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A Comparative Study of School Architecture in East Azerbaijan Province During the First Pahlavi Era

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ABSTRACT: The architecture of the first Pahlavi period is considered a turning point in the evolution of Iranian architecture and urban planning, which dates back to the Qajar period and the familiarity of the Shah and his courtiers with European architecture. These changes reached a more tangible level in the first Pahlavi period, marking the beginning of modern Iranian architecture. The present study examines the architecture of schools from this period, focusing on a comparison between schools in East Azerbaijan and other modern schools in Iran, to provide a model for the design of today's schools. This study aims to analyze qualitative findings including: physical, spatial, and functional organization used in schools of the first Pahlavi period, such as appropriate access, spatial connections, hierarchy, arrangement of spaces, combination of full and empty space, open and semi-open spaces, introversion and extroversion, geometry and pattern, ., to arrive at solutions for the development of school architecture. The methodology of this research is historical-interpretive and case study (study of 6 schools from the Qajar and Pahlavi periods in East Azerbaijan province). The research method employed is qualitative, involving interviews with experts. In this study, 10 people were interviewed. In accordance with the principles of grounded theory, data collection and analysis were conducted following the first interview. This study also conducted a comparative analysis of the architecture of East Azerbaijan schools between 1304 and 1320, examining six landmark works in this province. Using the comparative method and structural approach, the spatial organization of schools from the Pahlavi period was analyzed, categorized, and coded. The results showed that the highest salience in the functional component was associated with extroversion, with a value of 28, and the lowest was associated with introversion, with a value of 7. The results indicate a decrease in Iranian-Islamic identity in Pahlavi-period schools. These changes include the shift from traditional architecture to new styles, the transformation of interior to exterior space, the reduction of hierarchy and proportions, the decline of decorative elements, and the elimination of green spaces.

Keywords: *Architecture, Schools, Pahlavi, East Azerbaijan.*

INTRODUCTION

An examination of educational spaces in schools across the country reveals that these environments rarely provide students with opportunities for exploration and hands-on experiences. The teaching and learning process mostly takes place within confined, static, and uninspiring spaces known as classrooms (Valian, 2019). One of the current challenges in our schools is the absence of spatial characteristics that were once present in traditional school architecture. In other words, in the design of today's schools, such qualities have been replaced by other elements, yet their absence is still strongly felt (Saeedi Kia, 2018). According to previous studies on Iranian schools, some investigations have addressed their structural aspects. The proper design of educational spaces has a significant influence on learning outcomes, including the development of children's creative thinking. However, when evaluating schools, the impact of spatial quality on mental development and creative thinking through thoughtful architectural design has often been neglected or insufficiently considered (Valian, 2019). There is a need to seek appropriate solutions for designing high-quality and effective educational spaces. The primary objective of this research is to identify a suitable architectural and spatial

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organization model for schools by examining schools in East Azerbaijan Province and analyzing the climatic elements and features used in First Pahlavi-era schools in comparison with other studied schools.

Problem Statement

Education, and consequently educational environments, have always played a key role in the progress and prosperity of societies throughout every historical period. Schools, which are considered the most well-known educational spaces, have undergone fundamental changes over time, including in the field of architecture. For this reason, studying these developments in different periods is of particular importance (Alaghmand et al, 2017). In Islamic-era Iran, educational spaces primarily consisted of madrasas. Briefly defined, a madrasa was a center for higher education where traditional Islamic sciences, such as Hadith, Tafsir, Fiqh, and other related disciplines, were taught (Dorani, 1997, 71). The madrasa was a response to the specific needs of the Islamic society. It was designed to serve an institution of intellectual and spiritual refinement (Hillenbrand, 2011, 173). From the early 10th century AD (4for teaching religious and literary sciences, called madrasas, became common. Among Islamic nations, Iranians were pioneers in establishing such institutions (Safa, 1959, 265).

Educational spaces in Iran have included both maktab-khanehs (traditional elementary schools) and formal schools. Maktab-khanehs generally did not have a fixed or dedicated location. Schools, however, featured green courtyards surrounded by hojrehs (student chambers) and iwans (vaulted halls). Seminars were often held in the iwans of the school or in small porches in front of the chambers, which also served as spaces for discussion and intellectual exchange. In these schools, classes were conducted within the same environment, where instructors provided direct education (Pirnia, 2008, 91–93). The hojrehs on the first floor were designated for advanced students studying higher-level courses (Dars-e-Kharij), allowing them to learn in a quieter environment with less interaction with others. The small porches in front of these hojrehs gradually turned into corridors. Architecturally, a corridor would be placed in front of the chamber, and a storage space or back room would be located behind it. The hojreh played a major role in school architecture and can be considered the most important architectural unit specific to traditional schools (Soltanzadeh, 1985, 438).

With the expansion of education and the development of formal schools, additional spatial elements were introduced into the educational environment. These architectural and functional components included hojreh, modarres (teaching halls), libraries, mosques, servants' rooms, lamp rooms, water rooms, and sanitation facilities (Kiani, 2014, 136). In the design model of these schools, spatial-functional elements were arranged around a central courtyard (miansara), which was typically rectangular or nearly square in shape, with right-angled or sometimes chamfered corners. The school entrance was placed along one of the main axes, usually centered on one of the longer sides of the rectangle. The space directly opposite the entrance, at the end of the central axis, was reserved for special functions, such as a domed hall, a school mosque, a library, a teaching hall (modarres), or a large iwan serving as a mosque or lecture space.

In some schools, the design followed a four-iwan layout, with two additional iwans placed on the axis perpendicular to the entrance. In other schools, instead of such iwans, there were two large spaces with wider spans than the surrounding hojrehs. These spaces, sometimes equipped with iwans, were generally used as classrooms, libraries, or, in some cases, mosques (Kiani, 2014,]138).

Regardless of the educational level, traditional schools generally featured specific spatial and functional elements as well as core units that, with slight variations, can be observed across different historical periods. However, in each era, certain new elements were added based on the prevailing educational approach and system, or the quality and function of some existing units underwent modifications (Vasigh & Ghadardan Gharamaki, 2016).

Climatic factors have not always had a uniform impact on the formation of school spaces. For instance, the need to construct a greater number of hojrehs (student chambers) often led to the utilization of all four sides of the courtyard for their placement, rendering the orientation toward sunlight less significant. Hojrehs were considered a key architectural element in school design, while the iwan served as a suitable space for lectures and gatherings due to its capacity to accommodate large numbers of students. Small iwans (iwanchehs) were commonly used for student debates and were often transformed into corridors on the upper floor for easier access. Behind each hojreh, there was usually a small back room (pasto). The essential components of Islamic schools included the entrance, sanitation spaces, courtyard, iwan, hojrehs, modarres (teaching hall), library, and service areas for caretakers. During the Pahlavi era, the most influential factors in shaping schools included population growth, Reza Shah Pahlavi's strong inclination toward modernization and national advancement, the enactment of compulsory education laws, and a shift in curriculum content from religious subjects to secular courses. As the Western educational system became the foundation for instruction, the design and construction patterns of schools were also influenced by Western models. Consequently, although architects made efforts to preserve the outward appearance of Iranian architecture, such as the use of brick, arches, tilework, and other traditional elements, the spatial structure and layout of school plans underwent a complete transformation compared to authentic Iranian schools. Thus, the identity-defining characteristics of Iranian-

Islamic architecture, which had been used in traditional schools for years, were gradually marginalized due to major shifts in the educational system and the adoption of Western models for new school construction (Razavipour & Zakeri, 2017). The resulting school buildings were typically rectangular cubes with brick walls, long and monotonous corridors, classrooms with right-angled corners, tall windows with protective bars, and asphalt-paved courtyards where restrooms were often located in a corner (Kamelnia, 2015, 35).

In addition to structural and functional characteristics, the spatial form of architecture also possesses perceptual dimensions. Climatic and geographical conditions, building materials, construction techniques, and functional needs shape structural features. In contrast, understanding the perceptual and artistic aspects of architectural spaces requires attention to cultural attributes, traditions, and social values. The old schools of East Azerbaijan Province have played a significant role in Iran's educational history. Since the Safavid era, various schools have been built and, in some cases, demolished in this region, reflecting the importance of education and the intellectual culture of its people. The city of Tabriz, known as the "City of Firsts," is among the first cities in Iran where modern-style schools were established. These historical schools are considered cultural attractions of the city, with the spirit of education and training embedded in every brick of their structure. The formation of educational spaces has, from the outset, been shaped by factors such as curriculum content, political and social systems, and other contextual demands, evolving and transforming in every era. This research aims to investigate the architectural developments of the Pahlavi era along with the educational content of that time, and to conduct a comparative analysis between the schools of East Azerbaijan and modern school architecture in Iran. This comparison seeks to establish an appropriate architectural model for contemporary school design.

Objectives:

To achieve an appropriate architectural model for school design through the examination of architectural transformations and educational content, as well as the spatial relationships between schools in Tabriz and Ardabil, and to identify and compare the climatic elements and characteristics employed in schools of the Pahlavi era with those of other schools.

Research Question:

How can the study of school architecture in East Azerbaijan Province during the Pahlavi era contribute to developing an appropriate design model for contemporary educational buildings and modern schools?

Hypothesis:

By analyzing and comparing the architecture of schools in East Azerbaijan Province during the Pahlavi era, it is possible to develop a suitable design model for contemporary educational buildings and modern schools.

Significance of the Study

The importance and necessity of research on changes and developments in the schools of the first Pahlavi period in East Azerbaijan Province lies in the fact that, based on this, samples of schools from the Pahlavi period were selected using purposeful sampling. After a comparative analysis of these samples, the effect of changes and developments in the educational concept on their architecture and physical structure is examined and analyzed. The primary objective of this research is to develop a suitable model of school architecture by examining the schools in East Azerbaijan Province and identifying and adapting the elements used in schools from the Pahlavi period, in comparison with other schools. These physical, spatial and functional organization indicators that have been considered are: Physical organization includes: (Regulation of open spaces, circulation, communications, hierarchy, spatial confinement, outside-inside relationship, access, geometry and pattern, symmetry, balance, materials, proportions, decorations; Space includes: (Open space, closed space and semi-open space, central courtyard, organization of space, flexibility, diversity and legibility, spatial arrangement, spatial diversity, fluidity and dynamism, spatial expansion and transparency, spatial confinement, human scale; Functional includes: (Form and function, diversity in form and shape, introversion, extroversion, zoning of spaces, visual comfort, connection with nature, which will be analyzed and examined in the schools of the first Pahlavi period.

MATERIALS AND METHODS

Given the nature of this research, the study adopts an interpretive-historical approach, utilizing the case study method and relying primarily on library and documentary studies. Initially, the research outlines the structure of education in Islam, with particular focus on the development of educational forms during the First Pahlavi era, highlighting the prominent characteristics and theoretical differences among schools of that period. Subsequently, the study examines how teaching methods influenced the physical structure of schools, aiming to evaluate and align these influences specifically during the First Pahlavi era. To ensure the validity of this investigation, credible case examples must be identified that, despite the prevalence of a particular school structure among contemporaneous variants, demonstrate that educational changes led to structural modifications intended to facilitate the learning process. This research, as an interpretive-historical study, investigates architectural changes in schools during the First Pahlavi period. Analyses related to these schools are conducted through logical reasoning and data collection via library resources and field surveys. The primary objective is to gain a more precise understanding of architectural transformations in schools, focusing on the arrangement of elements and architectural features to determine an appropriate

educational environment. By examining the design patterns of physical components, including micro-spaces and comparable schools from the First Pahlavi era, this study aligns the parts and overall physical fabric of schools with respect to the impact of educational policies. Based on a comparative study, the physical samples under investigation have been analyzed to achieve the ultimate goal of reconciling the architecture of First Pahlavi schools with that of other schools of the same era, considering the influence of educational policies.

Literature Review

In any scientific research, reviewing previous studies on the subject is essential to becoming familiar with the perspectives and approaches of other researchers and how they have addressed related topics. This process clarifies the examined aspects by others, prevents repetition of their efforts, and serves as a foundation for addressing gaps and complementing the current research. Moreover, the present study itself may become a subject of future research. A review of historical research reveals that less attention has been paid to traditional Iranian architecture. Studies on school architecture and structural patterns have focused on its components, dividing the spatial organization of schools in Iran and discussing the principles of designing educational spaces based on the location and volumetric composition of school spaces relative to one another. The primary objective of this research is to elucidate the general patterns of these types of buildings and to conduct a comparative study of the architecture of schools in East Azerbaijan Province during the First Pahlavi era, with a focus on structural patterns and spatial organization. The primary objective is to analyze and gain an understanding of the schools of Tabriz during the First Pahlavi era and to examine and compare their historical elements, structural patterns, and utilized components. This section presents the literature review through an examination of specialized books, published articles in reputable domestic and international journals, and doctoral dissertations on the topics of schools, structural patterns, registered valuable schools in northwest Iran, educational spaces, and architectural psychology.

Vasigh Behzad and Ghadardan Gharamaki (2016), in their article "The Concept of Education and Its Influence on Islamic School Architecture: A Comparative Study of Seljuk and Safavid Schools," examined changes in the concept of education and teaching methods across these two periods. These changes led to transformations in the physical form and architecture of schools, including modifications to entrance design, school courtyards, and the number and quality of hojrehs (student chambers).

Alaghemand et al. (2017), in "A Comparative Study of the Architecture and Content of Iranian Schools from Traditional to Modern Periods," explored architectural developments and school patterns during the transitional and modern periods. Their study concluded that these changes were primarily influenced by rigid Western imitation, the absence of traditional spatial qualities in modern schools compared to traditional ones, and the elimination of residential spaces, without the content of these spaces affecting these changes.

Divandari et al., (2018), in "A Comparative Study of the Spatial Structural Evolution of Qajar and Pahlavi Schools with an Emphasis on Educational Values in Mashhad," found that the differing educational systems in these two schools caused corresponding transformations in their spatial structures. For instance, the Shariati School underwent significant spatial change compared to the Soleymanieh School due to the evolution of its traditional educational system.

Razavipour and Zakeri (2017), in "The Impact of Educational System Transformation on the Architectural Identity of Qajar and Pahlavi Schools (1876–1941)," classified schools built in these two eras based on social conditions and educational transformations. They extracted identity indicators from authentic Iranian schools and evaluated the level of identity retention by comparing them with those from the same periods. Their results indicated a decline in Iranian-Islamic architectural identity following educational reforms during the Pahlavi era.

Behbahani Eslami (2015), in "A Study on the Morphological Evolution of Iranian Mosque-Schools: The Safavid and Qajar Periods," examined how educational spaces initially formed and how spatial components were gradually added or removed over time.

Bemanian et al. (2011), in "A Comparative Study of Architectural Features of Mosque-Schools from the Qajar and Safavid Periods," showed that mosque-school architecture in the Qajar era was more complex and spatially diverse than that of the Safavid era. This complexity led to fewer hojrehs in Qajar schools, while features like clerestories, four-sided domed halls, and cross-shaped plans created a more open and lighter courtyard space.

Hayati et al. (2019), in "Typology of Traditional School Architecture with an Emphasis on Educational Policies: A Case Study of the Safavid Period," noted the expansion of school dimensions, the increase in quantity and quality of hojrehs and modarres, attention to the courtyard as a vital life element of the school, changes in entrance designs, relationships with the city and public domain, and the connection of schools with religious spaces.

Khodabakhshi et al. (2015), in "A Study on the Spatial Evolution of School Architecture Based on the Role of the Governing Educational System," aimed to understand the spatial evolution of Iranian schools, suggesting that with the transformation of the educational system during the Qajar period and the establishment of Dar al-Fonun, school architecture gradually shifted from traditional to modern schools.

Taher Sima et al. (2015), in "Explaining the Educational Role of Open Spaces in Iranian Schools: A Comparative Study from Traditional to Contemporary Schools," highlighted the impact

of architectural space quality on sensory, intellectual, and perceptual cognition. They argued that the traditional Iranian school model was shaped with active educational roles for open and semi-open spaces.

Naqd Bishi and Rahmati (2017), in "Architectural Psychology of Future Schools," reviewed current trends in the evolution of educational spaces and linked them to the future by exploring solutions derived from environmental psychology principles to envision the design of future educational environments. The book attempts a holistic view, introducing pioneering countries in educational space design and sharing their experiences with future schools.

Sami Azar (1997), in "The History of School Development in Iran," reviewed the history of schools in Iran across various periods, emphasizing the necessity of fundamental transformation in school construction following developments in the 18th century.

Soltanzadeh (1985), in "History of Schools in Iran from Ancient Times to the Establishment of Dar al-Fonun," examined the history of Iranian schools from antiquity until the founding of Dar al-Fonun, documenting the history and features of existing or recorded schools in historical texts.

Kiani (2004), in "Architecture of the First Pahlavi Period," also asserts that after the architectural peak of the Safavid era, the subsequent period saw a halt in growth and innovation. The onset of the Pahlavi period marked widespread changes across various fields, differing fundamentally from previous historical trajectories.

Ghafari (1998), in "Spatial Organization, Principles of Construction, and Analysis of Sample Schools," discusses organizational types suitable for educational functions, considering site characteristics, environmental and climatic features, cultural aspects, and other relevant factors. Understanding the various types of spatial organization, their positive potentials, negative features, limitations, and underlying principles is crucial.

The innovative aspect of the present study lies in its focus on East Azerbaijan Province, which was selected due to its historical significance along the Silk Road, proximity to Europe, and its geographic position as a conduit for the transfer of European science and civilization to Iran. Consequently, the establishment of the first educational institutions in this region—such as the first printing house, national newspaper, Korolalha School, public library in Tabriz, and the first medical and modern-style schools—highlights the importance of this research. This study conducts a comparative analysis of the architecture of schools in East Azerbaijan Province during the First Pahlavi era.

Review of Research Background

The review and examination of theoretical backgrounds focus on identifying the historical values of schools from the First Pahlavi period and analyzing and comparing architectural elements of these schools as fundamental concepts. This process aims to develop an initial theoretical framework that aligns with the study's strategic axes. In reviewing the theoretical literature and historical analyses of schools, the concept and history of schools during the First Pahlavi era are addressed. Among Pahlavi-era schools, prominent and well-known examples are selected, and the architectural elements in these schools are compared and presented. (Fig 1).

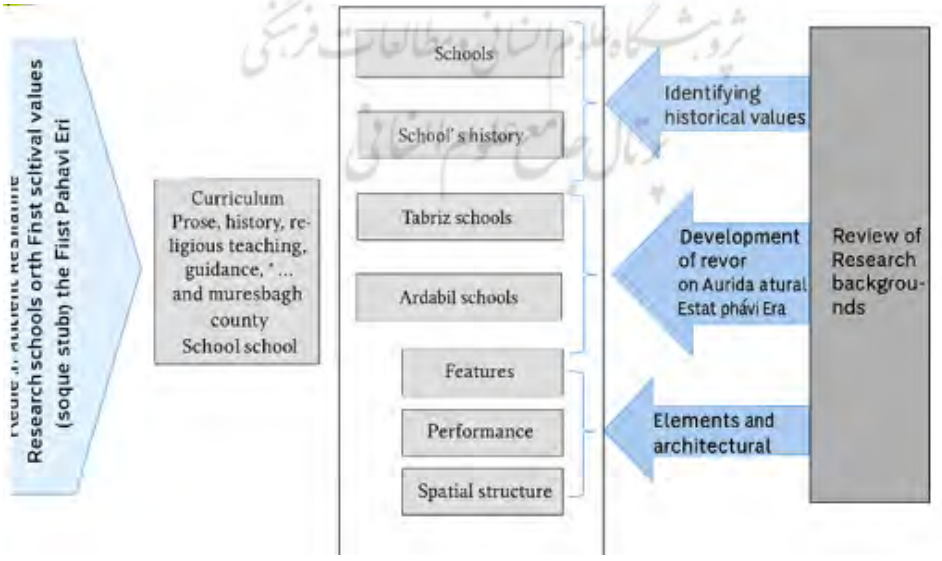


Fig. 1: Review of research backgrounds

Theoretical Foundations

School

The use of the word "school" in its technical sense contrasts with the word "maktab," which refers to a place for teaching reading, writing, and copying manuscripts. In contrast, "school" refers to a place of instruction, derived from the word "lesson." In Islamic culture, civilization, and education, the term "school" has also been applied to institutions such as beyt al-adwiya (hospitals), dar al-shifa (healing houses), observatories, and teaching centers like large mosques, all of which served as centers for teaching and learning (Mousavi, 1994). After the family environment, the school is considered a crucial place for education, as well as the upbringing of individuals in society, and for their overall health (Divandari et al., 2018). In a child's mind, the most prominent "place identity" belongs to the home; an identity that helps the child distinguish between places and enables understanding and effective interaction with different environments (Kashi & Bonyadi, 2013, 51). The school, as a "social institution," refers to a set of organized and stable social relationships formed to meet specific educational and cultural needs in the modern world (Fazeli, 2019, 10). As a "space or semantic field," the school is a place where learning and teaching processes take shape. In its true sense, the school is a mental and meaningful space that includes networks of social relations. In this environment, both educational and non-educational activities are conducted (Fazeli, 2019, 10).

Pahlavi Era

The architecture of the Pahlavi era, with a focus on antiquarianism, was mainly influenced by the Sassanian and Achaemenid periods. In this architectural approach, two categories of elements were either used or imitated: the first category included specific structural elements such as columns, capitals, bases, windows, stairs, entrances, arches, and openings. The second category pertained to decorative elements, including reliefs, carvings, sculptures, and roof crenellations.

During the First Pahlavi period, Iranian and Western architects involved in the construction of governmental, educational, and industrial buildings faced, for the first time, particular historical choices. They had to decide which historical period, in what manner, and to what extent would inspire their works. Although the influence of the political climate and the tendency towards antiquarianism were evident, architects enriched the architectural space emerging from this trend by introducing a great variety in the construction of buildings. Examples of such buildings include the Shahre Bani Darband Palace, Bank Melli, Firouz Bahram School, and the Carpet Building (Barvar, 2000). In this era, architectural changes were noticeable across all aspects, from plan structure to decoration. One of the most significant features was extroversion, born from modern thinking. The importance of stairs in buildings, elevation above ground level, the shift in plan structure from radial to linear, grandeur emphasized by entrance stairs, variety in materials including stone, cement, and metal, attention to ancient architectural patterns, Western-oriented and modern styles with a glance at the past in decorations, stone and cement façades emphasizing horizontal and vertical linear elements are among the other characteristics of architecture in this period (Kiani, 2004, 236; Razavi Pour & Zakari, 2017, 69). Overall, architecture in this period was more influenced by Western architecture compared to previous eras.

Characteristics of Architecture in the First Pahlavi Era

It covers the years 1299-1320, during which major and fundamental changes and developments occurred in the political, social, and cultural structures. Subsequently, various and unprecedented effects occurred in architecture and urban planning. Intellectual developments over the past twenty years have had significant effects (Rezaei et al., 2022) (Table 1).

Another characteristic of architecture in the Pahlavi period is the diversity of architectural styles, given the short time frame of this period to develop a style, and on the other hand, the contradiction of styles (Rezaei et al., 2022).

Introduction of Sample Schools from the Pahlavi Era

Sample Schools in Tabriz

In this study, four schools selected and studied during the first Pahlavi period in Tabriz were examined. The schools studied in this article are introduced in the table below (Table 2).

Sample Schools in Ardabil

In this study, two samples of schools that were selected and studied during the first Pahlavi period in Ardabil were examined. The schools studied in this article are introduced in the table below (Table 3).

Analysis of Sample Schools from the First Pahlavi Period in East Azerbaijan Province

Spatial Typology of the Schools under Study

If space is defined as a bounded existence by clear enclosing elements, then the three components — walls, ceiling, and floor — play a crucial role in its formation (Haeri, 2016, 194). Architectural space refers to a specific and confined area composed of enclosing components. In Iranian architecture, three types of space are simultaneously observed: open spaces, enclosed spaces, and semi-open spaces. From a formal perspective, space in architecture is generally divided into three main categories: open, semi-open, and enclosed (Mahmoudi, 2005). Semi-open or covered spaces are considered volumetric joints, facilitating smooth and continuous transitions between different realms. Historically, these spaces not only played a role as part of the overall organization of the building, alongside open and enclosed spaces, but also existed almost as independent spaces with diverse uses. Such spaces simultaneously embody characteristics of both open and

Table 1: Characteristics of Architecture in the First Pahlavi Era

Characteristics	Description
Extroversion	Extroverted buildings are structures that are in direct communication with their exterior spaces, including urban elements such as passages, pathways, and other external features. Their interior spaces also maintain this same connection with the outdoor environment (Memarian & Pirnia, 2015).
Plan	The First Pahlavi era witnessed the most significant and perhaps the most drastic changes in building plans, due to the rapid and uninterrupted introduction of new functions into architecture, imported without local or cultural adaptation into Iranian architecture (Kiani, 2004, 236).
Construction Materials	Building materials included tile, brick, stone, wooden windows and doors, as well as railings and window guards, and sometimes metalwork on roofs. Buildings of this period in Iran were still constructed using traditional methods, employing mud bricks and fired bricks (Kiani, 2004, 237-239).
Façade	The elevation of buildings above ground level and their prominent display at the center and entrance of the building are observable in almost all buildings of the Reza Shah era. The façades made the most use of vertical linear signs and elements. Columns and windows played a significant role in creating a sense of grandeur and magnificence for the viewer (Kiani, 2004, 239-242).
Windows and Balconies	Windows, besides the simple use of wood and glass, incorporated metal for the first time in the form of railings and guards. Corresponding with balcony railings, metalwork with new designs and motifs—mostly reflecting 19th-century European metalworks inspired by traditional old patterns—was integrated, complementing the buildings and city façades (Kiani, 2004, 243).
Decorations	Brick, stone, tile, and metal decorations were used in accordance with the time and place. It is not possible to attribute the 20 years to any single specific decorative style, as stylistic diversity in decorations was equally present (Kiani, 2004, 244-245).

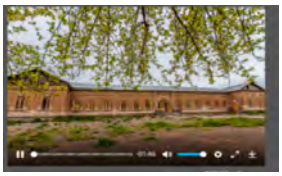
Table 2: Sample Schools in Tabriz

School Name	Year Built	Historical Period	Description	Image
Anoushiravan School, Tabriz	1921 (1300 SH)	First Pahlavi Era	This school belongs to the First Pahlavi period. The construction was completed in 1300 SH (1921 AD), and it underwent repairs and modifications in 1331 SH (1952 AD). Since then, after the renovations, it has been in use as a school.	
Tohid School (Parvin Etesami)	1939 (1318 SH)	Qajar and First Pahlavi Era	The building consists of three floors: a basement, a ground floor, and a first floor. It has three entrances located at the north, south, and west. The ground floor features 16 rooms and a five-step single-lamp staircase that leads to the first floor. The first floor features a central corridor with eight rooms on either side. The basement has 14 rooms on the west side, with two external accesses.	
Roshdieh School	1926 (SH 1305)	First Pahlavi Era	The current building of Roshdieh School belongs to the First Pahlavi era. It is a two-story structure equipped with various sections, including a library, laboratory, and workshop for industries and handicrafts. It overlooks a very large courtyard, and the façade is adorned with beautiful brickwork. The western part of the building has suffered deterioration over the years.	
Boys' and Girls' Teacher Training College	1934-1936 (SH 1313-1315)	First Pahlavi Era	The Ministry of Culture at the time established the Teacher Training College building dedicated to boys in 1314 SH (1935 AD), and it was inaugurated in 1315 SH (1936 AD). The building is bordered on the west and south by Khaqani and Daneshsara streets and is located next to the Aji Chay river. .Opposite its entrance lies the large Daneshsara Square	

enclosed spaces (Mahmoudi, 2005).

Semi-open spaces enable better interaction with the external environment and also serve as locations for the manifestation of behaviors derived from lifestyle patterns (Madahi et al., 2018, 149). A semi-open space is recognized as an intermediate space positioned between two or more spaces, reflecting each of them while also facilitating the transition or transformation from one space to another. The relationship between enclosed

Table 3: Sample Schools in Ardabil

School Name	Year Built	Historical Period	Description	Image
Safavi School, Ardabil	1931 (1310 SH)	First Pahlavi Era	The governor's building is executed in an Iranian Neo-classical style with a "V"-shaped plan form. Essentially, Iranian architectural principles are applied to the building's structure using new materials and European construction techniques. The basement of the main building features vaulted arches.	
Imam Khomeini School, Bileh Savar, Ardabil	1926 (1305 SH)	First Pahlavi Era	The educational spaces comprise four classrooms, an eastern hall used as a library, and a western hall that is divided into administrative offices. The old building of this school remains intact and is considered the oldest educational structure in Ardabil Province and the Moghan region. It is a historical and notable landmark.	

and open spaces can be established in two ways: physically and mentally. Physically, the intermediary space is designed to enable connection, continuity, and extension between spaces. Mentally, this connection forms through the individual's perception, creating a sense of cohesion between the two spaces (Benyani et al., 2018) (Table 4).

Organizational Patterns in the Studied Schools

Central Organization: In this arrangement, elements are concentrated around a prominent part. This central part may be an open or enclosed space that acts as a focal point.

Linear Organization: The linear organizational pattern is characterized by a line of movement created through pathways and directions. In this arrangement, components are placed in a row.

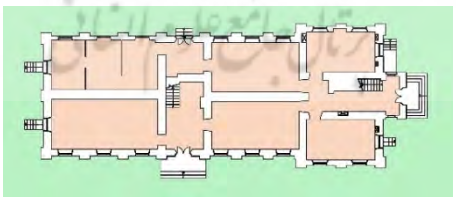
Radial Organization: Radial organization is a combination of central and linear organizational patterns. This type includes a dominant central space from which several linear structures radiate outward.

Clustered Organization: This organization comprises several units that share similar or complementary functions and exhibit physical and visual similarities. These units can be placed adjacent to and continuous with each other or connected through communication axes (Ghafari, 1998) (Table 5).

Table 4: Spatial Typology of Schools

Semi-Open Space Enclosed Space Open Space

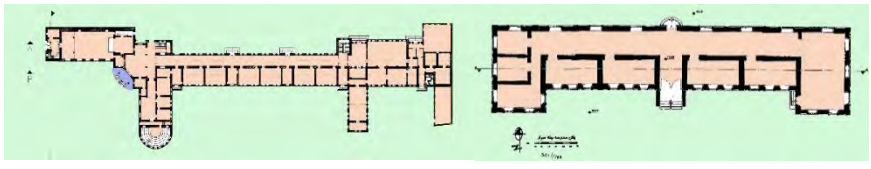
Anushiravan School, Tabriz



Tohid School

Roshdieh School, Tabriz

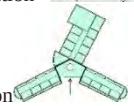
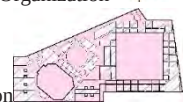
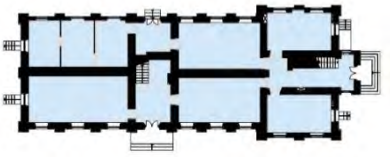
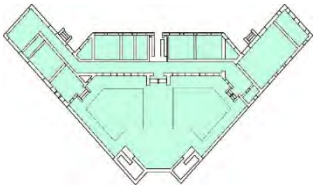
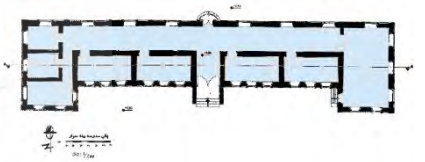
Safavi School, Ardabil



Boys' and Girls' Teacher Training College

Imam Khomeini School, Bileh Savar, Ardabil

Table 5: Organizational Patterns in Schools

Central Organization  Radial Organization 		Linear Organization  Clustered Organization 
		
Anushiravan School, Tabriz (Central)	Towhid School (Linear)	Roshdieh School, Tabriz (Central)
		
Safavi School, Ardabil (Radial)	Boys and Girls Teacher Training School (Linear)	Imam Khomeini School, Bileh Savar, Ardabil (Linear)

Classification of Repetitive Elements

The connection between repetitive elements or similar components with abstract elements leads to the emergence and clarity of those abstract elements. In architectural complexes such as traditional schools, repetitive forms and components—like the rooms surrounding the courtyard and abstract elements like domed halls, classrooms, and verandas overlooking the central courtyard — are shaped based on axes and principles of symmetry within a hierarchical and harmonious system.

Repetitive elements serve as a foundation for displaying the character and legibility of the abstract and main elements of the complex. The order and harmony of these repetitive and abstract elements play a significant role in shaping the structure, identity, and overall character of the complex. According to the second principle of Gestalt theory, the entirety of the school space holds greater significance than the individual components that comprise it. This wholeness is achieved through concepts such as structure, physical mass, geometry, symmetry, balance, hierarchy, and composition with a special order (Ghafari, 1998,] 8-9) (Table 6).

Horizontal and Vertical Spatial Expansion

The study of the schools under investigation shows that spatial expansion has occurred through adjacency. In this manner, the independence of each space is maintained by solid dividing walls. Given the importance of independence and separation of classrooms, spatial expansion is not observed in the schools examined. However, in the administrative section, one or more adjacent spaces are connected through doors, and this connection provides the basis for spatial expansion. Vertical spatial expansion is also possible when the height of a space increases by one layer, as an increase in height adds more diversity to the space (Haeri, 2016, 183) (Table 7).

Light Expansion and Views

Light expansion and views are subcategories of spatial expansion. Views and light contribute to the expansion of space. The way light and views are utilized changes the spatial quality (Haeri, 2016, 87). Lighting in educational spaces is particularly important. In the studied schools, light and views are mostly expanded horizontally through doors and windows. At Anoushiravan and Roshdieh Schools, light enters from the central courtyard through the semi-open space and then into the classrooms (Table 8).

Decorations

By examining various examples of brick decorations, we can observe specific features in the use of bricks during this period (Table 9).

Table 6: Classification of Repetitive and Singular Elements

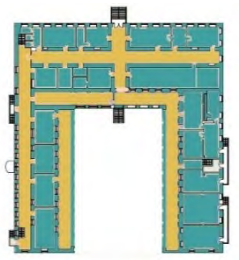
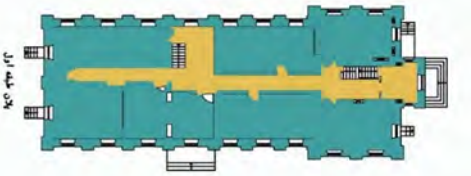
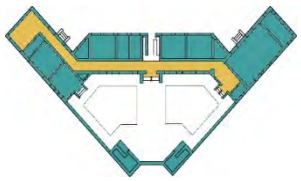
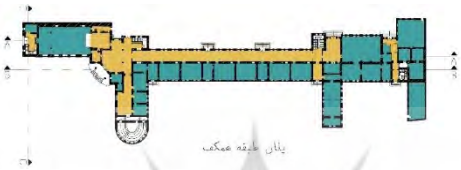
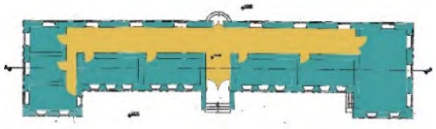
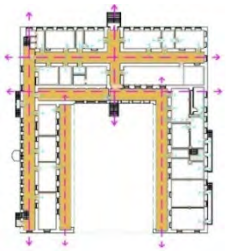
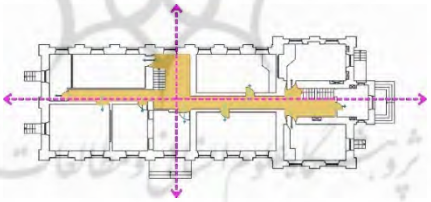
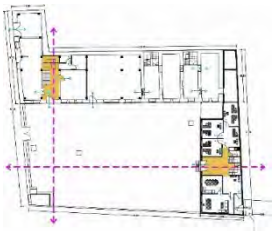
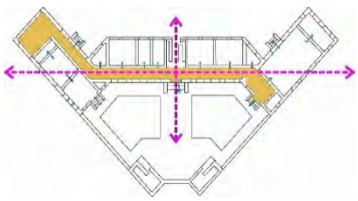
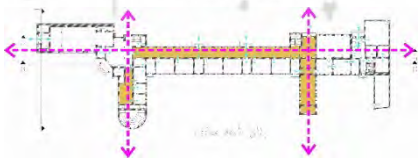
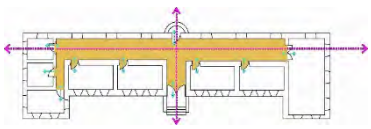
Repetitive Elements		Singular Elements
		
Anoushirvan School of Tabriz	Tohid School	Roshdieh School, Tabriz (Central)
		
Safavi School of Ardabil	Boys' Teacher Training College	Imam Khomeini School, Bileh Savar, Ardabil (Linear)

Table 7: Horizontal and Vertical Spatial Expansion

Horizontal Spatial Expansion		Vertical Spatial Expansion
		
Anushiravan School, Tabriz	Tohid School	Roshdieh School, Tabriz (Central)
		
Safavi School, Ardabil	Boys and Girls Teacher Training School	Imam Khomeini School, Bileh Savar, Ardabil (Linear)

Connections Between Main and Secondary Axes and Main and Secondary Entrances

An axis is a mental and systematic line between two points or two functions. In addition to indicating directions, axes are also linear and have dimensions. Axes always create a direction in a certain direction that causes everything to be called to that direction. The path of movement, direction, and vision of a person in a building are constantly affected by encountering these lines (Taghizadeh & Taghvaei, 2019) (Table 10).

Table 8: Light and View Expansion

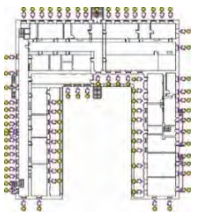
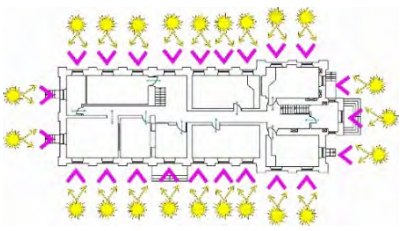
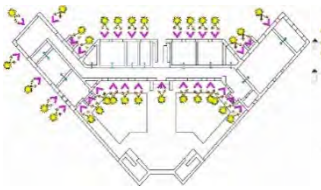
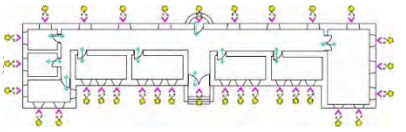
View Expansion  Light Expansion		
		
Anoushiravan School, Tabriz	Tohid School	Roshdieh School, Tabriz (Central)
		
Safavi School, Ardabil	Boys and Girls Teachers' College	Imam Khomeini School, Bileh Savar, Ardabil (Linear)

Table 9: Decorations

Roshdieh School, Tabriz	Tohid School	Anoushiravan School, Tabriz
		
Simple approach to volumetric elements and sculptural details	Entrance gate with elliptical arch and simple brickwork; brick columns with simple design and flower-shaped capitals	Brick decorations with semicircular arches and convex brickwork around the windows
Imam Khomeini School, Bilesavar, Ardabil	Safavi School, Ardabil	Boys and Girls Teachers' College
		
Beautiful brick decorations on the façade with geometric patterns using trapezoidal bricks and brick framing around doors and windows	At the second-floor entrance, colorful tile poems are installed on both sides of the wall, and mosaic tilework is featured above the entrance gate.	Overall, the building lacks special decorations except for tile inscriptions and a brick façade.

Organization of the Main Façade

One of the important aspects in organizing the main façade is symmetry. In all the studied examples, an overall symmetry is present, with slight variations. (Table 11).

Spatial Organization and Spatial Characteristics

Spatial organization is a fundamental pattern for creating composition in architecture that brings together different spaces and provides a coherent structure for the design (Hillier, 1996, 73). The way spaces are arranged can clarify their relative

Table 10: Communications

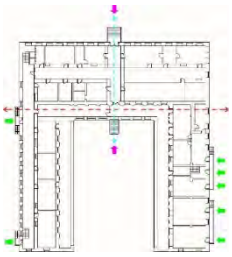
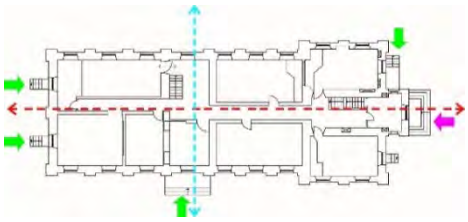
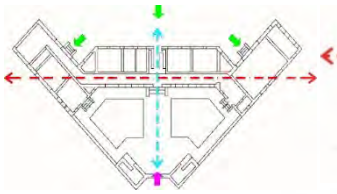
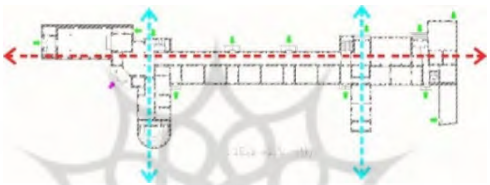
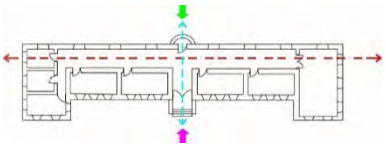
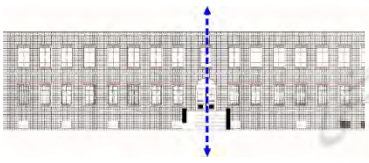
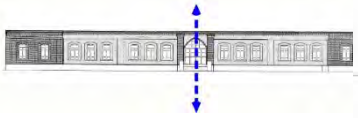
Main Axis of Building		Secondary Axis of Building
Main Entrance		Secondary Entrance
		
Anoushiravan School, Tabriz	Tohid School	Roshdieh School, Tabriz
		
Safavi School, Ardabil	Boys and Girls Teachers' College	Imam Khomeini School, Bilesavar, Ardabil

Table 11: Organization of the Main Façade

Symmetry Axis		
		
Anoushiravan School, Tabriz	Roshdieh School, Tabriz	Tohid School
		
Safavi School, Ardabil	Boys and Girls Teachers' College	Imam Khomeini School, Bilesavar, Ardabil

importance and functional role in the organization of a building (Ching, 2018, p. 204) (Table 12).

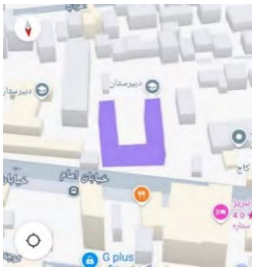
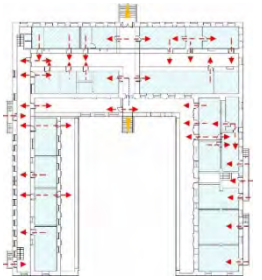
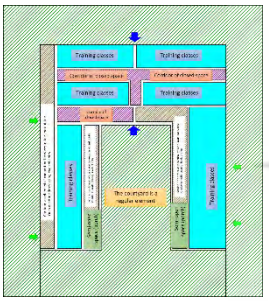
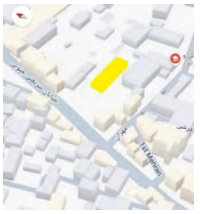
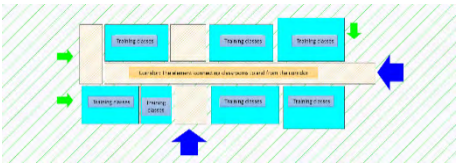
Comparative Study of Schools in Terms of Architecture

In this section, the schools in question were examined using the indicators mentioned in Table 13.

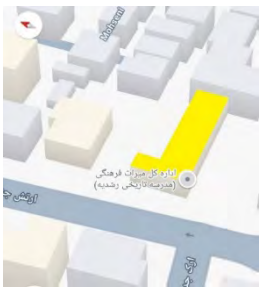
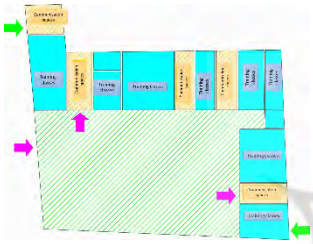
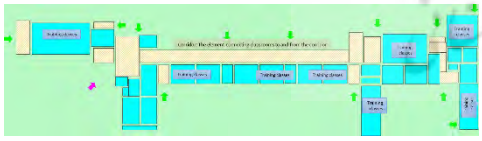
Common Features of Schools in Terms of Architecture

All six schools designed for architecture education are fully compatible with the educational system, and their spaces are designed in accordance with functional needs. These schools have a regular geometric structure and are often square or rectangular in shape.

Table 12: Spatial organization and spatial characteristics

Anushiravan School, Tabriz	
Location and Three-Dimensional Position in Urban Fabric	Spatial Organization and Hierarchy
	
Architectural Features Analysis	Structural Components Quality and Spatial Elements
	Courtyard: organizing element Corridor: connecting inner spaces and outside to inside; establishes a hierarchical entrance sequence Access: indirect and direct entrances from the courtyard to classrooms and educational spaces; direct entrances to corridors; verandas Verandas: semi-open and covered Climate: cold Space types: open and enclosed Inward orientation of the school within the historic fabric Use of natural elements in the courtyard
Tohid School	
Location and Three-Dimensional Position in Urban Fabric	Spatial Organization and Hierarchy
	
Architectural Features Analysis	Structural Components Quality and Spatial Elements
	Courtyard: pavilion (koshk) in the middle of the courtyard, an open space with four surrounding directions Corridor: central corridor with eight rooms on both sides Access: two entrances providing direct access from the courtyard to the corridor and corridor to classrooms Climate: cold Outward orientation

Continiue of Table 12: Spatial organization and spatial characteristics.

Roshdieh School, Tabriz	
Location and Three-Dimensional Position in Urban Fabric	Spatial Organization and Hierarchy
	
Architectural Features Analysis	Structural Components Quality and Spatial Elements
	Courtyard: organizing element Dominant inward orientation Access: 4 separate entrances The building is arranged on two sides around the courtyard Climate: cold
Boys' and Girls' Teacher Training School	
Location and Three-Dimensional Position in Urban Fabric	Spatial Organization and Hierarchy
	
Architectural Features Analysis	Structural Components Quality and Spatial Elements
	The courtyard features a greenhouse, garden, and sports field. Linear building with a corridor Access: one main entrance at the corner of Daneshsara Street, and 12 separate entrances leading to the courtyard Climate: cold Outward orientation
Safavi School, Ardabil	
Location and Three-Dimensional Position in Urban Fabric	Spatial Organization and Hierarchy
	

Continiue of Table 12: Spatial organization and spatial characteristics.

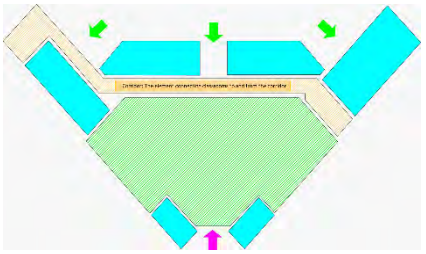
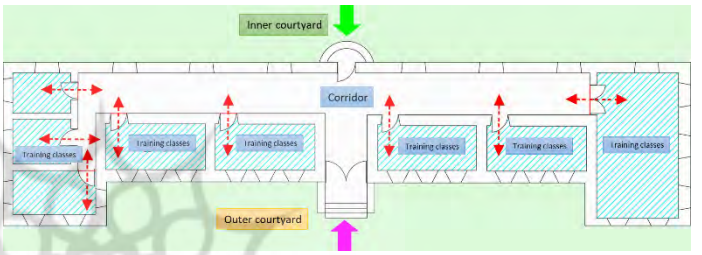
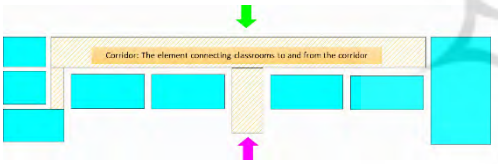
Architectural Features Analysis	Structural Components Quality and Spatial Elements
	Outward oriented Two courtyards: a small courtyard at the entrance and a large courtyard at the back The building is placed in the middle of the courtyard Radial plan as organizing element Corridors connect classrooms and exterior spaces Internal spaces connected via circulation corridors
Imam Khomeini School, Bilehsavar, Ardabil	
Location and Three-Dimensional Position in Urban Fabric	Spatial Organization and Hierarchy
	
Architectural Features Analysis	Structural Components Quality and Spatial Elements
	Courtyard: includes two courtyards, outer and inner Outward orientation Access from the courtyard to the ground floor Façade decorated with beautiful brickwork

Table 13: Comparative study of schools in terms of architecture.

School Name	Anoushirvan School, Tabriz	Tohid School (Parvin Etesami)	Roushdieh School, Tabriz	Daneshsaray School for Boys and Girls, Tabriz	Safawi School, Ardabil	Imam Khomeini School, Bileh Savar, Ardabil
Historical Period	First Pahlavi Period	Qajar and First Pahlavi Periods	First Pahlavi Period	First Pahlavi Period	First Pahlavi Period	First Pahlavi Period
Location	East Azerbai-jan (Tabriz)	East Azerbaijan (Tabriz)	East Azerbai-jan (Tabriz)	East Azerbaijan (Tabriz)	Ardabil	Ardabil
Date of con-struction	(1300AH)	(1318AH)	(1305AH)	(1315AH)	(1310AH)	(AH 1305)
Karbari	Middle School	Girls' High School	Karo Danesh Girls' High School	Girls' High School	High School	Elementary School

Continiue of Table 13: Comparative study of schools in terms of architecture.

School Name	Anoushirvan School, Tabriz	Tohid School (Parvin Etesami)	Roushdieh School, Tabriz	Daneshsaray School for Boys and Girls, Tabriz	Safawi School, Ardabil	Imam Khomeini School, Bileh Savar, Ardabil
School components	Classroom - corridor - courtyard	Classroom - corridor - courtyard	Library, laboratory, and handicraft workshop	Library, laboratory, and hall, dining hall	Nine classrooms, foyer, amphitheater, lecture hall, laboratory, cinema, part of which has become a museum	Four classrooms, a hall in the eastern part called the library, and a hall in the western part that is separated into office space
Plan	Symmetry and rhythm in the façade	Symmetrical - symmetry and repetition of façade modules	Symmetrical	Asymmetrical	Symmetrical and two-armed, with an eagle-shaped roof with raised tops, having a V-shaped planform	This building has a U-shaped plan and is completely symmetrical.
Geometry	U-shaped	Rectangular	Z-shaped	Linear Rectangular	Radial	U-shaped
Number of floors	3rd floor, ground floor, first floor, and basement	First floor, ground floor, and basement	Two floors	Three floors, a basement, and two floors above it	Two nd floor – ground floor, first	One st floor – ground floor
Number of courtyards	Two courtyards, one inner and one outer courtyard	The pavilion is located in the middle of the school courtyard	One	One	Two courtyards, a small courtyard at the entrance, and a large courtyard behind the school	Two courtyards - with an outer and inner courtyard
Communications and access	Communications through corridors and internal stairs	Communications through corridors and internal stairs	Four separate entrances - through the courtyard	It has one entrance on the corner of Daneshsara Street	Internal spaces are connected through communication corridors The stone communication staircase of the upper floor of the building is located in front of the entrance and is built in two arms.	Access from the courtyard to the ground floor with four stairs
Introverted-Extroverted	Introverted	Extroverted	Introverted	Extroverted	Extroverted	Extroverted
Sense of space	Sense of movement around the corridor	Sense of movement in the courtyard	Reminiscent of traditional architecture - simple - historical signs of survival and stability	Linear architecture and in one direction	Majestic, order, dominance, grandeur, and elevation in the form of psychological effects	Internal circulation and communication through the corridor
Natural elements	Green space and trees	Green space and trees	Presence of green space	Presence of green space	Green space and nature	Green space and nature
Decorations	Brick decorations with semicircular arches and semi-convex brickwork around the windows.	The entrance hall is shaped like an oval arch, and the brickwork is simple. The columns are in the form of simple bricks with vase capitals.	Simple approach to volumetric elements and sculpture	The building as a whole does not have any special decorations, except for the tile inscriptions and its brick façade.	At the beginning of the entrance to the second floor, poems in the form of seven-colored tiles are installed on the sides of the wall, and there is also mosaic tile work in the form of an inscription above the entrance door.	This building features beautiful brick decorations on the façade, including a stile, intricate geometric patterns with double-headed bricks (trapezoids), and brick framing of the doors and windows.

Most of these schools are situated near markets and main urban routes, providing easy access and fostering greater social interaction. The use of well-designed internal or external courtyards is also a common feature among these schools, creating a desirable sense of place and tranquility.

All schools are equipped with a central corridor between classes or a corridor in front of the courtyard to facilitate communication. This separation and relationship between architectural elements give the educational space a special identity. The central courtyard, a characteristic feature of traditional Iranian architecture, is designed in these schools with a specific geometric order, such as a square or rectangle, and is implemented with symmetry to create a coherent and efficient environment.

The presence of water basins, green spaces, and a central courtyard has provided direct connections between rooms and other parts of the school. Additionally, these elements enable the use of natural light and establish a visual connection with the surrounding natural environment. The design of the spaces surrounding the courtyard has also been adjusted to accommodate geographical directions and climatic conditions for different seasons.

The spatial layout in school design begins with the public sphere, then moves to the semi-public sphere, and finally to semi-private areas, such as entrances, and culminates in private courtyards. The existence of communication paths, such as corridors and stairs, not only provides a function for movement but also creates environments for learning, studying, and interaction among students, thereby increasing the sociability of these spaces.

The external form of these schools is mainly influenced by the characteristics of the land, such as slope, access network, location of waterways, and the shape of ownership in traditional cities with organic texture; for this reason, these forms sometimes appear irregular.

The coordination between the open and closed spaces of the school and their integration into the urban landscape is designed in such a way that the school assumes a prominent role in the urban context and is perceived as one of the integral elements of the city. However, the lack of open or closed spaces in some areas with specific climatic conditions, such as areas with intense sunshine or heavy rainfall, may create challenges for students to use.

One of the most important aspects of school design is the quality of space that results from the harmony between buildings, courtyards, and closed or semi-open spaces. The regular connection between these spaces has enhanced their overall performance.

Architectural Distinctions of Schools

In the pre-Qajar period, schools had rooms that were removed over time. With the emergence of the new education system, schools have transitioned from traditional, introverted designs to more extroverted and modern ones. The combination of introverted and extroverted spaces is evident in this type of design, such that in the building complex, in addition to the presence of central courtyards or internal open spaces, the entire complex is surrounded by open environments. Introversion and extroversion can be identified in traditional and contemporary schools, respectively.

In traditional schools, horizontal connections were formed through porches surrounding the open space, as well as semi-open areas. However, in contemporary schools, these connections are established through communication corridors. Full and empty spaces in traditional schools were designed with desirable visual and perceptual qualities such as unity, diversity, hierarchy, sequence, contrast, and continuity.

The role of the courtyard transformed from the mid-Qajar period, shifting from a central communication space and the heart of the complex to a simple, open space. The first major change in the pattern of schools occurred in the Dar al-Fonon, which presented a new definition of schools, presenting a semi-traditional model.

Schools of the Safavid period evolved compared to those of the Timurid period, but from the Safavid period to the early Qajar period, there were no significant changes in these structures. However, from the mid-Qajar period, there were extensive changes in the way schools were designed and built to meet the needs of modern education. New schools began to take shape in the Dar al-Fonon, featuring a new teaching method that included rows of benches in the classroom and the addition of connecting corridors for improved access.

Qualitative Findings

Coding

Open Coding for Schools of the First Pahlavi Period

Interviews conducted:

According to what was said in the section on full and empty spaces, in introverted architecture, three issues are considered: creating a desirable relationship between humans and nature, regulating environmental conditions for human life, and a logical connection with the characteristics of the site (Open code: environmental and climatic factors, presence of nature)

The internal order of traditional schools is geometric, symmetrical, and with introverted architecture and a special connection in the form of successive spaces between the outside and the inside (Open code: geometric order)

In traditional school architecture, the module and rhythm of components play an important role in the quality of expressing space (Open code: rhythm)

The succession of diverse spaces, ranging from dark to light, changes in space density, variations in the degree of confinement, size, direction, color, and decorations, can be considered desirable measures for school architecture (Open

code: spatial diversity, decorations, color).

Creating enclosure through buildings, creating enclosure through soft texture, creating variety in the path of movement through sudden breaks in the path, setbacks, and advances in the path of movement (Open code: environmental diversity, diversity in form and function, and shape used in the building)

Scale of space, connection between inside and outside, elements enclosing the space, lighting, accessibility to everyone, ease of access, adaptability, spatial arrangement (Open code: spatial diversity, permeability, visual proportions)

In these schools, their good quality can be understood as empty spaces permeate the crowded spaces and evoke a feeling of lightness and transparency in humans (Open code: transparency)

The sequence of diverse spaces, ranging from dark to light, changes in terms of space density, degree of enclosure, size, direction, color, and decorations. Can be considered desirable measures for schools (Open code: spatial diversity, decorations, color).

In school architecture, human scale means the relationship between dimensions, sizes, and human capabilities with the space or elements used (Open Code: Human Scale)

Having an identity and the right connection with sustainability values in native and traditional architecture means that the school, in addition to having the desired personality and identity, has a correspondence of form, function, and concept in the body of the building (Open Code: Form and Function)

The school building is an effective element in the quality of the urban landscape and architecture that has the desired form and visual quality (Open Code: Urban Landscape)

Visibility and the importance of its role in the landscape and view from afar (Open Code: Physical Form)

In the architecture of historical schools, attention is paid to the skyline and the view from afar, and the necessary legibility is seen in the school volumes (Open Code: Legibility)

The beautiful exterior and interior brickwork of schools, their uniqueness attracts attention more than anything else. The exterior façade of the house features decorative polygonal motifs with brick grooves. The openings are entirely made of wood and have simple framing decorations. (Code: decorations, details)

Emphasis on the comfort of the residents and the pleasantness of the environment and presence (readable, diverse environment).

Diversity in the façade, proper permeability, regular skyline, (proportions, proper permeability).

The discussion of hierarchy is a discussion between the inside and the outside, because the sense of the outside space cannot be found in the rhythm of the atmosphere of the inside. In other words, the inside lacks these properties, and the outside conditions cannot be allowed to enter. This transformation plays a role in the hierarchy, because the entrance threshold is the condition for entry and transformation, which, after the door and in a space like the vestibule (the main entrance space that is usually located after the entrance), in the Pahlavi period, as the interior and exterior spaces faded. The spaces became more extroverted; this structure also collapsed (Code: hierarchy, introversion, extroversion). In the schools of the Pahlavi period, symmetry also brings balance and diversity through its rhythm and beat (Code: symmetry).

Based on the results obtained from coding and data reduction, considering the salience of the components in the Pahlavi period, the highest salience is associated with extroversion in the functional component, and the lowest is associated with introversion in the functional component. The results indicate that the functional components play a more prominent role in the adaptation of schools in the Pahlavi period. The results suggest that the Iranian-Islamic identity declined during the Pahlavi period. Changes have been observed, ranging from the reorganization of school architectural elements to the transformation and replacement of old spaces with new ones of a completely different nature or a change in spatial quality without altering the type of space. The change from introversion to extroversion, the transformation of the central courtyard into an outdoor open space, changes in hierarchy and connecting elements, the decline in proportions and geometry, the decline in decorations, the reduction or elimination of green space, in the Pahlavi period we see changes in architecture compared to previous periods, from the plan structure to decorations and materials and colors in the physical component, which has a special relationship with schools in the Pahlavi period.

After extraction and open and axial coding, 38 codes were extracted. After refinement based on the basic concepts and physical organization of the code and the main research question, 31 codes remained, and the rest were deleted. Thirteen codes were related to physical organization, 11 to spatial indexing, and 7 to functional indexing.

RESULTS AND DISCUSSION

The years 1920 to 1941 marked a fundamental transformation in Iran's political, social, and cultural structures, which heavily influenced architecture and urban planning. This study examines the contexts that led to the formation of contemporary architecture during these twenty years and analyzes the intellectual motivations behind these changes.

Research indicates that transformations in the educational system played a key role in architectural evolution. The expansion of new schools and the changed functions of educational buildings introduced spaces such as classrooms, administrative offices, workshops, laboratories, and assembly halls, replacing the traditional structure of maktabs and religious seminaries that previously existed.

The emergence of outward-oriented architecture, in contrast to the inward orientation prevalent in traditional Iranian architecture, was a key factor in this morphological shift.

Table 14: Coding and categorizing open codes and extracting a central code for each category

Code Type	Extracted Code	High-light	Code Name
Physical organization	Arrangement of empty spaces	(23)	Empty and empty spaces, full and empty spaces and volumes, full and empty spaces, physical advancement and retreat, retreat, subsidence.
	Circulation	(10)	Movement and flow of people in space, including movement paths (both horizontal and vertical).
	Communications	(20)	Links and relationships between spaces, elements, and functions, including movement, functional, visual, natural, and symbolic and cultural connections.
	Hierarchy	(9)	Accessibility, gradual arrangement of spaces from public to private, from mundane to spiritual.
	Spatial confinement	(8)	Importance of semi-open space, veranda and the like, general verandas - open and wide veranda - two semi-open spaces - quasi-van space - large semi-open space.
	Inside-outside relationship	(15)	To achieve peace and personal satisfaction, it is essential to have healthy relationships with others and engage in social interactions.
	Accessibility	(15)	Easy access, accessible by car and on foot, with a short distance to the main centers.
	Geometry	(15)	Dimensions and size of spaces in proportion to function, size of each space in proportion to function, in proportion to function, strict adherence to internal functions, adherence of form to function, adherence of form to function of the building.
	Symmetry	(22)	Category of functions, use of geometric techniques, symmetry, alignment
	Balance	(23)	Spatial and physical balance, symmetrical plan, functional balance, coordination between spaces, and coherent spatial organization.
	Materials	(25)	Use of diverse materials, materials appropriate to function, separation of activities appropriate to the background materials, use of multiple materials, use of materials appropriate to dimensions, use of native and available materials, use of materials appropriate to structural behavior, variety of materials based on understanding of material characteristics.
	Proportions	(20)	Human proportions, human scale, location and dimensions of the playground, order.
	Decoration	(22)	Use of diverse decorations, body as decoration, climatic and efficient decorations, continuous decorations, integration of space and body during movement as a type of decoration, stucco moldings, formal decorations, efficient decorations, dazzling decorations, and enchanting decorations.
Spatial	Open space, closed space, and semi-open space	(25)	Closed space: means of communication with the outside, maintaining privacy, creating peace, and concentration. Open space: gathering, social interaction, ventilation, and natural lighting. Semi-open space: gradual control of entry into the space, shading, and transition from inside to outside.
	Central courtyard	(8)	.Climate element, space, introverted form, and harmonious with the environment
	Spatial organization	(15)	Organization, juxtaposition of spaces, orientations.
	Flexibility	(17)	Designing flexible spaces, spaces with the ability to change functions, spaces with different functional separations, multiple spaces, spaces with high adaptability, transparent enclosure, flexibility in spatial arrangement, spatial dispersion, integration of urban space and architecture.
	Diversity and legibility	(22)	Diversifying spaces, creating diversity on façades - creating a mental schema, creating legible spaces, comfortable circulation in movement, tangible spaces, visual security, functional transparency in the eyes of the audience.
	Spatial layout	(16)	Proper layout, dimensions, and sizes.
	Spatial diversity	(21)	Diverse spaces, diversity in the type of space, different experiences of people, diverse activities.
	Fluidity and dynamism	(22)	Flexibility, variability, active growth and movement, continuity, and visual transparency.
	Spatial expansion and transparency	(14)	Concepts of rigid, semi-transparent, and transparent.
	Spatial confinement	(20)	Diversity in enclosure, quality of light, and presence of different air currents.
	Human scale	(15)	Respect for human and animal scale, observance Scales for different ages, scaling, motor scale, and developmental scale.

Continiue of Table 14: Coding and categorizing open codes and extracting a central code for each category.

Code Type	Extracted Code	High-light	Code Name
Functional	Form and Function	(24)	.Diverse volumes - geometric form
	Variety in Form and Shape	(18)	Creating visual diversity and dynamism in façades, creating perceptible spaces, and utilizing .simple yet perceptible geometry
	Introversion	(7)	Centric organization - attention to the center and introversion - introversion - introversion of volume, internal order - arrangement of main elements around a center - spatial order - spatial order .- around a central core - attention to the center
	Extroversion	(28)	An extroverted organization in the Pahlavi period, with an emphasis on extroversion and the .façade of the building
	Segmentation of Spaces	(11)	.Spatial proportional elements, functional harmony, and compatibility of space and body
	Visual Comfort	(12)	Satisfactory spaces, calming environments, the absence of crime in society, and creating distinc-.tive opportunities
	Connection with Nature	(20)	Using vegetation, combining form with nature, utilizing natural forms, covering forms, and incorporating natural landscapes and plants, the presence of plants helps soften the air, while the .presence of trees in movement paths adds to the aesthetic appeal

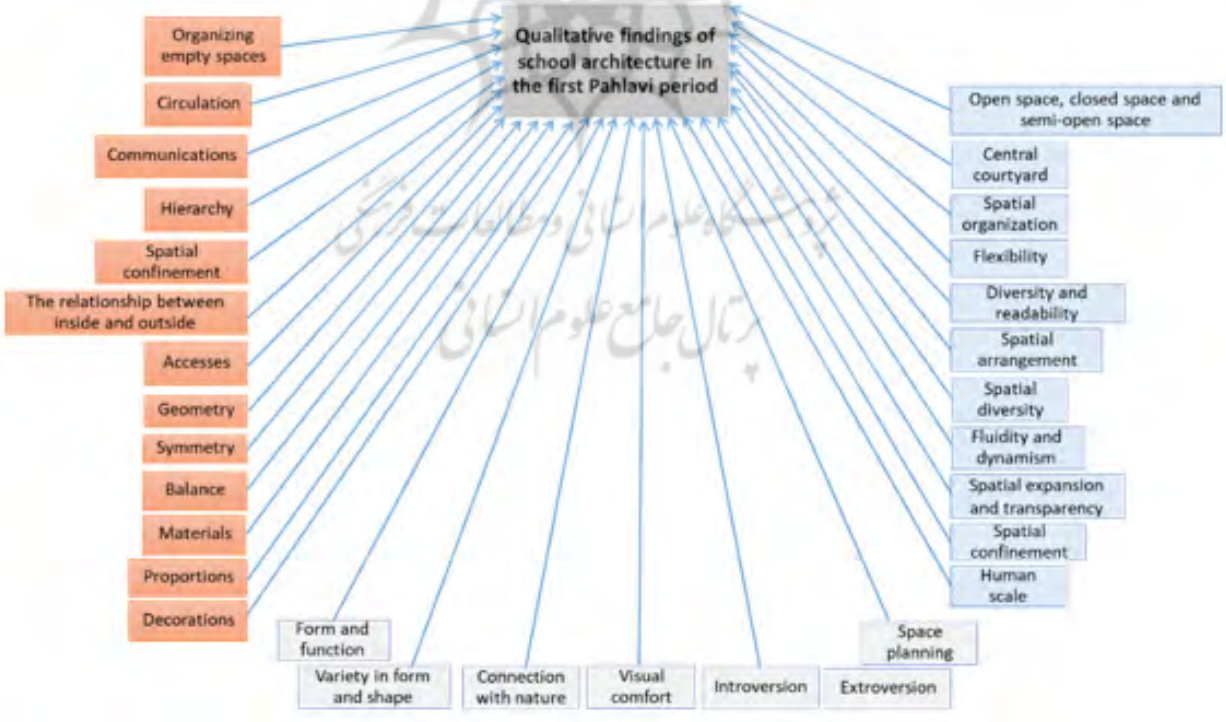


Fig. 2: Open coding of components extracted from semi-structured interviews based on description and interpretation

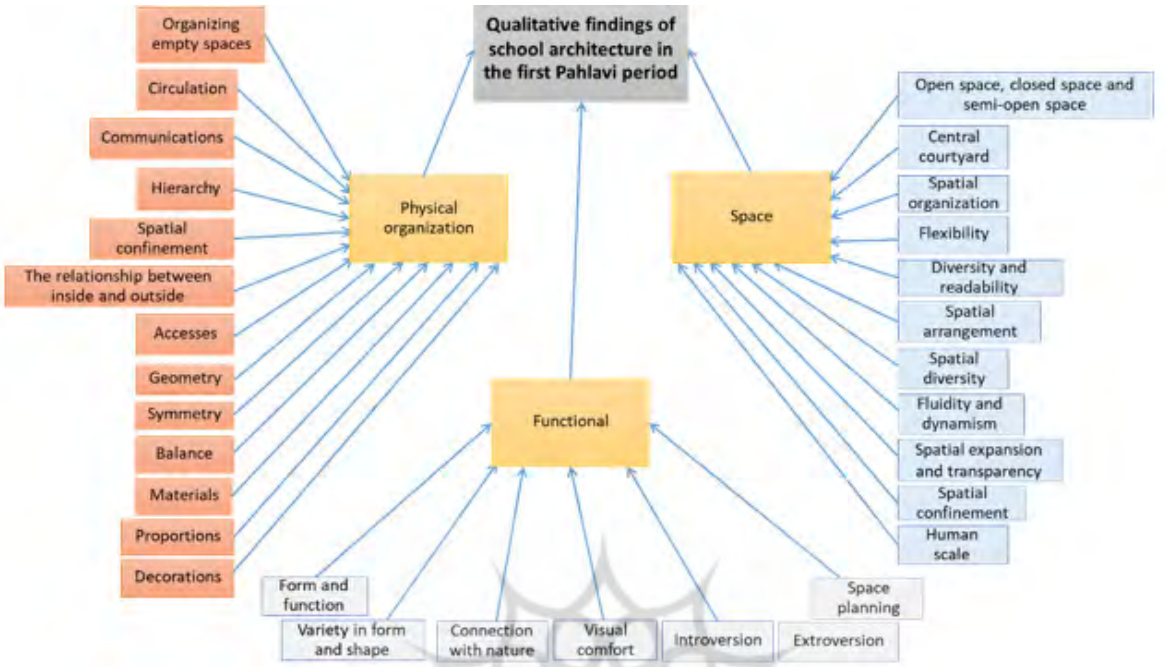


Fig. 3: Classification of physical, spatial, and functional organization components based on axial coding

Outward-oriented architecture strengthened the connection between interior and exterior spaces, activating the surrounding environment and fostering a more vibrant and diverse communal life.

During the Pahlavi I era, the most significant changes affected building floor plans. The rapid introduction of new functions without adaptation was particularly evident in educational, administrative, and governmental buildings such as ministries, post offices, municipalities, police stations, and banks. This architecture was primarily inspired by Western models, with a focus on schools, universities, and governmental structures.

Regarding construction materials, buildings of the early Pahlavi period, especially in the first decade, typically combined elements of brick, tile, stone, and metal. Brickwork was the dominant material in the building's structure, while stone was used extensively in the stairs. Stairs were not only functional inside the buildings but also served to emphasize grandeur and majesty at the entrances.

With the rise of centralization, modernization, and the development of a new military architectural style, most governmental buildings were designed as symbols of these traits. Elevated building platforms above ground level, along with an emphasis on grand, central entrances, were characteristic features of this era.

Key factors influencing the transformation of architectural elements in the Pahlavi I period include:

- Prioritization of floor plans in design due to new functional relationships and the impact of academic education.
- Long corridors in large buildings, such as schools and government offices, are often combined with multiple side sections.
- The importance of stair design, both in formal entrances and interior spaces, lies in its use of double or curved forms.
- Delay in adopting modern construction technologies and relative continuity of traditional building styles.
- Entrances with tall columns expressing grandeur, influenced by both Iranian revivalism and early modern European styles.
- Changing window orientation from interior-focused to outward-facing, redefining privacy at urban and neighborhood scales. New window designs, both in residential and governmental buildings, featured tall, repetitive forms.
- The prevalence of balconies altering the street façade and facilitating interaction between interior spaces and streets, reminiscent of traditional verandas but with a different orientation.
- A general trend towards brick façades with classic Iranian

and Western decorative motifs prevailed in the early period, shifting towards simplicity in the later years.

CONCLUSION

Based on the findings obtained in the qualitative section, 38 codes were extracted, each code representing a component and an indicator. After axial coding, these codes can be categorized into three dimensions: physical, spatial, and functional organization. The results obtained from coding and data reduction, taking into account the salience of the components in the Pahlavi period, indicate that the highest salience is associated with extroversion in the functional component. In contrast, the lowest salience is related to introversion in the same component. It is clear from the results obtained that functional components play a more prominent role in the adaptation of schools during the Pahlavi period. The results indicate the fading of Iranian-Islamic identity during the Pahlavi period. Changes have been observed, ranging from the reorganization of school architectural elements to the transformation and replacement of old spaces with new ones of a completely different nature, or a transformation in spatial quality without a change in the type of space. The change of introversion to extroversion, the transformation of the central courtyard into an external open space, the change in hierarchy and connecting elements, the decline in proportions and geometry, the decline in decorations, the reduction or elimination of green space, in the Pahlavi period we witness changes in architecture compared to previous periods, from the structure of the plan to the decorations and materials and colors in the physical component has a special relationship with the schools of the Pahlavi period.

Appropriate design patterns, such as centrality, layering, overlapping courtyards, reflection, diversity in school architecture, elongation of plans, entrance in the center, the importance of regulating environmental conditions, and the importance of orientation to the east, west, and sun, are important on the one hand. On the other hand, the era was the Neoclassical era, during which buildings were mostly symmetrical in Europe, and the influence of the West was significant in both school education and the design and structure of schools. As a result, educational spaces from the school mosque, featuring a central courtyard pattern, later evolved into schools with an elongated plan pattern and an entrance at the end of the courtyard, aligned along the axis. During the Pahlavi period, we observe changes in architecture compared to previous periods, ranging from the plan structure to decorative elements. The most important of them is extroversion, which was the product of modern thinking. The importance of the staircase in the building, being higher than the ground level, changing the plan structure to linear, giving grandeur to the building with an emphasis on the entrance stairs, the variety of materials, the use of stone, cement and metal, as a result, the elements, materials and structure of the Pan were completely broken compared to traditional Iranian schools, and the simultaneous construction of buildings, each of which represents one of the schools of thought of specific periods in Iranian history.

AUTHORS' CONTRIBUTIONS

M. Mohajer conducted the literature review, experimental design, data analysis and interpretation, manuscript preparation, and manuscript editing. Sh. Akbari Namdar conducted the experiments and literature review, data collection, and manuscript preparation. M. B. Kabirsaber assisted in reviewing the literature and preparing the manuscript. N. Valizadeh performed some of the remaining experiments.

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CONFLICT OF INTERESt

The authors declare no potential conflicts of interest regarding the publication of this work. In addition, the authors have fully observed ethical issues, including plagiarism, informed consent, infringement, falsification or distortion of data, publication or resubmission, and redundancy.

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