows form	0.55	M
	How to connect outside and inside	0.56	M		Efficiency and beauty	0.53	M
	Spatial demarcation	0.77	H	Decoration	Discipline	0.71	H
	mass of space	0.61	H		Various decorations	0.69	H
Signs and symbols	Visible structures	0.69	H		Decoration structure	0.59	M
	Structure as a symbol	0.54	M		The geometry	0.81	VH
	Platonic forms	0.89	VH		Visible details	0.87	VH
	How to use materials	0.44	L		Connection method	0.59	M
	Type of material	0.56	M	Form	Form	0.79	H
Coordination	sustainability	0.69	H		Structural forms	0.46	L
	Construction technology	0.58	M		body shell	0.51	L
	Coordination of the structure with the climate	0.61	M		The shape of the facade	0.60	M
	the balance	0.78	H		The way shapes are placed together	0.87	VH
	Component integrity	0.43	L		Structural signs and symbols	0.21	VL
	fan made	0.58	M		Structural elements	0.84	VH
	resistance	0.41	L		Structure as structure	0.87	VH
	Proportion	0.53	M		Light structures	0.57	M

In the Fig 6, an example of the surface observer of the fuzzy model is presented considering the influence of 36 variables in different dimensions as input variables. In this figure, you can see how different input values affect an output value in different dimensions. In the sense that you can see the reaction in one view. According to the figure below, the mentioned components in the aesthetics of the structure and effective architecture are associated with an almost irregular trend of the quality level recorded in the surface observer.

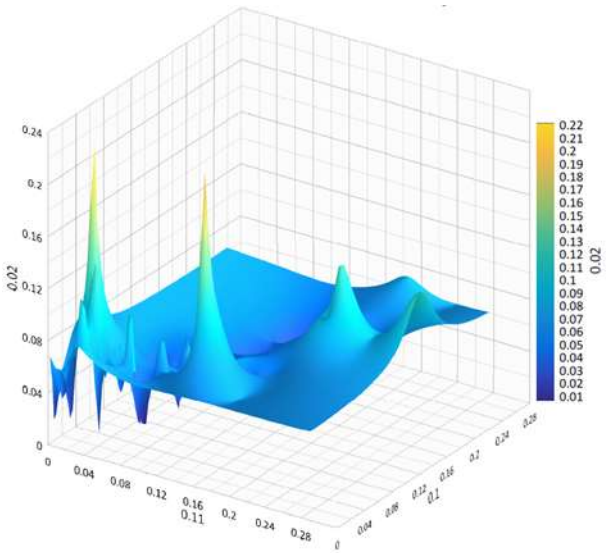

Fig 6 The variable extracted from the aesthetics of the structure in architecture with MATLAB software

In this order, relying on the previous table and considering the direct effect of the studied indicators on the aesthetic level of the structure in the mentioned architecture, the frequency distribution of the maximum and minimum in the components mentioned in the image below was visited in the field and confirmed the accuracy of the effect. Each variable of the linear regression diagram for the factors is drawn, which indicates the accuracy of the influence of the factors in two sets, both lines benefit from a curved slope.

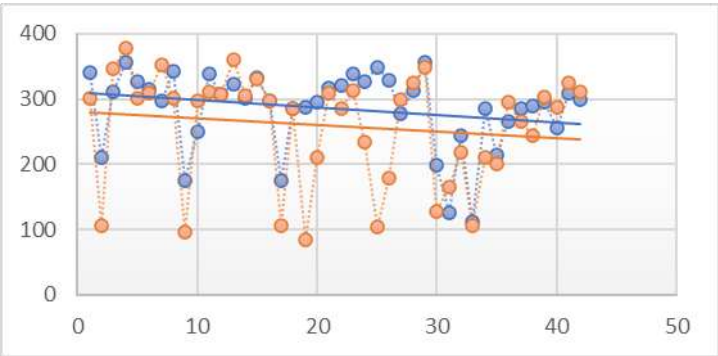

Fig 7 The distribution of the aesthetic variables of the structure in the architecture of cultural buildings and linear drawing

7. Discussion

In addition to being an arena for the formation and strengthening of social and cultural interactions, cultural landmark buildings are also a place to display the fields of architectural design and the interaction of the structure with it, with an emphasis on aesthetic aspects. Also, these places help to strengthen local and national cultures by promoting it in physical aspects. This research showed that there are aspects and components that can be addressed to create beauty in the interaction of the structure with architecture.

Based on the interviews conducted, 36 codes were extracted, which needed to be placed on the governing dimensions extracted from the theoretical field for convenience and data reduction. Therefore, the axes are predetermined and the components are placed in it. The results of the qualitative field are different from the quantitative field, and due to the difference between the designer and user groups, the design criteria in cultural works should be the users' ideas. In the quantitative and fuzzy Delphi section, in order to achieve an easier design and the use of components with higher values, it was necessary to remove a number of them that had less impact, for this reason, the following components with these characteristics were removed;

From the environmental dimension, safety with L class and membership degree of 0.37 are removed. In the formal dimension, structural form with final L class and membership degree of 0.46 and physical shell with L final class and membership degree of 0.51 and signs and symbols A structure with a degree of membership of 0.21 of the VL floor is removed. In the spatial dimension, spatial arrangement with membership degree of 0.21 and the final floor VL, and in the dimension of signs and nods, how to use materials with the membership degree of 0.44 and the final floor L, and in the dimension of the integration of components and the membership degree of 0.43 and the final floor L and resistance with the membership degree of 0.41 and the final class L are removed. In general, 8 components are removed from them and the number of components with high impact reaches 28 items.

Among all the dimensions, the only dimension from which no components are removed is decoration. This shows that the use of components in a decorative and structural way adds a significant amount to their beauty.

8. Conclusion

There is a close relationship between aesthetics and architecture. People who care a lot about aesthetics in architecture usually give great importance to aesthetic matters when building a structure. And they are thinking about how to use different parts including harmony, proportion, rhythm, scale, etc. to create the right beauty. Modeling a structure is one of the first topics that attract your attention. If a building is architecturally interesting, it often becomes a landmark that defines a city. This makes tourists to see it from all over the world.

Monumental buildings often imitate certain architectural styles that are immediately recognizable. Many of these design elements are still used by architectural and design consultants. They also use endless principles of good design as inspiration for their design projects.

Architectural design is used to achieve the visual beauty and eye appeal of space users. These designs are based on a shape or structure that is used as the ossification of the form or body in space. The structure is proposed as an elaborate way to display the integration of the structure with the form of the body with elaborate solutions, and when they are placed on the integration of the form and the structure, from there the aesthetic issues related to architecture enter the category of structure and stability. Structures in different buildings and especially cultural buildings where the

architect can reach the peak of creativity have increased the spatial quality. For more efficiency between the interaction of structure and architecture in achieving aesthetics, the following works are suggested;

Using the structure as decorations in order to provide order and neatness and to display the technologies appropriate to the time

Attention to structural elements in the environment to depict the link between form and structural technology instead of using physical forms.

The use of regular shapes in architectural designs to create easier structural ossification and division of static forces, as well as focus on balance and stability.

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Elucidating the Elements of Islamic Architecture that Contribute to Defining its Identity in the Context to Perceived Environmentally

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Research Article

Abstract

Objectives: The purpose of this study is to explore the elements of Islamic architecture that contribute to the establishment of a strong connection between individuals and their surroundings, as well as enhancing their perception of the environment and preserving the cultural identity of Islamic architecture. It is important to acknowledge that the various elements of Islamic architecture have the capability to instill a sense of order, harmony, spirituality, identity, and vitality within the environment. This not only creates an aesthetically and emotionally pleasing experience for observers but also emphasizes the importance of understanding the identifying elements of Islamic architecture. Furthermore, this research adopts the metasynthesis approach to investigate the relationship between Islamic architecture and environmental perception.

Methodology: The research methodology used in this study is defined by its purpose and is described as both descriptive and analytical with a survey-based approach. The data collection process involves conducting documentary studies, making field observations, and conducting interviews with 12 experts in the relevant field. In order to analyze the qualitative data and validate the variables extracted from the sources, metasynthesis and inductive coding methods were utilized in the Max Kyuda software during the interpretation of the interviews.

Results: In accordance with the study's objective and theoretical framework, as well as the responses provided by the participants during the interviews, the research components were categorized into seven dimensions: Identity, Social, Functional, Cultural, Environmental, Aesthetic,

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and Physical, as established by Max Kyuda. It is worth mentioning that each of these dimensions further comprises subsets through the process of inductive coding.
Conclusion: The enhancement of architectural design levels such as order, dynamism, and legibility, as well as the incorporation of key elements from Islamic architecture in contemporary cities, should be a vital consideration for architectural designers and urban planners. By assessing the spaces within Islamic architecture, the connection between humans and the environment can be explored and its impact on urban identity and the enhancement of the relationship between Islamic architecture and environmental perception can be discussed.

Keywords: Identity; Architecture; Islamic Architecture; Environmental Perception; Meta-study

1. Introduction

Urbanization is a fast and unprecedented process happening around the world. According to official reports, it is predicted that 68% of the global population will reside in cities by 2060 (Desa, 2018). Thus, urbanization involves the movement of people from rural areas to urban centers, leading to physical transformations in these environments. Urbanization has traditionally been linked to human advancement and progress, but recent studies have highlighted that it can also result in inequalities and significant problems within cities. Presently, we are witnessing the negative impact of urbanization on developed countries, including unfavorable social, economic, and cultural conditions. This awareness prompts individuals and nations to recognize the potential challenges that can arise in their own regions when urbanization occurs without appropriate social support and infrastructure (Kuddus, Tynan, and McBryde, 2020). Urbanization is the process through which cities grow as a result of industrialization, economic development, and an increase in the size and density of urban areas. This, in turn, brings about specific changes in expertise and the labor force within urban areas (Mutatkar, 1995). In contrast, the present generation is confronted with their own set of challenges, one of which involves gaining a better understanding of the widespread impact of the built environment on physical and mental well-being. Consequently, the design of the built environment holds immense potential for addressing many of the pressing concerns that currently affect public spaces in different nations. As a result, the approach towards evaluating the quality of the public environment is shifting from a biomedical standpoint to a more social anthropological perspective, with architects and planners playing critical roles in this transformation (Azzopardi-Muscat et al, 2020). In contrast, it is observed that sustainability issues in landscape architecture and urban design are interconnected and encompass multiple domains. These issues arise as a result of various changes such as demographics, social dynamics, economic factors, environmental factors, and technological advancements. Consequently, they are progressively evolving into intricate and interdisciplinary challenges (Hensel et al., 2020). In addition, in the present time, contemporary architecture functions as a practice that transcends national boundaries within the realms of culture and ideology. Therefore, if architecture represents culture, its representations reflect the aspirations and wants of individuals. Furthermore, the involvement of architecture in the urban globalization strategies strongly reinforces the assertion that the transnational elite connects the state and the globalization of capitalism (Khan, 2018). Islamic architecture encompasses the architectural styles of cultures, regions, or societies that have embraced Islam as an integral part of their social and cultural framework. This term remains valid today, as Islam has consistently maintained its role in shaping architectural development, despite changes in expression over time and space. Islamic architecture reflects spiritual, symbolic, social,

political, functional, behavioral, and formal aspects, and it is through these elements that the influence of Islam can be observed (Rabbat, 2011). Through its architectural manifestations, Islamic culture is depicted as a reflection of civilization and identity. The objective is to achieve an architecture that harmonizes with the cultural and natural environment, while also aligning with modern construction techniques. This includes considerations such as housing, the use of environmentally friendly materials, and safeguarding the rights of both the environment and future generations. Ultimately, the goals of Islamic architecture aim for sustainability by taking into account the environment from social, economic, and climatic perspectives (Alhawty, 2021). Consequently, the contemporary understanding of Islamic architecture has evolved from a conservative interpretation of Sharia law to embrace the concept of "Islamic purification," which integrates architectural principles (Alhawty, 2021; Idham,2021). Islamic planning principles serve as a foundation for design and architecture, with a focus on privacy within enclosed spaces and the use of high walls. These principles are rooted in cultural trends and are founded upon a human understanding of the world. Furthermore, Islamic architecture showcases distinct stages of planning and unique design, offering a comprehensive perspective on the housing models embraced by Muslims across various geographical settings. However, the lack of awareness regarding Islamic teachings among the present generation of Muslims has resulted in the westernization of home design and spatial orientation (Malik and Mujahid, 2016). Therefore, based on these clarifications, it can be asserted that a dwelling also symbolizes various inhabitants and reflects the specific geographical factors of its locality. Consequently, from the perspective of the occupants, their beliefs and cultural background significantly impact the arrangement, construction materials, and zoning of the house. In this context, Islam exerts a profound impact on the residences of its followers, as evidenced by the presence of Muslim houses that embody Islamic architectural principles (Hasan et al., 2021). Although there exists a wide range of interpretations of Islamic architectural productions, architecture endeavors to incorporate its roots within both the changing and unchanging framework. This is because Islamic architecture possesses a unifying aspect that is expressed through religious values, and its defining characteristics are understood as having a firm identity. Consequently, establishing a connection between these elements serves as a strategy to foster the architectural identity and to analyze contemporary Islamic architectural outcomes through this connection. This allows for the framing and identification of the diverse and numerous products or results that arise within this context (Fanjan and Alboadam, 2023). Thus, it can be inferred that the decline of the Islamic way of life in modern architecture and urban planning in Iran leads to various issues. These issues include the rise of polarization and inequality in urban areas, marginalization problems, significant increase in land prices, resulting in smaller and fragmented plots of land. Additionally, the failure to incorporate key principles of Islamic architecture like introversion and separation between inner and outer neighborhoods due to small residential units further impacts the quality of living spaces and prioritizes minimalism. Moreover, the prevalence of consumerism has become widespread as a result of these factors (Raisi, 2021). However, it is important to remember that perception is a personal process in which sensory experiences are given significance. Through this process, humans are able to establish connections and understand the meanings of objects, sensory experiences, ideas, and imaginations. Additionally, the motivation of an individual and the context in which perception takes place play a crucial role in this phenomenon (Yazdanfar, Heidari, and Aghajari, 2015). In simpler terms, when humans familiarize themselves with their surroundings, they attempt to create order and structure by interpreting and comprehending the connections between their bodies and the urban space. By mentally envisioning and establishing meaningful connections between visual elements, the psychological impact of

human understanding of urban space can be categorized into two groups: understanding the quality of the environment and perceiving its visuals. Therefore, environmental perception can be seen as the act of receiving information to gain an understanding of the relationship between people and their surroundings (Mojedzadeh et al., 2023). Islam encourages a sustainable and uncomplicated approach to residential and physical spaces, making Islamic architecture an ideal model for all types of buildings. This architectural style greatly influences how humans perceive their surroundings by incorporating geometrical elements that create harmonious and balanced spaces. The use of local materials in construction adds cultural and regional identity, enhancing the beauty and tranquility of Islamic buildings while improving human perception of the environment. However, contemporary housing structures often disregard these Islamic principles, leading to limitations. Hence, this article aims to elucidate the key components of Islamic architecture that contribute to environmental perception, employing the metasynthesis approach.

Table 1 The evolution of identity in research sources (Source: Author, 2023)

Year	Author	Description
1960	Lynch	What gives a location its own separate existence result in a unique and distinguishable shape compared to other locations, and serves as a framework for understanding its entirety.
1980	Schulz	Place identity is a prerequisite for human identity. The essence of architecture is determined with reference to this factor
1995	Cullen	He describes identity as the act of acknowledging the unique characteristics of each environment and avoiding the homogeneity and resemblance found in urban environments.
1999	Rappaport et al.	Having a personal identity signifies the contrast in being extroverted. On the other hand, a collective identity implies having common attributes associated with being introverted. Consequently, possessing an identity entails simultaneously possessing distinctiveness and likeness in one's characteristics.
2004	Alexander et al.	They perceive identity as the tangible manifestation of visionary attributes within structures, which serve as the fundamental essence of vitality for each individual, urban setting, edifice, or unspoiled environment. Nevertheless, these entities defy verbal description.
2014	Vale	The construction of national identity in the context of modernity and architectural development.
2022	Al-Mohannadi & Furian	Preserving urban identity involves re-establishing the connection between social sustainability and the architecture of housing, given its socio-cultural nature and its close relationship with urban design theories

The promotion of architectural identity is influenced by cultural factors.

According to Webster's dictionary, identity refers to the similarity and cohesion of all elements that form the tangible existence of an object. On the other hand, in another dictionary, identity is defined as the nature, fundamental quality, and authenticity of an object. Frequently, identity appears to include beliefs that adhere to essentialism, where identity is perceived as permanent and immutable, and certain distinctions are established, although some disparities might be concealed during this process. For instance, the eradication of class and gender differences may occur through the declaration of a national identity. In reality, identities are not homogeneous, as there might be contradictions within them that need to be resolved, and any alterations can only come about on a global and national level in the political domain. These changes do not solely transpire at this level, as the formation of identity also transpires at a more localized and personal level (Woodward, 2018). Consequently, the identity of a place encompasses a fusion of the social and cultural attributes of the respective community, which are manifested in the physical manifestations of urban spaces, shown in Table 1. Moreover, the rapid expansion of modern cities, coupled with the

recent alterations of traditional urban environments, has led to discrepancies between the physical features of urban spaces and their cultural identity. Among these urban areas, public urban spaces serve as domains that are extensively utilized by the public, as they have the potential to foster a shared sense of place within urban society, thereby playing a crucial role in enhancing the social aspects of human existence (Ziyaee, 2018). In urban studies, identity can be understood as the unique characteristics of a place or the combination of people within that place (Ujang, 2012). This implies that urban identity represents the natural, cultural, and man-made elements of a city, as discussed through the concept of place identity. Place identity refers to how a place appears and the common elements that shape people's individual perceptions of that place. The distinctive physical or visual features of a place can also contribute to the understanding of its identity (Carmona, 2021). Conversely, place identity encompasses the emotional and psychological connection between individuals and a specific place, as well as the distinguishing features that establish this connection (Ujang, 2017). The understanding and aspirations of individuals are greatly influenced by their identities, which play a significant role in various aspects of organizational and personal life. Consequently, identities are crucial for comprehending and analyzing the consequences surrounding individuals (Brown, 2015). Numerous research studies highlight that the identity of architectural structures is built upon the elements utilized to represent the culture and customs of a specific location or people (Hynda, Samir-Djemoui, and Mohamed, 2022). Therefore, the importance of identity in urban public spaces cannot be denied. From a social standpoint, identity describes the distinctive qualities of an object, encompassing diverse perspectives and objectives, including personal, social, moral, and even political dimensions (Kaymaz, 2013) shown in Table 2.

Table 2 The evolution of Islamic architecture in research sources (Source: Author, 2023)

Year	Author	Description
1898	Fletcher	The Islamic architectural style is uniquely connected to the religion that influenced its development, and it is designed to foster a cohesive way of life across various regions.
1961	Schuon	Schuon presents an interpretation of true beauty or its comprehension, which can be evaluated through theoretical and intellectual means. The Pythagorean method is employed in the exploration of various symbols within Islamic art.
1979	Papadopoulo	The praise of everyone has been garnered by various artistic elements such as mosaic work, tile work, wall paintings, abstract decorations, and inscriptions in the majority of Islamic buildings.
2008	Hasham Morteza	In order to align the lives of Muslims with the goals and teachings of Islam, the principles of Islam were collected. By adhering to these principles in the early Muslim societies, they were able to establish social and physical environments that were in harmony.
2015	Teimouri	According to respected Islamic scholars in the field, beauty in Islamic art is considered subjective and dependent on perception.
2018	Kadoi	The Islamic world has been presented in museums in Europe and America throughout history.
2023	Nasser Al Arifi	The unique characteristics of Islamic architecture involve giving importance to restoration and creativity, acknowledging the aesthetic significance of Islamic ornamentation, and emphasizing the artistic aspects of deviating from anthropomorphic representation.

Architecture is a manifestation of our principles, asserts Norman Foster, as the manner in which we construct is indicative of our lifestyle. This explains why the indigenous customs and historical strata of the urban environment are incredibly captivating, as each era presents its unique

terminology. Occasionally, delving into the past becomes necessary to extract motivation for the forthcoming era, and at its most impactful, architecture epitomizes our societal principles (Bianco, 2018). Islamic architecture emerged with the rise of Islam and is deeply intertwined with the beliefs, teachings, and practices of the religion. It is both a concept and a tangible expression, and, like any other architectural tradition, it addresses the specific needs of the society it serves, taking into account factors such as climate, geography, and culture. Therefore, Islamic architecture is seen as a revolutionary and enduring phenomenon that reflects the values and principles of its creators. Furthermore, Islamic architecture seamlessly combines creativity, imagination, and technical expertise to fulfill the physical, mental, and spiritual needs of individuals (Omer, 2008). Thus, in line with the objectives of Islam, architecture is considered to be a branch of art rather than engineering, Islamic designs encompass concepts beyond mere decoration, and the utilization of flower motifs along with the absence of figurative and animal motifs stem from the deep-rooted reliance of Muslim artists and architects on nature for inspiration, owing to their religious beliefs. Moreover, Islamic mosques exhibit two distinct attitudes. For instance, the notion of form holds significant controversy in Islamic history. It is possible to analyze and examine form in two distinct categories, with one of them being the square plan - a feature that is commonly found in Iranian art both before and after the advent of Islam. The significance of the square plan can be attributed to the prevalence of the number four amongst Muslims, as the Kaaba itself possesses four corners (Esmaeili, 2014). In contrast, Islamic architecture possesses a distinct aesthetic quality that sets it apart from other architectural styles. This defining characteristic is rooted in Islamic arts, as the architectural heritage reflects the creativity and cultural legacy of the nation throughout its extensive history. The inherited structures of aesthetically appealing architectural designs within Islamic society have withstood the test of time and imposed reverence from the world, acknowledging their suitability for human use (Gamal, Farghlaa, and Nasr, 2021).

Furthermore, the intricate design and embellishments found in the architecture of mosques highlight the significance of Islamic culture as one of the most influential and remarkable civilizations in human history. The incorporation of geometric shapes in architectural structures indicates that Muslim artists were conscious of their work, aiming to capture values that align with their spiritual and ideological needs. Consequently, comprehending the aesthetic worth of Islamic ornamentation and the artistic aspects of architectural decorative elements, such as geometry and botany, can be beneficial for scholars and researchers studying Islamic aesthetics and decorations. Furthermore, the existence of Islamic architecture is closely intertwined with Islamic perceptions of God, humanity, nature, life, death, and the afterlife. Additionally, it illustrates the religion of Islam and the essence of Islamic culture and civilization, as the structures within Islam are constructed to honor the singular creator and master of the cosmos, as well as those who dwell within them. Consequently, nature serves as the foundation for accomplishing mankind's spiritual purpose on earth. In other words, humans are intertwined with nature, as the entire natural surroundings for humans is nature itself. Sustaining nature is synonymous with preserving oneself, while causing harm to nature equates to causing harm to oneself, ultimately signifying a triumph for civilization. It explicitly declares the obligations and responsibilities towards nature (Omer, 2012).

1.1. Environmental Perception

Perception is a subjective matter that relies on the information our five senses gather. Architecture, akin to language, communicates messages. These messages are contained within the physical dimensions of the building and are comprehended in our minds. When this information aligns in our minds, we form a perception of the building. It is important to note that the focus of

perception in architecture primarily lies in the viewer's mind. Architectural literature emphasizes the significance of meaning in architectural works, and when observers decode the message contained within, it is referred to as perception. Different individuals may interpret and derive diverse meanings from a particular work (Pouragadham et al., 2023). Furthermore, perception is shaped by factors such as knowledge, experience, emotions, cognitive variables, and the decisions of the observer. The environment can be comprehended through four cognitive, emotional, interpretative, and value dimensions. Essentially, perception encompasses the object being perceived, and in the case of architecture, it is not confined to solely physical aspects but also encompasses mental aspects that motivate the creation of physical structures. Psychology explores the various factors that impact perception. One such factor is human consciousness, which directly influences the sensory nervous system. Another factor is the individual's circumstances and the environmental conditions they are exposed to throughout their life. These circumstances include aspects like gender, age, education, needs, assumptions, beliefs, and thinking patterns. The environment itself also plays a crucial role in shaping perception, and it is influenced by numerous factors. Consequently, different environments yield different perceptual effects (Ngakan, 2019). Furthermore, Franz Brentano categorizes the concept of human perception into two distinct components. External perception refers to the comprehension of objects through visual observation of physical phenomena, whereas internal perception involves understanding objects through cognitive processing of mental phenomena. In the context of architecture, both internal and external understanding are essential in order to enrich the encounter with the physical and mental aspects of environmental features. The engagement in mental activities inherently entails a certain level of awareness of those activities themselves (Palangi, 2022). As argued by Marin and Lima (2009), the term "environmental perception" possesses a multifaceted and interdisciplinary nature, lacking a universally accepted definition in the realm of biology (Marin and Lima, 2009). On the contrary, Schultz, Shriver, and Tabanico argue that humans have a self-centered connection with nature, with their environmental concerns being primarily related to themselves. This mindset corresponds to a lack of concern for the environment, except for those individuals who view themselves as an integral part of nature. Different individuals can react differently to the same environment. Generally, individuals who have stronger connections to the environments they frequently inhabit contribute more to addressing environmental issues, unlike those who are geographically distant from an environment and only have temporary engagements with it (like park or beach visitors or tourists in natural reserves seeking enjoyment or leisure). This contribution to the problem was observed by Schultz et al in 2004. Hence, the perception of the environment is regarded as a concept of perception utilized in the connection between individuals and society with the environment, being a psychosocial phenomenon where the depiction of the environment relies on the cognitive and emotional processes formed through personal experiences. Conversely, the concept of environmental perception is intricate and linked to the socio-environmental viewpoint. In the case of humans, their interaction with the environment is not solely based on physiological requirements, but also on their needs and desires. Environmental education plays a crucial role in cultivating environmental perception within its cultural influence. In reality, environmental perceptions are seen as a prerequisite for attaining various levels of environmental awareness. The significance of this framework is highlighted for the peaceful coexistence between humans and the environment, advocating a responsible, accurate approach towards nature preservation (Marques et al., 2020).

It can be concluded, after considering this subject, that individuals may have varying interpretations of an object. The architect's understanding of architecture is influenced by their

experience and their ability to comprehend architectural concepts. This understanding is then conveyed through the architect's perception of the form and value present in the architecture they observe. Generally, the characteristics of architecture can be identified by visually examining its constituent elements, and different reactions can be elicited by an object. Many scientific approaches in architectural design indicate that the complexity of architectural design encompasses various activities and aspects. One of these aspects is perception within architectural spaces. Perception allows humans to recognize architectural works based on their experiences. Furthermore, there are generally four dimensions that characterize human perception: cognitive, emotional, interpretive, and value dimensions. These dimensions also highlight the differences in perspective between architects and non-architects. The term "perception" stems from "perceive," which denotes observation, concept, awareness, and knowledge. Theoretically, perception is the process of acquiring information from the human environment, actively engaging with it, integrating it into one's own experiences, and assigning meaning to the acquired information (Ngakan, 2019). Consequently, the process of perception involves the interpretation and comprehension of sensory information obtained from the surroundings, and it is influenced by a range of factors including culture, experience, and context. Moreover, architecture is responsive to ingrained habits rather than our basic needs, which have developed over millennia in the natural world. This evolutionary progression establishes a connection between mankind and their senses, predisposed to seek out faces, fractals, and appreciate bilateral symmetrical arrangements. In fact, studying the impact of architecture on human perception enables us to grasp how public buildings can either foster unity or division and cultivate a sense of community cohesion and identity (Sussman and Ward, 2019). However, identity, in contrast, refers to how we perceive ourselves and our position in society. It is shaped by diverse aspects including culture, religion, language, and history. The connection between perception and identity is intricate and heavily influenced by the cultural and historical environment in which we reside. Moreover, Islamic architecture has undergone transformation throughout the years and has been influenced by factors like the observer's cultural heritage, historical circumstances, and the architectural elements integrated into its design. Therefore, comprehending Islamic architecture is subjective and influenced by the observer's personal background and past encounters (Pandya, 2020). The concept of Islamic architecture's identity is a topic of discussion from two different angles: the visible appearance and shape in public spaces, as well as the deeper reality that lies within. This attribute is not unique to Islamic architecture alone, as all religious architectures possess it. However, the latter perspective holds true significance and legitimacy in terms of "meaning" and serves as a means to preserve, mold, construct, and ultimately enhance urban identity. The identity of Islamic architecture holds great significance and uniqueness, and due to its intangible nature, it cannot be possessed as an "object" (Hojjatollah, 2012). The theoretical framework in Fig 1 has been developed by considering the research background, examining theoretical foundations in Islamic architecture and environmental awareness, recognizing commonalities, and extracting influential components from these two fields.

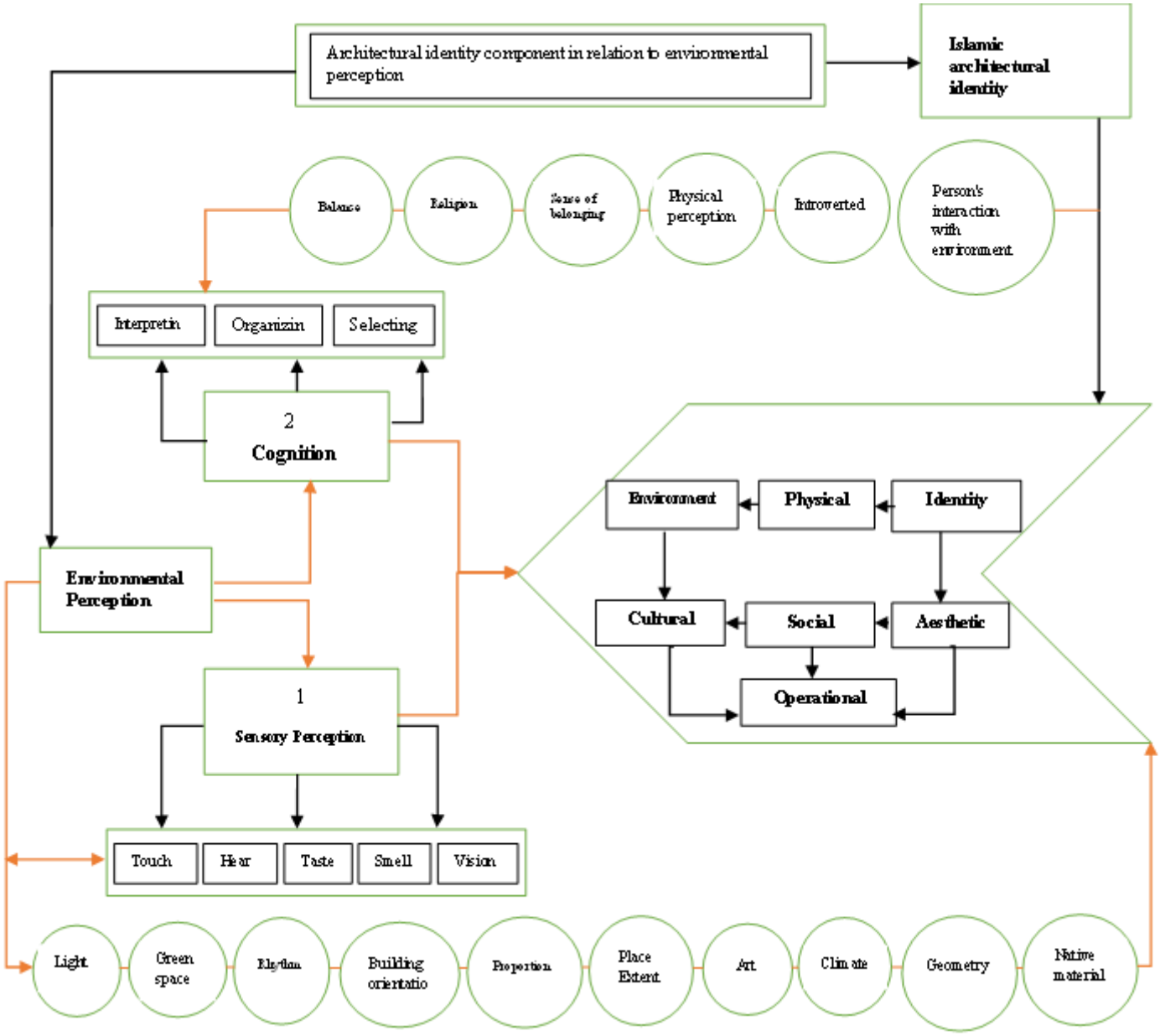


Fig 1 The theoretical framework of the research (Source: Author, 2023)

2. Research Background

Expert researchers initiated the research project by considering the topic and approach, and in the following, we will outline a few theories.

Spahich's publication, "Islamic Architecture from the Perspective of Theoretical Foundations, Spiritual Values and Historical Developments", published in Iran in 2018, aims to elucidate the conceptual and spiritual principles that guide Islamic architecture while highlighting its historical origins. The author goes on to offer comprehensive explanations and illustrative examples in this

domain. Similarly, in 2023, Al-Jamil's article, "Utilizing three-dimensional spatial structures for identifying extraordinary characteristics in architectural objects", presents Islamic architecture as a subject of study concerning human behavior and emotional assessments of spatial encounters within architectural settings.

Talebi authored an article titled "The Potential of Islamic Designs in the Visuals of Modern Islamic Cities" in 2020. The article highlights the significance of Islamic patterns and ornamentation in diverse aspects of Islamic architectural structures. The author emphasizes the need to incorporate elements that possess aesthetic and indigenous qualities in the enhancement of urban landscapes and furnishings, as it fosters a sense of cultural identity and religious heritage among the citizens. The objective of Talebi's article was to explore the potential of Islamic patterns and their impact on the visuals of contemporary Islamic cities. He concluded by stating that the incorporation of Islamic patterns in the urban beautification and graphic design of Islamic cities can effectively convey Islamic concepts and visual identity, considering their visual quality and underlying meanings. According to Dr. Behzad Sidawi's article titled "Knowledge of Islamic Architectural Heritage Vocabulary" published in 2013, the elements of Islamic historical architecture are intentionally designed and constructed to adapt to the physical conditions of individuals, as well as to address environmental, social, physiological, and religious factors. Dr. Sidawi argues that architects should not only comprehend the concealed values within historical elements, but also understand how these values interact and merge within these elements. To achieve this, the architect can gain a proper comprehension of these components and integrate them effectively into their design. The present study introduces a theoretical framework suggesting the examination and understanding of architectural heritage terminology to be integrated into contemporary building designs by architects.

Hillenbrand authored a book named "Islamic Architecture" in 1994. This publication stands out as a fundamental work within the realm of Islamic architecture, delving into the historical aspects, design principles, and societal significance of this architectural style. In contrast, Hoffman scrutinizes the fundamental principles and ideas in environmental perception, including object recognition, attention, and memory, in his 2008 book titled "Perception and the Physical World: Psychological and Philosophical Issues in Perception." Hoffman has utilized mathematical techniques and neural networks in order to elucidate perceptual procedures and has explored philosophical and psychological matters regarding environmental perception. In 1979, Gibson examined the ecological framework in environmental perception in his work "Ecological Approach to Visual Perception". According to Gibson, environmental perception ought to rely not only on sensory information, but also on the actual environment. To explain this, he has introduced a concept called "self-propelled locomotion".

3. Methodology

In this phase of the study, it is important to consider that the research approach is applied with the intention of gathering information and carrying out a descriptive-analytical investigation through surveys. The information collection process entails conducting documentary analysis, making field observations, and conducting interviews with twelve professionals in this particular field. These approaches have been validated and approved by experts. In order to examine the qualitative information and validate the variables obtained from the sources, as well as linking them to the interviews, the Max Kyoda software utilized metasynthesis and inductive coding techniques. It is important to mention that the metasynthesis approach entails reviewing the sources and interviews conducted from a qualitative perspective in order to evaluate existing knowledge and

potentially advance it. The data examined through this method comprises the results of previous naturalistic studies. Ultimately, metasynthesis involves an extensive examination of a phenomenon by synthesizing qualitative discoveries. The conclusions and inferences drawn from the comprehensive review of all relevant articles constitute the interpretations obtained. Consequently, a meta-analysis offers novel insights and understandings that were not previously addressed in the original papers. By employing a systematic approach, metasynthesis enables researchers to uncover fresh and essential concepts and metaphors. This approach aims to generate knowledge and present a holistic overview of the framework (Rouhi-Balasi et al, 2020). This approach allows for a comprehensive comprehension of phenomena by incorporating various settings, participants, and qualitative traditions. Such a synergistic understanding can be beneficial in theory development, as well as in informing practice and policy. By combining multiple qualitative studies, a more profound understanding of the phenomena under investigation can be achieved, contributing to theory development and informing practice and policy (Aguirre, and Bolton, 2014). However, it is important to note that the analysis of the collected data in this research utilized Barso and Sandusky's 7-step method in Fig 2.

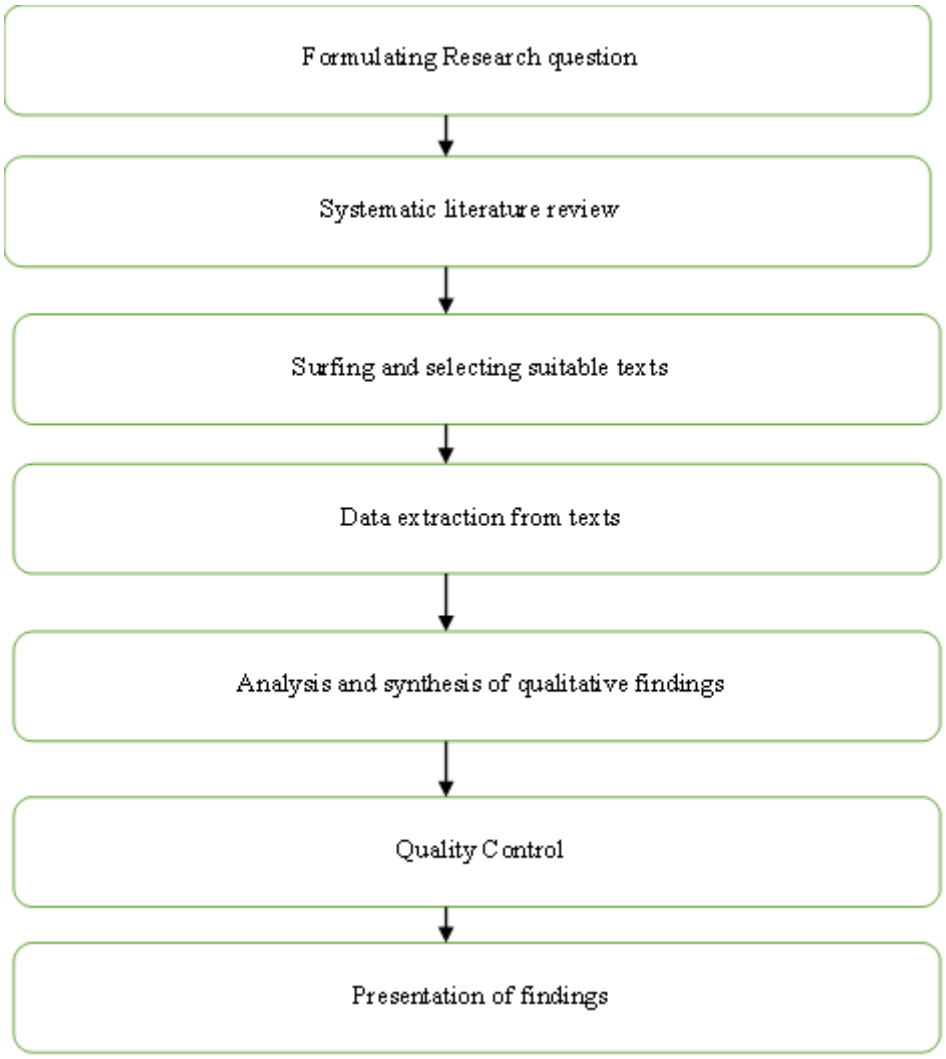


Fig 2 Steps of implementing metasynthesis (Source: Shahmohammadi et al, 2018)

In the initial phase of this study, the focus was on investigating the elements of Islamic architecture that contribute to environmental perception, using the metasynthesis approach. Relevant experts were given a prepared questionnaire to gather their insights. Subsequently, the qualitative data obtained from the Max Kyoda software was analyzed using the meta-composition method, taking into account the content of the interviews conducted. After verifying the results, the research findings were presented in the form of tables, graphs, and outputs generated by Max Kyoda.

Table 3 The first step of hybridization

Indicators	Research questions	Response
what? who? (Study area) When? (Time limit) How? (methods of data collection)	What are the factors affecting Islamic architecture? What is the study area to achieve these factors? What period of time were theoretical sources reviewed and searched? How were the research data collected?	Identifying factors through research background Browsing databases and citation scientific journals of recent years Using secondary data such as interviews

In order to address the research questions, the initial phase involves providing the demographic and descriptive details of the twelve experts who participated in the interview, which is presented in Table 3.

Table 4 Descriptive statistics of interview participants

Variable	Class	Frequency	Frequency percentage
Scale	International	0	0
	National	1	8.3
	Regional	7	58.3
	Local	4	33.3
Field of Study	Architecture	4	33.3
	Urban Design	7	58.3
	Geography	1	8.3
Academic degree	Ph.D.	12	100
Experience	10 – 15 years	2	41.7
	5-10 years	7	41.7
	Less than 10 years	3	16.7
Occupation	University Professor	4	33.3
	Expert	1	8.3
	Counselor	4	33.3
	Design and Execution	2	16.7
	Manager	1	8.3

It is important to note, based on the interviews conducted, and shown in Table 4 and Fig 3, all the participants have obtained a doctorate degree due to the intricate and specialized nature of the subject matter. The majority of them, accounting for 58%, have specialized in urban planning, while 34% have focused on architecture, and the remaining 8% have studied geography. In terms of occupation, the highest percentage, 34%, belongs to university professors in this field, followed closely by consultants at 33%. Design and execution professionals comprise 17% of the participants, while experts and manager make up 8%. The interviewees' professional experience is most commonly within the range of 5-10 years, with 58% reporting this duration. Furthermore, the

majority of their work within this field revolves around regional affairs, constituting 59% of their activities.

Continuing with this topic, it is important to note that the components of these studies can be categorized into seven dimensions - Identity, Social, Functional, Cultural, Environmental, Aesthetic, and Physical. Max Kyuda divided these dimensions into subsets through inductive coding, as shown in Fig 4. These categories specifically address the overlapping aspects of Islamic architecture and environmental perception. Thus, it can be inferred that enhancing the organization, energy, and comprehensibility of architectural design, as well as incorporating key elements of Islamic architecture in contemporary cities, is a significant focal point for architects and urban planners.

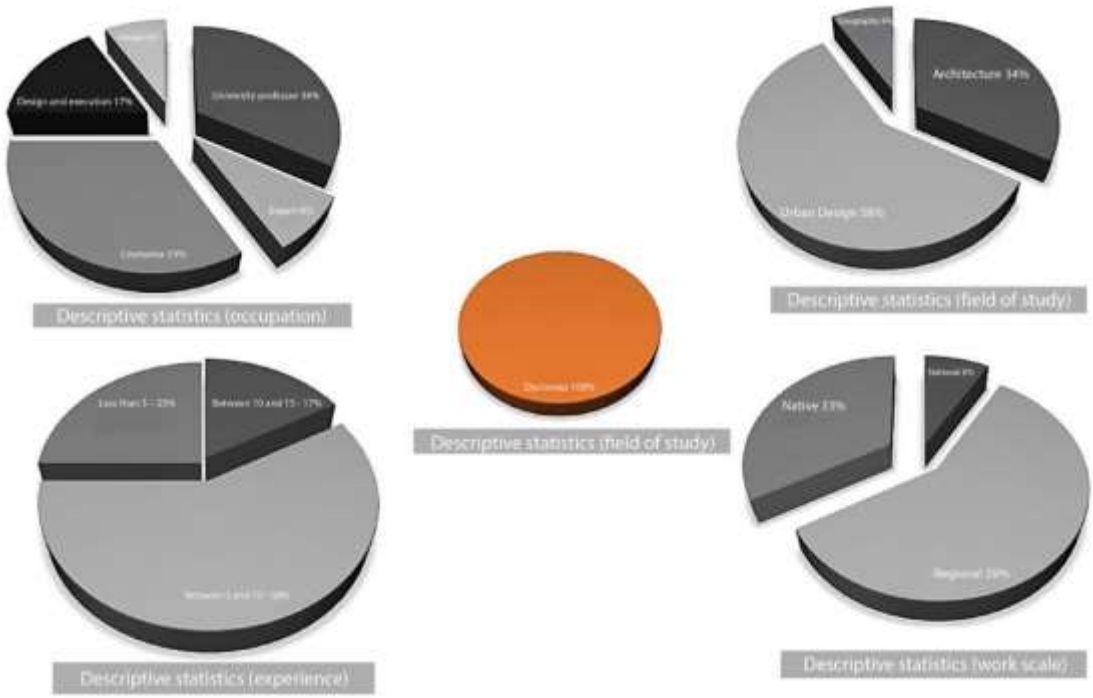


Fig 3 Descriptive statistics of the interviewees (Source: Author, 2023)

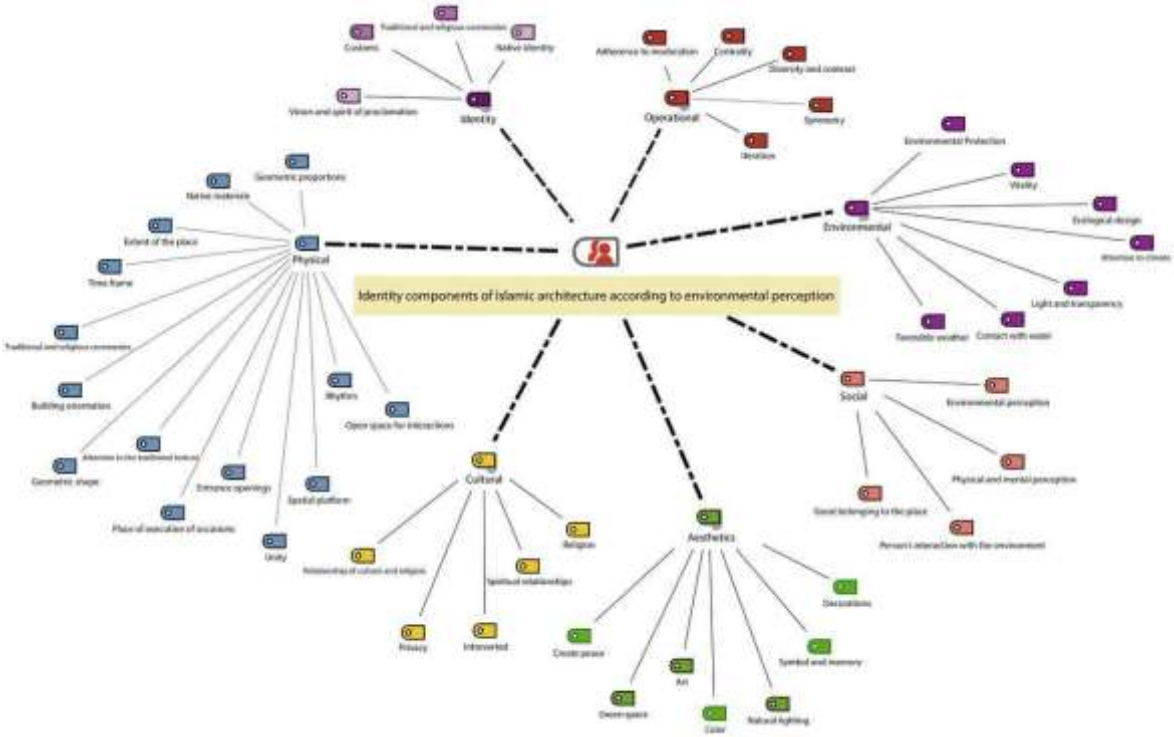
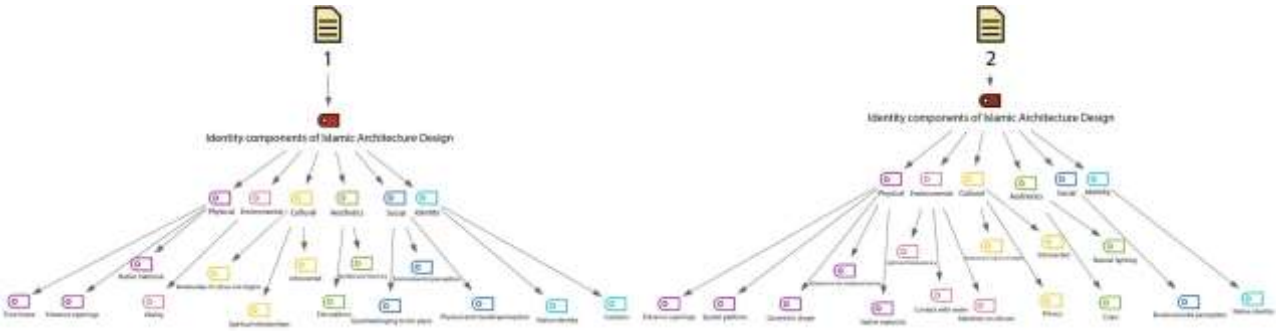
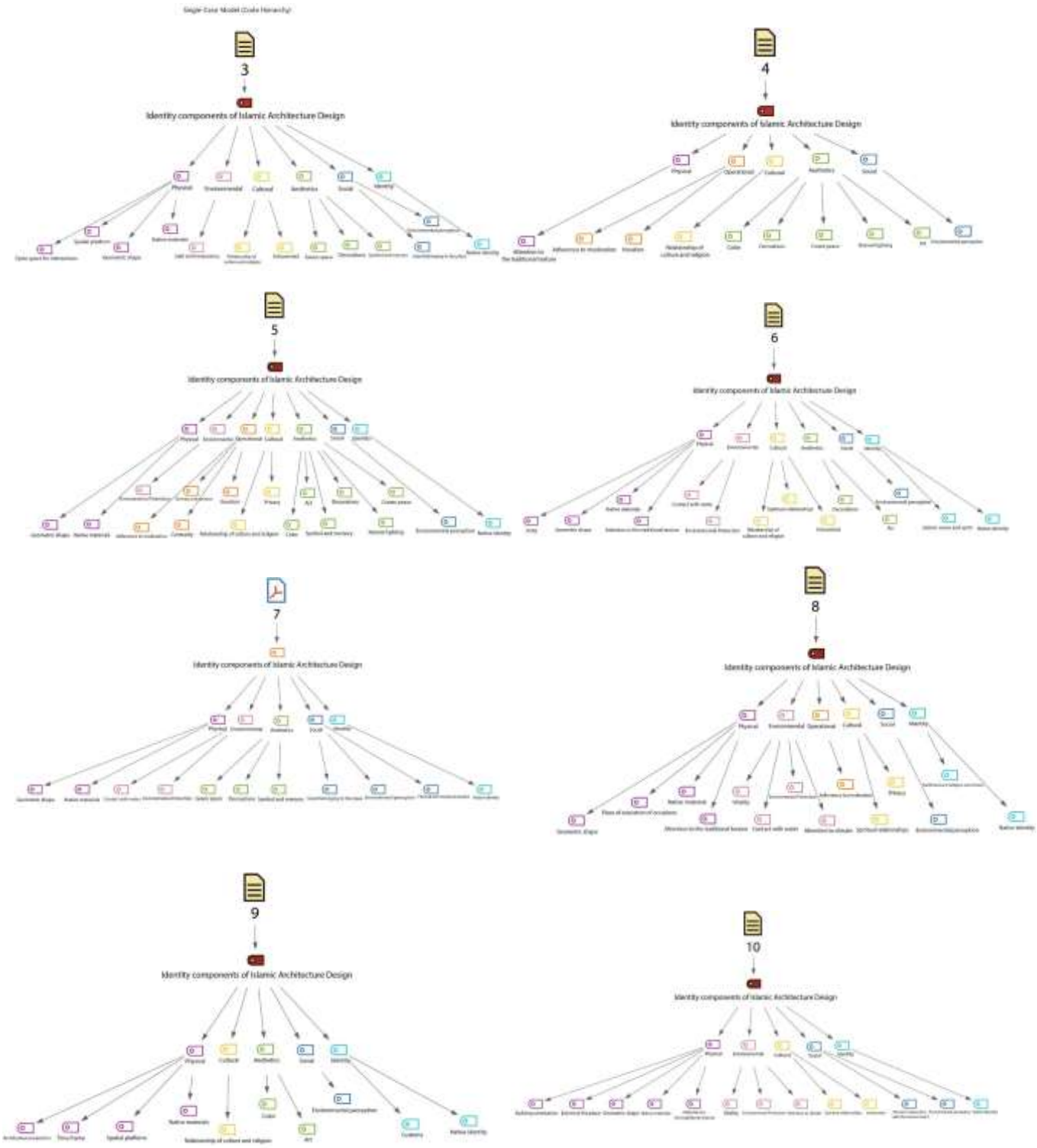


Fig 4 Identity-giving components of Islamic architecture in relation to environmental perception (Source: Author, 2023)

4. Findings

At the start of the research method, the interview analysis for this study, conducted with a group of 12 individuals including experts in this particular field, utilized open coding with Max Kyoda software. It should be emphasized that the qualitative components extracted from the software's results were categorized into seven main dimensions: identity, social, functional, cultural, cognitive aesthetics, environmental, and physical. This categorization was performed individually for each interview, as depicted in Fig 5.

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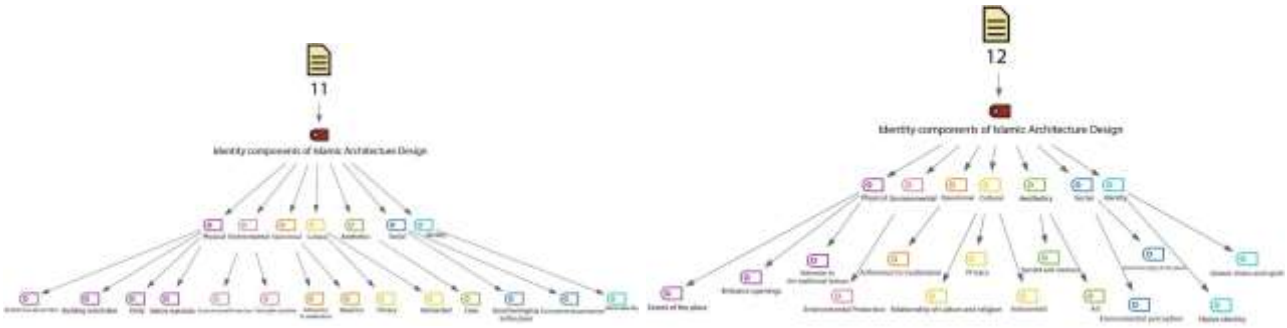

Fig 5 Coding of the conducted interviews (Source: Author, 2023)

5. Dimension of Identity

According to the review of conducted studies and research findings presented in Fig 6 of the Max Kyuda software, perception can be defined as a process wherein sensory information is initially received from the surroundings and subsequently interpreted and influenced by various factors like culture, experience, and context. Perception also encompasses an individual's collection of experiences, emotions, and attitudes towards their environment, and these elements contribute to one's understanding and interpretation of the surrounding environment. Additionally, the architectural design of a space and our perception of it can significantly impact its identity, allowing the designer to establish a distinctive identity by taking into account the audience's perception. Hence, it can be inferred that the perception of the environment can have a significant impact on the establishment of architectural identity. For instance, elements like the shape, color, and texture of a building can influence how it is perceived by the viewers. Conversely, identity is shaped by a multitude of factors including culture, religion, language, and history, and assigning an identity to an architectural creation necessitates considering the audience's perception of that creation. Furthermore, identity is the means by which we define ourselves and our position in the world, and therefore, the architect must possess the ability to instill a distinctive identity through visual, spatial, physical elements, etc. Architecture encompasses the specific and distinct attributes of an architectural creation that sets it apart from others. In addition, individuals tend to develop their Islamic identity by interpreting their own religious convictions and observances. It is crucial to recognize that Islamic identity is a complex notion that impacts various aspects of life such as religion, culture, and society. Consequently, perception plays a significant role in shaping this identity, as it relies on an individual's comprehension and encounters with Islamic teachings. Therefore, people's understanding of their cultural heritage, social interactions, economic conditions, and personal encounters profoundly influence how they perceive and identify with Islam. In contrast, the association between the Islamic viewpoint and ethos and the understanding of the environment is fostered by promoting the indigenous identity, thus motivating individuals to adopt a responsible stance in order to achieve harmony and equilibrium with the natural environment. Consequently, comprehending the connection between environmental perception and local identity becomes crucial and essential. Efforts should be made to establish environments that uphold and reinforce the feeling of cultural identity. These endeavors involve conserving natural landscapes, preserving cultural and traditional symbols, advocating for customs, supporting cultural institutions, and establishing spaces that enhance the connection and sense of belonging to the original culture of a particular area. In conclusion, it is important to note that physical and mental perception pertains to an individual's sensory and cognitive encounter with the constructed

surroundings, while native identity is connected to a person's feeling of being part of a particular cultural or ethnic group or significant location.

5.1. Social Dimension

The close connection between environmental perception and feeling of belonging to a place lies in the fact that people's perception of their surroundings can significantly impact their attachment to a specific location or community. Moreover, for numerous individuals, their sense of belonging to a place is deeply influenced by their historical and religious cultural connections. Therefore, depending on individuals' perception of the natural and constructed environment, environmental perception can either strengthen or undermine this sense of belonging. The experience is distinct. As an illustration, individuals who view their surroundings as aesthetically pleasing, distinct, or exceptional possess a heightened sense of connection to that location. Conversely, those who view their surroundings as mundane, ordinary, or tainted by negative energies might experience a lesser sense of belonging to that environment. Overall, the correlation between one's perception of their environment and their feeling of attachment to a place is complex, influenced by various cultural, social, and personal factors. Furthermore, this element possesses the potential to significantly influence an individual's interaction with their surroundings and exert significant effects on human behavior. In general, the perception of the environment plays a crucial role in shaping human encounters and actions within the physical and social realm. Therefore, comprehending the various factors that impact environmental perception holds significance in order to construct environments that foster human well-being and sustainability. Conversely, environmental perception can also impact an individual's engagement and involvement within a specific location or society. People who experience a sense of belonging to their surroundings are more likely to engage in social events and activities. Conversely, individuals who have a hostile attitude towards their environment are less inclined to participate socially. Additionally, environmental perception can influence how individuals perceive their own role and can impact the formation and preservation of the environment. It is important to note that environmental perception is closely intertwined with the physical and psychological perception of humans. This implies that environmental perception can also impact physical and mental well-being. For instance, exposure to natural environments like forests or environments with historical significance such as traditional architectural homes have been associated with various benefits for physical and mental health. These benefits include reduced stress, improved mood, and increased physical activity.

5.2. Functional Dimension

The importance of the environment and introversion in architecture can also impact the way society and culture perceive the surroundings. Architectural designs that incorporate natural elements and establish a harmonious relationship with the environment can contribute to enhancing the cultural and social significance of nature. Consequently, this can shape people's perception of and appreciation for the natural world and encourage more respectful and sustainable behaviors and attitudes. Islamic architecture has the ability to generate a feeling of unity, equilibrium, and organization within a given space, impacting both the physical and psychological state of an individual. By employing techniques such as manipulating light and shadow, Islamic architecture enhances the perception of depth and spatial dimensions, ultimately resulting in a harmonious and symmetric architectural style. In contrast, repetition plays a significant role in Islamic architecture by establishing a feeling of rhythm and balance in the surroundings. Simultaneously, it serves as a

representation of cultural, local, and religious values. Islamic architecture notably utilizes geometric patterns and calligraphy to accomplish the repetition of these elements. These patterns and designs are often repeated in various sizes and arrangements, contributing to a sense of cohesion and harmony within the environment. Consequently, the repetitive motifs can foster a connection with Islamic cultural and historical values, exemplifying the Islamic emphasis on culture and religion.

5.3. Cultural Dimension

There are several factors that affect how people perceive the environment, including sensory experiences, cultural background, personal preferences, past experiences, and religious beliefs. By analyzing the cultural and religious aspects, it can be inferred that both play a significant role in shaping environmental perception. For instance, cultural and religious practices highlight the significance of environmental preservation, and these values can in turn impact the way individuals interpret and value their natural surroundings. In the realm of architecture, environmental perception plays a significant role in the manifestation and presentation of culture and religion. This implies that an individual, based on their understanding and awareness of the environment, incorporates various concepts such as self-awareness, culture, history, religion, and theology, and utilizes them to express their architectural style, specifically Islamic architecture. However, the connection between culture, religion, environmental perception, and introversion is influenced by a wide array of cultural and social factors. Visual arts within architecture serve as powerful instruments that contribute to comprehending non-verbal communication and act as a representation of culture and religion. Moreover, they possess the ability to convey and convey values, beliefs, and cultural and religious identity effectively. Architecture is employed in various cultures and religions to convey their unique cultural, native and religious identity. These structures frequently incorporate elements like tranquil areas, organic materials, and gentle illumination, establishing an environment conducive to reflection and rest.

5.4. Aesthetic Dimension

After analyzing the correlation between the perception of the environment and its aesthetic components, it can be deduced that these two aspects are intertwined and connected to how individuals encounter and comprehend their surroundings. The perception of the environment entails the manner in which individuals observe and interpret it, encompassing not only a utilitarian function but also an aesthetic dimension that allows us to gather and structure information from our surroundings, granting significance to it. Moreover, beauty plays a crucial role in assigning significance to our mental experiences, triggering attraction and emotional responses towards a particular environment. Additionally, within the realm of environmental perception lies the assessment and comprehension of the visual, auditory, and tangible characteristics of a given space. It is worth noting that aesthetic experiences can greatly differ among individuals due to their personal inclinations, cultural backgrounds, and religious beliefs. Different individuals may have varying preferences when it comes to finding certain landscapes, architectural styles, or urban environments visually appealing.

The aesthetics of an environment can be impacted by various elements, including color, shape, symmetry, texture, harmony, balance, and overall arrangement. Many of these elements are related to its physical dimensions, suggesting that aesthetic and physical aspects mutually affect each other. The well-being, visual comfort, mood, and behavior of individuals can be significantly influenced by the aesthetic aspects of an environment. Furthermore, in a specific society or region, cultural and

social factors and dimensions might also contribute to the development of aesthetic standards and values. By examining the intricate connection between artistic elements and environmental perception, one can ascertain that environmental perception greatly affects people's perception and interpretation of different aspects of architecture, including aesthetics. Additionally, environmental perception encompasses our comprehension of spatial relationships, scale, and proportions within a given environment. It is important to note that environmental perception and aesthetic dimensions are highly subjective and can vary from person to person.

5.5. Environmental Dimension

It is worth noting that the way humans perceive and experience the environments they live in is greatly influenced by those environments. The physical aspects of the environment, such as its natural elements, climate, buildings, and infrastructure, play a role in shaping our sensory and mental experiences. Additionally, the environment provides cues and stimuli that our senses receive, influencing our perception and understanding of our surroundings. However, it is important to acknowledge that each individual's unique perceptual filters and cognitive processes also play a role in how they perceive and interpret the environment. Individuals have subjective opinions and differing perspectives on the environment. Consequently, their environmental perception plays a crucial role in influencing their actions and conduct. As people comprehend and interpret their surroundings, they make decisions and behave accordingly. For instance, upon observing a bustling and cacophonous street, some might opt to stroll along a peaceful side street. Evidently, our comprehension of the environment directs our interactions and ability to adapt to it. Hence, if an individual actively educates themselves and comprehends the historical and cultural value of an urban setting, they can enhance their understanding and connection to that place while also diligently preserving the environment. In many traditional architectural styles, there is a belief that the built environment is connected to nature, and therefore buildings and structures should be designed in a way that complements the surroundings, utilizes local materials, and incorporates the landscape into the design. This approach gives a sense of liveliness and energy to the built environment, fostering a connection with nature and promoting a feeling of well-being and tranquility. Similarly, Islamic architecture embraces both internal and external spaces, utilizing natural light, water, and vegetation to create a beautiful, spiritual, and dynamic environment that upholds cultural, religious, and traditional values. Additionally, the design of buildings is influenced by the surrounding landscape, often leading to constructions on hillsides or the positioning of structures to maximize natural light and ventilation, thus creating a vibrant atmosphere.

5.6. Physical Dimension

Architecture is utilized across various cultures and religions as a method to convey cultural, ancestral, and religious identity. Similarly, in diverse indigenous cultures, architecture signifies the social, cultural, economic, and religious aspects of a specific community. Hence, when geometric elements are integrated into Islamic architecture, they generate spaces that promote positive and harmonious human interaction, ultimately enhancing individuals' perception of their surroundings. Additionally, the use of Islamic art, geometric patterns, and calligraphy in Islamic architecture fosters a profound connection with Islamic culture and tradition. Consequently, the pace of life slows down, enabling individuals to appreciate and embrace their surroundings more deeply. The utilization of geometric forms like circles, squares, and triangles reflects the Islamic emphasis on

mathematics, astronomy, and science. Incorporating these shapes in the architectural landscape can establish a feeling of equilibrium and symmetry. Moreover, employing these shapes can foster a sense of affiliation with Islamic societies' cultural heritage and reinforce their religious identity. Traditional designs in buildings and structures, as well as tall houses, often incorporate geometric shapes like triangles, circles, and squares in native architecture. These shapes reflect the natives' emphasis on the surrounding natural world and can convey a strong connection to traditional cultural values and beliefs. It is important to consider that geometric shapes, such as triangles, squares, and rectangles, are frequently employed in the design of pyramids, temples, and other architectural structures. Hence, geometric forms take on the role of representing and symbolizing Islamic principles and convictions. On the contrary, in architecture, the perception of the environment plays a vital part in conveying culture and religion. This implies that individuals, based on their comprehension and awareness of the surroundings, develop diverse concepts encompassing self-awareness, culture, history, and religion, which they then express through architectural forms. In indigenous societies, architecture often incorporates natural materials like wood and stone as well as designs featuring houses adorned with plants, symbolizing the connection between humanity and the environment. However, culture and religion can have a significant influence on the design and purpose of architectural features. In Islamic architecture, for instance, geometric shapes like circles, squares, and triangles are used in prayer rooms, schools, gardens, and stairs. These shapes serve as symbolic representations of Islamic values and beliefs. Additionally, the design of buildings can also shape individuals' perceptions and interactions with the environment, thereby exerting a profound impact. Similarly, incorporating organic materials and shapes into Islamic architecture can establish a feeling of alignment with the natural world, fostering a stronger bond with Islamic ideologies and beliefs. Alternatively, the embellishments and construction materials employed in Islamic architecture bear great influence in shaping an individual's sense of legibility, belonging, and ease, and furthermore, employing natural and native materials also carries significant advantages in terms of environmental preservation. In summary, by integrating cultural and natural aspects into the surrounding environment and elements of Islamic architecture, the sense of connection with cultural heritage and the natural realm can be enhanced.

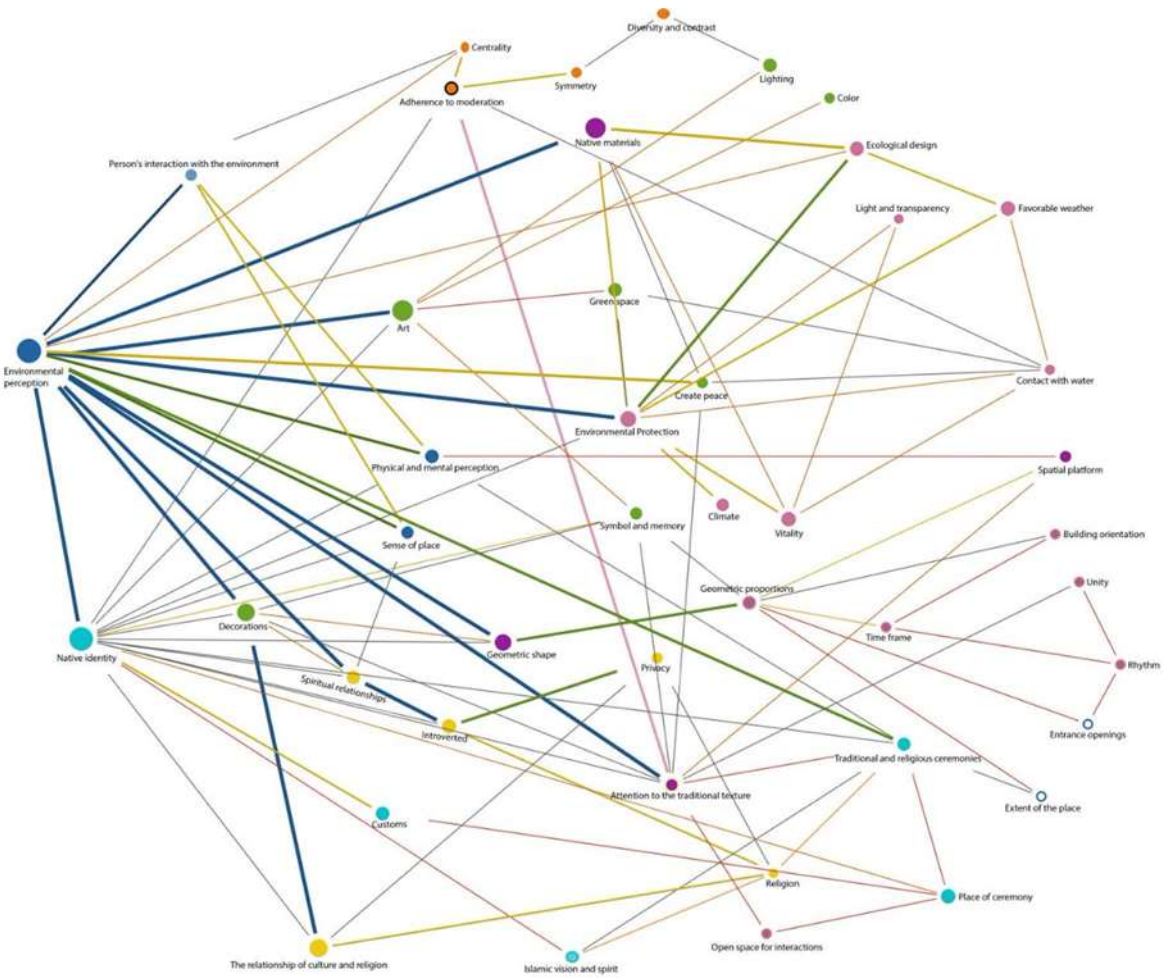

Fig 6 Relationship between the relevant codes in the Max Kyoda software (Source: Author, 2023)

6. Discussion

The main objective of this research is to elucidate the elements of Islamic architecture that contribute to its identity in relation to environmental perception, using the meta-composite approach. The findings demonstrate that the various factors that define Islamic architecture have a significant impact on environmental perception. Therefore, there exists a profound and meaningful connection between the components of Islamic architecture, environmental perception, and identity. Islamic architecture, being a prominent form of architecture worldwide, has evolved over time due to varying circumstances. Consequently, to fully comprehend the diverse concepts of Islamic architecture, it is essential to consult a wide range of sources and possess a comprehensive understanding and accurate interpretation of the cultural and historical aspects associated with this architecture. Additionally, it is important to consider the regional and cultural variations that may lead to different definitions and interpretations of Islamic architecture. In order to enhance the relationship between Islamic architecture, identity, and environmental perception, it is crucial to emphasize the incorporation of Islamic principles and values in architectural practices. Space is a crucial aspect in this kind of architectural style, serving as a prominent design element that

establishes a connection between people and the surrounding environment. This type of architecture encompasses principles like monotheism, justice, privacy, modesty, and social unity, while also incorporating geometric patterns commonly found in temples, mosques, and palaces. Additionally, it involves the usage of elements such as tiling, wall paintings, and brickwork. Applying these models and comprehending these principles and values enable us to execute projects that align with the religious tenets of Islam and express Islamic heritage and ecological consciousness. Through analyzing the findings of this current research in relation to previous studies, it can be deduced that there is a scarcity of available sources regarding Islamic architecture, and furthermore, the shared characteristics of Islamic architecture, architectural identity, and perception have seldom been explored or examined. Consequently, there exists a pronounced deficiency of resources in these particular domains. According to this study, various research projects, including the investigation carried out by Dib et al. (2022), have thoroughly explored the structure, elements, life cycle, and workflow, as well as the solutions facilitating decentralized identity, based on the ten principles of identity. These matters are thoroughly examined, assessed, and compared. In conclusion, the obstacles impeding the transition to a completely decentralized identity model are addressed. Conversely, in a study conducted by Zhang et al. (2018), an image of a street view is utilized to anticipate human perception. Their model demonstrated remarkable precision in forecasting six perceptual factors of individuals, namely safety, vibrancy, attractiveness, prosperity, despondency, and monotony. This model can aid in charting the dispersion of human perception within a city's boundaries, facilitating the development of architectural design principles for newly developed urban areas.

7. Suggestion

It should be emphasized that there are numerous engaging and critical matters within the domains of perception and identity in Islamic architecture that have been overlooked and understudied. Several of these intriguing subjects, which are unfamiliar and distant from the original contexts of constructed cities, are listed below:

• Many studies in the field of Islamic architecture still face challenges and lack coherence when it comes to incorporating climatic considerations and native materials, thereby necessitating a study on the adaptation of standard architectural design principles in this context.

• The study focuses on examining the significance of geometric patterns and Islamic ornaments in how people perceive visuals, as well as exploring how they contribute to the concept of spatial awareness in Islamic architecture. This research is crucial for fostering a sense of connection and attachment to a particular location.

• Exploring the impact of lighting in mosques and Islamic structures on the mental well-being of individuals attending, this field offers intriguing psychological aspects for study.

• Delving into the research and examination of traditional houses found in Islamic cities and analyzing the utilization of both private and public areas within these houses, enhances architectural design to produce homes with a comprehensive design in contemporary times.

• The authors are encouraged to carry out interdisciplinary and comparative research to explore the difficulties faced by modern and postmodern architecture in urban areas, and to propose effective solutions to overcome these challenges in architecture and urban planning.

• A thorough examination of natural elements in how people perceive spiritual significance in specific locations, leading to enhancing the quality of human-body communication. This interdisciplinary approach is an ideal method to evaluate this particular domain.

8. Conclusion

In previous studies, it is important to highlight that the concept and elements of Islamic architecture's identity were examined independently from the components of human perception. However, the correlation between these two domains has not received adequate attention from researchers. By analyzing the spaces within Islamic architecture, it becomes feasible to explore the connection between individuals and their surroundings, as well as the impact it has on urban identity. Additionally, this can foster an enhanced relationship between Islamic architecture and environmental perception. Hence, Islamic architecture has developed in response to environmental perceptions, requirements, and symbolic significance. This leads to a design that suits the climate and provides a distinct symbolical and space-focused design within the cultural and geographical setting. In conclusion, it is important for the government and citizens to safeguard the significant symbolic and spiritual value of the elements and components of Islamic architecture. The examination of the sources and interviews conducted indicated that there is ample opportunity for the resurgence and reintroduction of these aspects considering current architectural trends. Components of Islamic architecture, including mosque architecture and traditional houses, can serve not only functional purposes but also as integral elements representing the identity of an Islamic city. Moreover, they can act as climate regulators embodying wisdom and connecting the past with the present. Conversely, it can be inferred that environmental perception shares a strong correlation with architectural identity and Islamic architecture.

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Designing Bags and Shoes for Young Women Using Modern Tapestry

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Research Article

Abstract

Clothing is a material sign of a cultural communication system; And weaving is one of the basic experiences of mankind, and among the interesting weaves is the tapestry weave, which is woven from the weave of tangled threads, the compressed chords in the form of a strong patterned and symmetrical surface, it has a design; A visual texture that is a subset of fiber art; And fashion, a phenomenon that exists more or less among the social strata and can be used in the design of modern bags and shoes for young women who follow the clothing of the Vionic brand. The purpose of this article is to apply the tapestry texture and appropriate materials in bags and shoes and boom in the clothing market, innovation in the design of women's bags and shoes and change the evolution in the visibility of an art; It is obvious that today bags and shoes are an important and inseparable part of the look and style, so we will give double glory with how to create the charm and appeal of women's bags and shoes, which is a combination of modern art and tapestry escape. Due to the fact that tapestry has a fancy and formal style, it is suggested that bags and shoes become more practical and can be used in all places. It is also possible to create a new world in the clothing market by using the art of tapestry in bags and shoes. The current research method is descriptive and its purpose is applied. To collect information related to the literature of the subject and the background of the research, a library method was used, and a qualitative research method was used to collect information to confirm or reject the research hypotheses. Rami tapestry can be displayed from models and textures, thread and various basic tools, scissors heads and cloth and simple and sometimes very beautiful and practical tools.

Keywords: Young Women; Tapestry Weaving; Bag and Shoe Design; Modern Art

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1. Introduction

Fabric is one of the basic experiences of human beings, which has been used to deal with cold, heat, and natural threats in the form of clothing, blankets, underlays, and house coverings, or protection of equipment (Rasoulzadeh, 2012). On the other hand, shoe design and production must go through many steps such as texture design and fabric creation with the art of tapestry, which is generally a word in the fashion world, a fabric that has a simple texture, carpet texture, knots or a combination of both. In a sense, one of the necessities of life in today's world is the need for bags and shoes, and the shoe industry is one of the living and dynamic industries of our country. It is a strong and commendable industry or background with forward-looking conditions and progressing (Hashemi, 2019). The first tapestry weaves belong to the Copts of Egypt. In the 7th century, they wove wonderful images of animals, people and plants in the form of beautiful curtains, taking into account order and symmetry. At the same time, in France, these textures included images from the book of Saint John with a limited color combination, and also in North and South America it can be woven by the Indians of this land, tapestries in the form of blankets, curtains, and rugs, etc., which have specific designs and colors of the culture and civilization of the people there. The discovery of the Pazyrik carpet, which is the oldest and the first hand-woven carpet on earth, is a proof of this claim. The needlework tapestry woven in the city of Bios dates back to the 11th century. This work depicts the course of the war between France and England. Its size is 70 x 50 cm and it is in the form of tapestry or modern texture. From the 11th century in France, England, Germany, Belgium, the beginning of developments in tapestry art, including the works of William Morris in England. He is one of the famous modernist artists of the world from the Arnovu school. The Bauhaus school played an important role in the evolution of tapestry. In the second half of the 20th century or the 60s, the Lausanne biennial caused important and new events in this art. A statement is made that a tapestry may not be a woven rug. They can benefit from the arts of needlework, Mukrame, two-thread weaving, multi-thread weaving, cord weaving, mat weaving, etc., and also use different materials, tools, and fibers (Rasoulzadeh, 2012: 27).

In the training sector of the shoe industry of our country, there has always been a problem of lack of resources. Sometimes noblemen, having a large and heavy bag of knowledge and experience of several decades, and having endured a lot of effort and effort and sometimes spending several years of time, have attempted to prepare documented sources in the industry (Sadatnouri, 2015). Fashion in Iran has been of interest from a historical point of view and has become an inseparable part of everyone's daily life, which due to the rapid progress in fashion and attention to the personalization of style and the importance of this issue, we decided to take a step in this direction. One of the common terms in the field of fashion and clothing that can be mentioned is tapestry. The word tapestry has no synonym or equivalent in Persian language, tapestry is an English word and in French it is called (tapestry). This art is related to the structure of weaving and is woven in the form of weft-warp, which can be used in clothing such as bags and shoes. As you know, the word bug is used for any type of device that is used. Although almost all types of bags fit into this category, the word has a meaning beyond bags. It is exciting that every year several thousand new design graduates start their careers in shoe design. Some may start their own brand, while others join companies to start their careers as designers. The current shoe designer community has many creative thinkers who take design concepts even further. For example, Marloz Ten Bohr Shank reinvented shoe metal and is constantly developing innovative ideas in shoe making. In general, the story of the weave is a representation of a simple weave in which motifs are created through color. In most weaving techniques, a weft is passed horizontally and consecutively between rows of vertical threads (warp) and is woven row by row. One of the characteristics of this artistic texture is

symmetry. This symmetry is created by color, design, material and texture technique. In this art, different tools and materials and (pure) form are used to present this art better and more beautifully. Tapestry is an independent work in the form of reliefs, hangings, wall hangings, etc. This art is progressing and being performed in most countries of the world. For example, in the tapestry workshop of West Dean University in England, they weave paintings and designs of great artists. These handicrafts are special and beautiful. Several professional artists weave them together. This art, equal to other arts, can be displayed in the open space as performance art or arrangement or executive art. It is worth noting that tapestry is a subcategory of fiber art, which includes soft sculptures, two looms, etc. (Rasoulzadeh, 2012: 29).

Tapestry is actually the art of storytelling with colorful yarns and thread fabrics. An art that has been unknown for thousands of years, and its beauty and effect have been displayed in the modern world. Due to the smallness of today's houses and the spread of minimal style in apartments, many people use tapestry fabric instead of wall hangings in home decoration accessories. For example, tapestry fabric with cotton fibers can be used as a tablecloth or bedspread. Also, these fabrics are beautiful and impressive in details such as cushion fabric and will transform the simple environment of your home into a special space (Nyazmand, 2011).

Tapestry art is similar to carpet weaving. More than anything else, tying the texture threads to each other revives the image of the carpet texture in everyone's mind; But tapestry is actually a fabric with a special texture. A hand-woven fabric that can be used for different applications. In tapestry art, the desired design can be tied together with the help of thread and needle. The final tapestry fabric is a product of applying a set of multi-art techniques. Textile, carpet weaving, Jajim weaving, Macroume, cloth weaving and even arts such as mirror work that can have a place in the fabric texture are some of the arts that you will experience with the tapestry texture. Also, many tips such as knowing the tools, thin embroidery and clean embroidery in the tapestry weaving stage will help you increase your speed. Sewing training for tapestry weaving, you must first have a previous design. A mental plan that you should draw with the help of pen and paper and carry with you as a clear, accurate and practical model. The next step is tying and tying the threads to create the desired design. Finally, you will have a fabric with desired thickness for decorative or practical use (Amiryan, 2018).

During the 1940s, which were the years of restrictions and shortages of knitted products during the Second World War, American women were encouraged to recover cotton bags. In fact, the possibility and appearance of bags with designs printed on them were approved by the National Cotton Board and the Knitted Bag Factory Association and had a national image (Ghayebi, 2014).

The birth of the handbag dates back to the 16th century. Since then, the shape and image of handbags has seen many changes. An exhibition in Germany has displayed bags from the 16th to the 21st century. The French company "Hermès", one of the famous manufacturers of luxury goods, undoubtedly owes the fame of its handbags to Grace Kelly. The Hollywood actress, who later became the wife of the King of Monaco, was so fond of this bag model that in 1956, Hermes named this model "Kelly".

Until the French Revolution, men carried handbags like women, after that men's fashion turned to simplicity and the bag became a woman's only tool. Johannes Piech believes that in the future, men will turn to carrying a bag instead of sports bags or laptop bags, and the bag will become a part of men's fashion.

Social and industrial developments have influenced fashion. For example, in the 17th century after the establishment of the post office, flat handbags with multiple pockets were produced, which were made of leather or silk. These bags were often decorated with patterns.

According to Thomas, the design of a formal bag - the design of a signature bag - the design of bags with stones and beads - the design of a metallic bag - the execution of tooled and embossed designs - the specialized vocabulary of bag design - the execution of fabric bags - the execution of other textures (Tanabian, 2011).

Man has been directly and indirectly and consciously or unconsciously connected with visual elements since long ago. In fact, the next elements were a means so that a person can use it together with words as one of the ways to communicate (Aghakhani, 2007, Hashemi, 2019).

The most common shape of a point is a circle, and often when the word "point" comes to our ears, its roundness is imagined in the mind; But it is not always like this. A point is one of the visual elements that may be a square, triangle, rectangle, etc. relative to its position in the image, and this issue completely depends on the frame (Nami, 2010: 20).

Similarly, the accumulation of points can also be used to show the form. If the number of points is very large, they are combined with each other and can create the idea of the color of different substances and colors in the mind. This is the basis of the technique of reproduction of light shadow, black and white and color images (Dundeby, 2010).

The most common use of point can be seen in the design of good brogue shoes. A style of men's shoes that is traditionally characterized by the use of dots in different sizes on the border of cuts and sometimes decoration in the form of patterns in the shoe effect (Hashemi, 2019). One of the famous designers who uses visual elements well in his work is "Manolobla Nik".

2. Artistic and Practical Work Process

After studying the theory parts and getting information about the world of tapestry art and thread weaving, we tried to design a set of bags and shoes for young women inspired by different subjects and create a new market and entrepreneurship; First of all, a storyboard was prepared from the textures and applications of tapestry and samples of textures were prepared by designing and taking into account the coloring, efficiency, elements such as the roots of the work, prominent texture, landscape designs and it was shown in the format of the storyboard; After creating a set of 36 linear etudes of the bag design and selecting 5 approved designs, the pattern and stages of weaving, the use of different materials, and the matching shoes have also been produced.

Storyboard is the first illustrated example of the project, which is used when designing clothes, bags, shoes, making movies, making animations, etc. Storyboard helps to depict a story or basic plot in successive frames. In general, the storyboard is the image of a story and is used to do artistic work, especially advertising and clothing design, to generate ideas and create a general plan in the mind; For fashion and clothing design, a designer may not have any ideas at the first stage, and at such a stage, storyboards come to help the clothing designer as a source of inspiration; At first, before starting the design of bags and shoes, a storyboard was prepared, which is a collection of visual information from the tapestry, and it was partially introduced.

Fig 1 Storyboard and woven tapestry samples

The initial etudes are prepared based on the initial information from the samples of tapestry textures and its application in line with the project topic and with the idea of the storyboard.

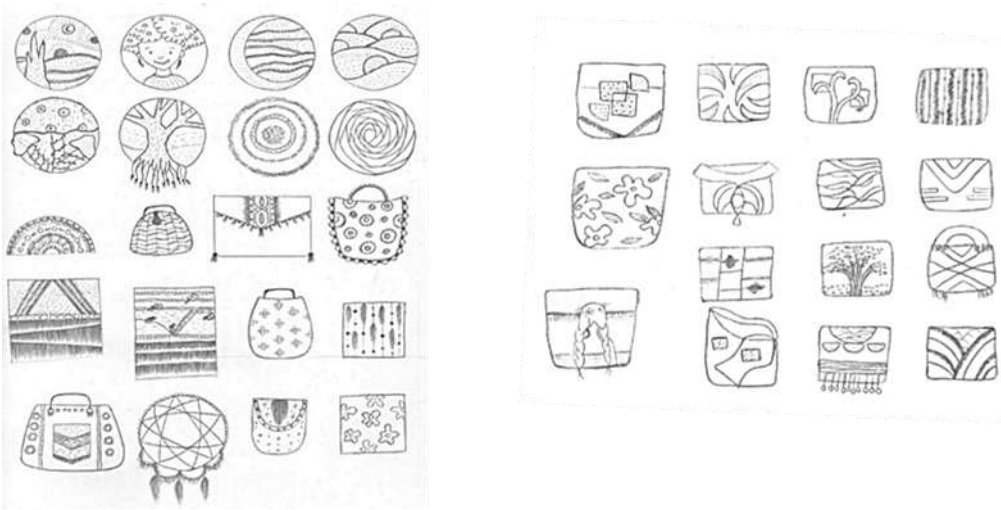

Fig 2 The initial etudes

2.1. Starry Night Design Bag and Shoes

The design of this work is inspired by the painting Starry Night by Dutch painter Vincent Van Gogh. After the preparation and drawing of the frame, the bottom of the bag is woven with thread and thread of satin leaves, and the details of the work are added in the form of hand embroidery.

The strap is woven with a Macroume method, and for more beauty, the leaf thread is woven with a leather thread. The back of the work is woven in the form of taffeta, and for the shoes, a design matching the design of the bag is woven but not identical. Work steps: drawing the form with two-mil cotton thread ready for weaving (this step is done for all four bags) and preparing the metal form, which is wrapped around a thread for greater strength. The texture of the background of the bag with thread and leaves. The design of this work is inspired by the painting Starry Night by Vincent Van Gogh, a Dutch painter.

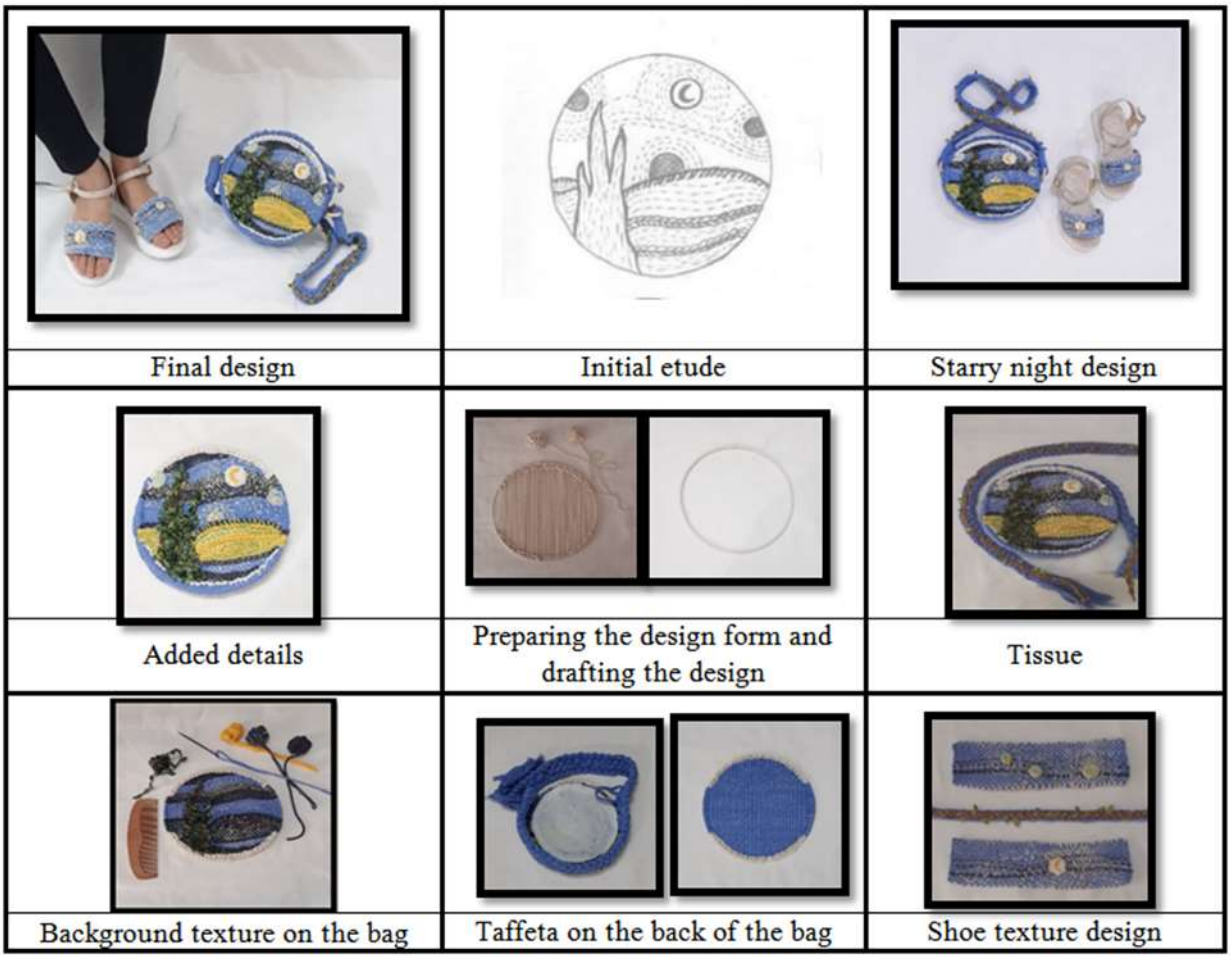

Fig 3 The working steps of star bags and shoes

2.2. The Design of the Moon and the Sun

The coloring of this work is done in orange and yellow tones. For the texture, cotton thread was wrapped around two circles with diameters of 15 and 20 cm for strength. Then, the weaving is done and first the weaving is done in the small circle part, which is a combination of different tapestry textures. The crescent part of the big circle is completed with taffeta. The back part of the work is a combination of flat and raised textures in an irregular manner. The work strap is woven using Macroume weaving method, for a pair of shoes a narrow strap is used that is woven in Macroume fashion, two parts of the upper of the shoe are drawn on the frame and woven according to the approved design of the bag.

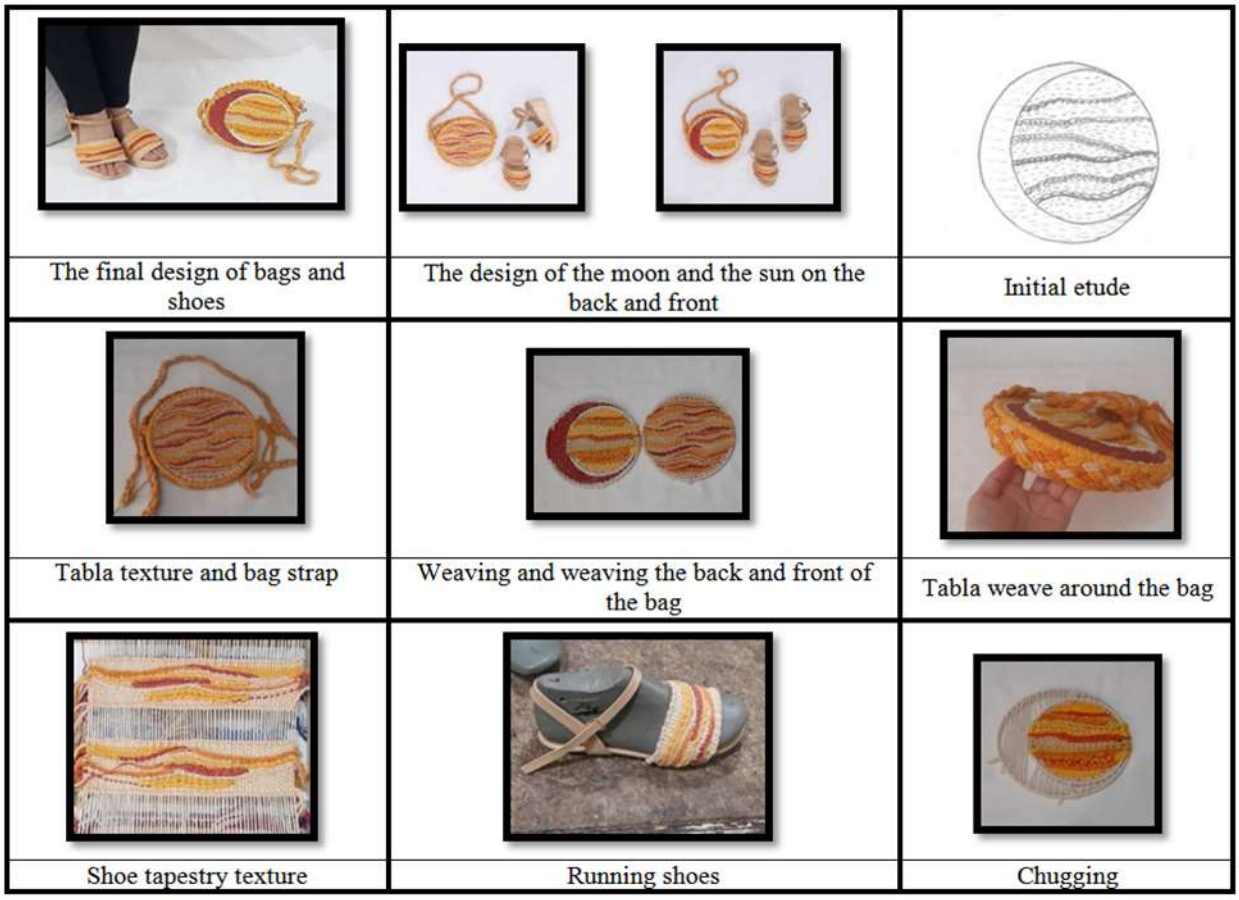

Fig 4 The stages of carrying out the work of bags and shoes tapestry design of the moon and the sun

3. Conclusion

Handicrafts express the authenticity, culture, taste and taste of a nation and have a great correlation with the history of traditions and geographical environment and consumption needs of the people. The tapestry with its high diversity has been used in many ways and many creativities and innovations. Considering the fact that bags and shoes are an important and inseparable part of people's clothing, as well as people turning to personalize their desired style, new and unique designs can open a new market and door to the world of bags and shoes and transform it. Considering the wide variety of types of tapestry, there is no limit to the use of material in tapestry. Due to the fact that the tapestry has a fancy and formal look, in order to make the product more practical and can be used in all places, it is possible to use strong sofa fabric and to prevent wear, strong sofa fabric can be used on the back of the bag and the bottom of the bag. The tapestry fabric can be placed on the bag with a button or... and remove that part at the time of work. The whole bag and multi-functional shoes and detachable parts can be used at work and in the assembly. Use of fabric with more weft-warp involvement to strengthen the work and also to produce our products in three lines: community, office, and assembly. Designing bags and shoes is an opportunity to innovate and break conventional boundaries and achieve new expressions. At the end of the collection, we can conclude that bags and shoes and the colors used in them have a great impact on people's style. In this research, an attempt was made to achieve a new and beautiful design in

women's style by combining tapestry textures and changing bag design. On this basis, by examining the types of tapestry and its application in bags and shoes, in addition to meeting the needs of young women who are looking for modernity and unique and tech clothing, it is possible to reach a profitable target market, as well as generate income and help the economic cycle of families.

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Investigating the Place of Textile and Clothing Art in the Metaverse

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Research Article

Abstract

In this article, the place of textile and clothing art in the world of virtual reality or the metaverse has been investigated. The place of fabric and clothing art in the metaverse is a fascinating and ever-evolving concept. As technology continues to advance, the boundaries between physical and virtual spaces are becoming increasingly blurred. Art, particularly in the form of textile and clothing design, is not exempt from this transformation. In the metaverse, artists have the opportunity to create immersive and interactive experiences that transcend traditional limitations. Through virtual reality and augmented reality, textiles can come to life, allowing individuals to engage with art in new and exciting ways. The metaverse provides a platform for artists to push boundaries, experiment with materials and techniques, and create truly unique and innovative pieces that challenge our notions of what art can be. In this digital realm, the possibilities for fabric and clothing art are endless, offering a new frontier for artistic expression.

Keywords: Fabric; Textile; Art; Metaverse

1. Introduction

The concept of the metaverse has gained significant traction in recent years, particularly in the realm of art. The metaverse refers to a virtual space where people can interact with each other and computer-generated environments. This immersive experience has opened up new opportunities for artists to showcase their work in unique and innovative ways. In the metaverse, art takes on a whole

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new dimension, allowing viewers to not only admire the artwork but also actively engage with it. Whether it's exploring virtual galleries, attending virtual art events, or even creating their own digital masterpieces, the metaverse has revolutionized the art world by providing a platform that transcends physical limitations and fosters creativity on a whole new level. As the metaverse continues to evolve, we can expect to see even more groundbreaking art experiences that push the boundaries of imagination and redefine what is possible in the realm of artistic expression (Amaizu et al, 2024; Chen, 2023). ~~[1, 2].~~

The metaverse is a virtual reality space where individuals can interact with each other and the environment in a digital realm. It is a place where people can escape from the real world and immerse themselves in a new and exciting experience. As the metaverse continues to grow and evolve, the role of art within it becomes increasingly important. Art has the ability to transform the metaverse into a vibrant and dynamic space, adding depth and meaning to the virtual fabric that makes up this digital landscape (Hajian et al., 2024; Batat, 2024). ~~[3, 4].~~

Art in the metaverse serves multiple purposes. Firstly, it enhances the aesthetic appeal of the virtual environment. Just as in the physical world, art in the metaverse can take many forms such as paintings, sculptures, or even interactive installations. These artistic elements can be strategically placed throughout the metaverse to create visually stunning landscapes that captivate and engage users. Art also has the power to evoke emotions, allowing individuals to connect with the virtual world on a deeper level.

Furthermore, art in the metaverse can act as a means of self-expression for both artists and users. The metaverse provides a platform for artists to showcase their work to a global audience, transcending geographical boundaries. Artists can create unique pieces that reflect their imagination and creativity, pushing the boundaries of what is possible in the physical world. Users, on the other hand, can use art as a form of personal expression by customizing their avatars or creating their own virtual artworks. This allows individuals to truly make the metaverse their own and express their unique identities within this digital space.

In addition to its aesthetic and expressive qualities, art in the metaverse also has commercial value. Just as in the physical world, art in the metaverse can be bought and sold, creating new opportunities for artists to monetize their creations. Virtual galleries and marketplaces have emerged within the metaverse, providing a platform for artists to showcase and sell their artwork to a global audience. This not only benefits artists financially but also contribute to the overall economy of the metaverse.

Moreover, art in the metaverse has the potential to foster social connections and community engagement. Virtual art exhibitions and events can bring people together from different parts of the world, fostering a sense of community and shared experiences. Through art, individuals can engage in meaningful conversations, exchange ideas, and collaborate on creative projects within the metaverse. This sense of community is crucial in building a thriving and inclusive virtual world that celebrates diversity and encourages collaboration (Sylaiou et al., 2024; Letafati and Otoum, 2023; Mu et al., 2024; Joy et al., 2022). ~~[5-8].~~

In conclusion, art plays a vital role in shaping and enhancing the metaverse. It adds visual appeal, allows for self-expression, creates economic opportunities, and fosters social connections within this digital realm. As the metaverse continues to evolve, it is essential that we recognize and embrace the significant role that art plays in enriching our virtual experiences. By incorporating art into the fabric of the metaverse, we can create a vibrant and dynamic space that engages and inspires users from all walks of life. Art plays a vital role in shaping and enhancing the metaverse. It adds visual appeal, allows for self-expression, creates economic opportunities, and fosters social

connections within this digital realm. As the metaverse continues to evolve, it is essential that we recognize and embrace the significant role that art plays in enriching our virtual experiences. By incorporating art into the fabric of the metaverse, we can create a vibrant and dynamic space that engages and inspires users from all walks of life.

2. Results and Discussion

2.1 Place of Fabric Art in Metaverse

Fabric art is a unique form of artistic expression that combines the use of textiles and various techniques to create visually stunning pieces. From quilting to embroidery, fabric art allows artists to explore different textures, colors, and patterns to convey their creativity. The metaverse, on the other hand, refers to a virtual reality space where users can interact with each other and the environment through digital avatars. It is a growing concept that has gained popularity in recent years. When these two worlds collide, fabric art in the metaverse opens up new possibilities for artists to showcase their work and engage with a global audience.

In the metaverse, fabric art takes on a whole new dimension. Artists can create virtual galleries or exhibits where visitors can explore and appreciate their work. The digital environment allows for a more immersive experience, where viewers can zoom in, rotate, or interact with the fabric art in ways that would not be possible in the physical world. This opens up endless opportunities for artists to experiment with innovative techniques and push the boundaries of traditional fabric art.

Furthermore, fabric art in the metaverse also offers a unique platform for artists to collaborate and share ideas. Through virtual communities and forums, artists from different parts of the world can come together to exchange knowledge, techniques, and inspiration. This global network of fabric artists allows for cross-cultural collaborations and the exploration of diverse perspectives. It also creates a supportive community where artists can receive feedback and encouragement from their peers.

Another advantage of fabric art in the metaverse is its accessibility. Unlike physical exhibits that are limited by location and opening hours, virtual galleries can be accessed by anyone with an internet connection at any time. This means that artists can reach a much wider audience and have their work seen by people from all walks of life. It also provides opportunities for emerging artists to showcase their talent and gain recognition without the need for a physical exhibition space.

However, there are also challenges that come with fabric art in the metaverse. One of the main concerns is the loss of tactile experience. Fabric art is often appreciated for its texture and three-dimensional qualities, which cannot be fully replicated in a digital environment. Artists will need to find creative ways to translate these aspects into the virtual space, perhaps through the use of realistic textures or interactive elements.

Additionally, there are also questions about ownership and copyright in the metaverse. As fabric art becomes increasingly digital, there is a need to protect the rights of artists and ensure that their work is not exploited or copied without permission. Platforms and communities in the metaverse will need to have clear guidelines and regulations in place to address these issues and safeguard the interests of artists.

Textile and clothing art have long been considered important forms of artistic expression. From the intricate patterns and designs woven into fabrics to the innovative techniques used in garment construction, these art forms have played a significant role in shaping cultures and societies throughout history. As technology continues to advance, the metaverse has emerged as a new frontier for artistic exploration. This virtual reality space offers endless possibilities for artists to

create and showcase their work, and textile and clothing art are no exception. In this article, we will investigate the place of textile and clothing art in the metaverse and explore the unique opportunities and challenges that arise from this digital realm.

One of the key aspects of textile and clothing art is the use of fabric as a medium. Fabrics have a tactile quality that adds depth and texture to art pieces, making them more engaging and interactive for viewers. In the metaverse, artists can digitally recreate these textures, allowing users to virtually touch and feel the fabric. This opens up new possibilities for artistic expression, as artists can experiment with different types of fabrics and textures that may not be feasible in the physical world. Additionally, the metaverse offers a global platform for artists to share their work with a wider audience, transcending geographical boundaries and reaching individuals from diverse backgrounds.

Art has always been a powerful tool for self-expression and storytelling. Through textile and clothing art, artists have the ability to convey their thoughts, emotions, and narratives through visual elements such as color, pattern, and form. In the metaverse, artists can take this storytelling to new heights by integrating interactive elements into their work. For example, users can interact with garments or textile installations by manipulating them or changing their appearance. This creates an immersive experience where viewers become active participants in the artwork. By leveraging the capabilities of the metaverse, textile and clothing artists can create dynamic and engaging narratives that captivate audiences in ways that were previously unimaginable.

However, the integration of textile and clothing art into the metaverse also presents unique challenges. One such challenge is the preservation of the artistic integrity of fabric-based artworks in a digital environment. While digital simulations can replicate the appearance of fabric, they may not fully capture its tactile qualities or the nuances of its texture and drape. Additionally, there is a risk of digital artworks being easily replicated or manipulated without the artist's consent, which raises concerns about intellectual property rights. Moreover, accessibility issues may arise for individuals who do not have access to the necessary technology or skills to fully engage with textile and clothing art in the metaverse.

Textile and clothing art have a significant place in the metaverse. The digital realm offers new opportunities for artists to explore innovative techniques, engage with audiences on a global scale, and create immersive experiences that blur the boundaries between art and viewer. While there are challenges to overcome in terms of preserving artistic integrity and ensuring accessibility, the integration of textile and clothing art into the metaverse has immense potential for pushing artistic boundaries and transforming how we perceive and engage with these art forms. As technology continues to evolve, it will be fascinating to witness how textile and clothing artists embrace the possibilities of the metaverse to create truly transformative works of art.

In conclusion, fabric art in the metaverse offers exciting possibilities for artists to expand their creative horizons and connect with a global audience. It allows for new forms of expression and collaboration, while also presenting challenges that need to be addressed. As technology continues to advance, fabric art in the metaverse will undoubtedly evolve, creating even more opportunities for artists to showcase their talent and engage with audiences in innovative ways.

2.2. Place of Clothing Art in Metaverse

The art of clothing in the metaverse is a fascinating aspect of virtual reality that allows individuals to express their creativity and personal style in a virtual world. In the metaverse, users have the ability to design and customize their own digital garments, pushing the boundaries of

traditional fashion. This fusion of art and technology has revolutionized the way we perceive and interact with clothing, opening up endless possibilities for self-expression and experimentation.

In the metaverse, clothing is not simply a means of covering the body but rather a form of artistic expression. Users can create unique and intricate designs using digital tools, allowing them to bring their imagination to life in the virtual realm. From futuristic sci-fi inspired outfits to fantastical costumes, the metaverse provides a platform for individuals to showcase their creativity and showcase their personal style in ways that were previously unimaginable.

Moreover, the metaverse offers a sense of freedom when it comes to fashion. In the physical world, individuals are often bound by societal norms and expectations when it comes to dressing. However, in the metaverse, users have the autonomy to experiment with different styles and aesthetics without fear of judgment or criticism. This freedom allows for a truly inclusive and diverse fashion culture, where individuals from all walks of life can express themselves authentically. Clothing in the metaverse is not limited to static designs; it can also incorporate dynamic elements that respond to user input or environmental factors. For instance, digital garments can change color, texture, or shape based on the user's movements or interactions with other objects in the virtual world. This adds an extra layer of interactivity and immersion, blurring the line between fashion and technology (Yazdani and Zohoori, 2022). ~~[9]~~.

Furthermore, the art of clothing in the metaverse extends beyond individual expression. It also offers opportunities for collaboration and community-building. Users can share their designs with others, participate in virtual fashion shows or events, and even sell their creations in virtual marketplaces. This sense of community fosters a supportive and collaborative environment where artists and designers can learn from each other, inspire one another, and collectively push the boundaries of fashion in the metaverse (Charaki and Zohoori, 2023). ~~[10]~~.

In conclusion, the art of clothing in the metaverse is a dynamic and evolving field that merges art, technology, and self-expression. It allows individuals to break free from societal norms and explore their creativity in a virtual realm. Through innovative design tools and interactive features, clothing in the metaverse goes beyond mere aesthetics and becomes a form of personal expression that transcends traditional boundaries. As virtual reality continues to advance, we can expect clothing in the metaverse to become even more immersive, innovative, and influential in shaping the future of fashion.

2.3. The Future of Textile and Clothing Art in the Metaverse

The future of Textile and Clothing Art in the Metaverse holds immense potential for innovation and creativity. As technology continues to advance, the boundaries between the physical and digital worlds are becoming increasingly blurred. This has opened up new avenues for artists and designers to explore and push the boundaries of their craft. In the Metaverse, artists can create virtual garments and textiles that are not limited by the constraints of the physical world. They can experiment with new materials, textures, and patterns that would be impossible to achieve in traditional textile art. By leveraging the power of digital tools and platforms, artists can bring their visions to life in ways that were previously unimaginable.

Artists working in the Metaverse have the opportunity to redefine the concept of clothing and textiles. In this digital realm, garments can be transformed into interactive pieces of art that respond to the wearer's movements or even their emotions. Through the use of sensors and augmented reality, clothing can become a medium for self-expression, storytelling, and communication. Imagine wearing a dress that changes color based on your mood or a shirt that displays animated patterns as you move. The possibilities are endless.

The Metaverse also offers new avenues for collaboration and community-building within the textile and clothing art world. Artists from different parts of the world can come together in virtual spaces to share ideas, collaborate on projects, and showcase their work to a global audience. This sense of interconnectedness and accessibility can foster a vibrant and diverse artistic community, where artists can learn from each other, inspire one another, and push the boundaries of their craft collectively.

Moreover, the Metaverse has the potential to revolutionize the fashion industry as a whole. Traditional fashion production is often resource-intensive, wasteful, and unsustainable. However, in the digital realm, these limitations can be overcome. Virtual garments do not require physical materials or production processes, making them a more sustainable alternative. Additionally, virtual fashion allows for greater inclusivity and diversity as it is not limited by physical body types or sizes. This opens up opportunities for more inclusive representation in fashion and challenges traditional beauty standards.

However, there are challenges that need to be addressed for the future of Textile and Clothing Art in the Metaverse to reach its full potential. One such challenge is the issue of intellectual property rights and copyright infringement. As virtual garments become more valuable and sought after, there is a need to establish clear guidelines and regulations to protect artists' rights and prevent unauthorized use or reproduction of their work.

In conclusion, the future of Textile and Clothing Art in the Metaverse is filled with exciting possibilities. Artists and designers have an unprecedented opportunity to push the boundaries of their craft, redefine the concept of clothing and textiles, and revolutionize the fashion industry as a whole. Through collaboration, innovation, and a focus on sustainability, the Metaverse has the potential to transform how we perceive and engage with textile and clothing art. It is an exciting time for artists to explore this new frontier and create truly immersive and captivating experiences for audiences around the world.

3. Conclusion

In conclusion, the place of textile and clothing art in the metaverse is undeniably significant. The metaverse, being a virtual world where people can interact and engage with one another, provides a unique platform for artists to showcase their creativity in the realm of textiles and clothing. Through digital platforms and virtual reality experiences, artists can create stunning and immersive art pieces that combine traditional textile techniques with cutting-edge technology. Textile art has always been an important form of artistic expression, and its presence in the metaverse only amplifies its impact. Artists can experiment with different materials, textures, and patterns to create visually striking garments and installations. Additionally, the metaverse allows for a more interactive experience for viewers, who can explore these artworks from different angles and even manipulate certain elements. The metaverse also provides opportunities for collaboration and innovation in textile and clothing art. Artists can connect with one another from different parts of the world, exchanging ideas and techniques to push the boundaries of their craft. Furthermore, advancements in virtual reality technology enable artists to create immersive fashion shows or exhibitions that transcend physical limitations.

Overall, the place of textile and clothing art in the metaverse is one that embraces innovation, creativity, and collaboration. As technology continues to evolve, so too will the possibilities for artists to create compelling and dynamic textile and clothing art in this virtual realm. The metaverse offers a new frontier for artistic expression, where artists can explore new mediums, connect with global audiences, and redefine the boundaries of what is possible in the world of art.

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