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Original Research Article

Explaining the Impact of the Bauhaus Approach on the Architectural Works of Fine Arts Students of Tehran University

(With Emphasis on the Pahlavi Period)*

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Abstract

Problem statement: With Iran's entry into the threshold of modernization and the establishment of the University of Tehran in the year 1934 (1313 AH) and the gradual formation of the Faculty of Fine Arts until 1940 (1319 AH), art and architecture education took a new approach towards academic methods. Academic experiences for approximately two centuries have shown how architecture is taught has a significant impact on the formation of architects' personalities and is reflected in their architectural works. One of the most influential academic institutions in this regard is the Bauhaus School in Germany. The Faculty of Fine Arts, as the first academic center for architectural education in Iran, has also demonstrated explicit interactions with many of these schools, including the Bauhaus, in terms of adopting innovative teaching methods. The influence of the predominant approach of the Bauhaus School can be observed in the examination of the works of professors and students.

Research objective: The objective of this research is to examine the Bauhaus approach in Germany, identify the patterns of this style, and trace them in the architectural structures of the Pahlavi era, which include the works of professors and students of the Faculty of Fine Arts at the University of Tehran.

Research method: This study is interpretive-historical, and as a result, the analysis of the findings and the influence of the fine arts are approached through a descriptive-analytical research method. To achieve this, several examples of buildings constructed by professors and students of the Bauhaus School were examined. The main design features have been extracted through the examination of these samples and interviews. Then, by systematically weighing the indicators using a developed formula, the degree of affiliation of each architectural work to this style was determined.

Conclusion: The results of the research indicate that the influence of the fine arts from the Bauhaus approach can be seen during the period of Emmanuel Pontremoli's management. The commonly used architectural parameters of this style include flat roofs, the use of modern materials and technology, a balance in the composition of volumes and facade elements, and functional beauty. These features are more pronounced compared to other characteristics, such as white facades and pilotis.

Keywords: Bauhaus approach, Pahlavi period, Contemporary Iranian architecture, Fine arts.

This article extracted from Ph.D. thesis of "Alaleh Baghalian" entitled "Reading the Role of the Schools of Architecture: École des Beaux-Arts and Bauhaus on Determining the Approach of Contemporary Iranian Architecture (1919-1979) (Comparison the Works of Graduates of Faculty of Fine Arts, University of Tehran: Architecture versus Visual Arts)" that under supervision of Dr. "Ghazal

Keramati" and in consultation of Dr. "Hossein Soltanzadeh" and "Mehrdad Matin" which is in progress at Islamic Azad University, Central Tehran Branch, Faculty of architecture and urban planning, Tehran, Iran in 2023. Corresponding Author: Gh.keramati@iauctb.ac.ir, +989122056174

Introduction

The architecture developed during the Pahlavi era often drew support from the works of architects and the influential ideas of the progressive movements in Europe. In Iran, the Bauhaus style is considered one of the most influential of these movements. The establishment of the University of Tehran and the initiation of the architectural education system in the country are significant milestones. This faculty is one of the most important institutions that managed to nurture the most specialized and influential architects between the 1950s and 1970s (Bani Masoud, 2015, 267). Although the main point of transformation in contemporary architecture and urban planning in Iran was laid during the Qajar period, the turning point and comprehensive changes occurred predominantly during the first Pahlavi era (Bemaniyan, 2006, 1).

The Faculty of Fine Arts at the University of Tehran experienced a dual approach in terms of its educational structure and perspectives from its establishment until the Cultural Revolution. It seems that there are two main turning points in education and architectural formation at the Faculty of Fine Arts. The first one is the launch of the architecture program with the establishment of the Faculty of Fine Arts, with professors who were mostly graduates of the École des Beaux-Arts in France. The second one is the formation of architectural styles by professors and students who also drew inspiration from the Bauhaus architectural style (Habibi, 2009; Bani Masoud, 2015, 267). Notable figures like Karl Schlaminger employed the teaching methods of the Bauhaus School of Germany in the education of visual arts and architecture. This approach, heavily influenced by modern architectural institutions around the world, including the Bauhaus school, which had expanded during those years, played a significant role in shaping contemporary architecture in Iran. Many of the contemporary architectural works carried out during the selected research period were developed by professors and students of the Faculty of Fine

Arts, and this group can be considered the pioneers and influential factors in contemporary architecture in Iran.

Therefore, this research aims to identify the patterns of the Bauhaus style and trace them in the buildings of the Pahlavi era, which are the works of professors and students of the Faculty of Fine Arts. It seeks to answer the following questions: What characteristics of the Bauhaus school have been employed in the architectural works of the Faculty of Fine Arts? And to what extent has each characteristic influenced the appearance of significant buildings during that period?

Research method

This research, based on its objectives, is a theoretical study with a qualitative and quantitative approach. It begins in two distinct steps: firstly, through an interpretive-historical research method, organizing sources and information, and secondly, through a descriptive-analytical research method, analyzing specific case studies, and ultimately conducting a comparative analysis. Through analyzing the educational system and its reflection in the notable architectural works of the Bauhaus school, the research seeks to describe the manner and extent of the influence of these schools on the architecture of the Faculty of Fine Arts. Thus, in the first step, reliable documents and sources such as books and articles have been utilized to examine the educational systems implemented in these schools through documentary studies. In the second step, to obtain the design characteristics of Bauhaus, an analysis and examination of selected examples of works carried out by professors and students of these schools have been conducted, and the main architectural features of this approach have been extracted (Fig. 1).

Finally, to analyze the results and describe the extent of the influence of Bauhaus design features on the architecture of the Faculty of Fine Arts, due to the unavailability of documents from the selected period, a study was conducted on the works of prominent architects and students (43 samples) who

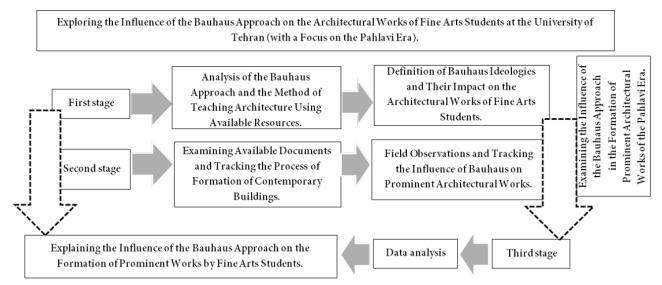


Fig. 1. Stages of Research Process. Source: Authors.

were professionally active outside the faculty during the selected period. For example, works by Andre Godard, Roland Dubrulle, Maximilian Siru, Houshang Seyhoun, Mohsen Foroughi, Haider Ghayaei, Eugène Aftandelian, Abdulaziz Farmanfarmayan, for the professors of the Faculty of Fine Arts (from the initial establishment to 1969) were examined, and for the significant architectural works by students of the Faculty of Fine Arts in contemporary Iranian architecture until 1979, works by Iraj Kalantari, Hossein Amanat, Bahman Paknia, Hamlet Haroutunian, Mehdi Alizadeh, and Ali Akbar Saremi were scrutinized. It should be noted that in this study, the analysis was based on the works of professors and students who received education or studied at the Faculty of Fine Arts until 1969, because significant changes occurred in the Faculty's system and architecture program after that time, and many distinguished and influential professors separated from the Faculty. In fact, a new educational system was established in the Faculty. Additionally, the year 1979 was chosen for the contemporary architectural works of the selected individuals to avoid overlapping with the Cultural Revolution period and its impact on architecture.

In the next step, to assess the influence of the design features of Fine Arts architecture on the design features of Bauhaus architecture, the frequency of design features in the Bauhaus school was extracted. Then, a systematic weighting method was applied to the features (where the weight of each feature is determined by the number of times that feature appears in the entire set of observations) to determine the degree of association of each developed architecture with the Bauhaus style.

Research background

The research conducted on the relationship between the Bauhaus School and the Faculty of Fine Arts can be broadly categorized into two main groups: the first category includes studies that focus on the ideas and philosophies of each school, while the second category consists of research conducted specifically on the educational aspects of these schools.

• The first category (ideas and philosophies) One notable example of such studies is the book by Lesnikowski (1982), which explores the reflection of

Lesnikowski (1982), which explores the reflection of 20th-century philosophical thoughts in architecture, and presents a narrative of the historical evolution of Western architecture based on the dichotomy of rationalism and romanticism, and refers to the influence of these ideas on the Bauhaus school. Curtis (1935), in his book, delves into the topic of German Expressionism and Bauhaus, discussing the thoughts of Expressionist professors at Bauhaus. Raleigh (1968) examines the background of modern art and discusses the ideology and teaching methods of Itten in art. Wingler (1980), in his book, examines the

functioning of the Bauhaus school in three locations: Weimar, Dessau, and Berlin, exploring the teaching of art through various professors and the formation of the architecture discipline at Bauhaus. Whitford (2013), Herzogenrath (1969), Droste (2019), and Suleimani In their books, they generally express the thoughts and influence of this school on art and architecture. Additionally, an international seminar titled "Bauhaus" was held in Tehran in collaboration with the Cultural Section of the German Embassy in Iran and the University of Art. In this seminar (Bauhaus international seminar in Tehran, 2018), scholars such as Hanachi, Habibi, Welts Bacher, and Shafei provided explanations about the Bauhaus school and its impact on contemporary Iranian architecture.

• The second category (education)

Harimurti (Harimurti et al., 2008), in their article, provide a general overview of the education of Bauhaus professors in the initial period of the school, discussing the objectives, concepts, and general methods of these professors. Azizi, in his article, presents a brief history of the formation of educational groups in the Faculty of Fine Arts. Zargarinejad, relying on documents, discusses the history of the formation of the faculty and its initial program. Soltanzadeh, in his article, addresses the issue of how the Faculty of Fine Arts was formed and how different departments were established within this faculty. Bavar, in his writings in architectural and cultural publications, narrates part of the educational program of the Faculty of Fine Arts. Ansari, in the introduction to his book, describes a portion of the limited-resource educational program of the faculty. Gharavi Al-Khaansari, in two of his articles, critiques and analyzes the architecture education in the Faculty of Fine Arts from its inception until the Cultural Revolution. Tabibzadeh Nouri, in his book, conducts interviews with individuals who studied during the management of Godard at the Faculty of Fine Arts, discussing aspects of architectural education during that period.

Despite conducted studies, so far, no research has

been conducted on the manner in which works of the Faculty of Fine Arts have been influenced by the Bauhaus school. The mentioned sources in Table 1 are presented as a basis for studies in the relevant field, assisting in the process of analyzing the data and documenting them.

Research background

· Ideas and thoughts of the Bauhaus school

European educators and theorists of the 18th and 19th centuries, such as Jean-Jacques Rousseau (1712-1778), Johann Heinrich Pestalozzi (1746-1827), Johann Friedrich Herbart (1776-1841), and Friedrich Wilhelm Froebel (1782-1852), had a significant influence on innovative ideas and teaching methods. These ideas played a distinct role in the development of progressive education. For example, the progressive education movement, led by John Dewey (1859-1952), which transformed architectural education in the first half of the 20th century, emerged from such a background of intellectual enlightenment (Butts & Cremin, 1953). Curricular and instructional in prominent schools worldwide, including Bauhaus, are notable examples of the transformation of education from traditional authoritarian methods to a modern design-oriented education that respects individual freedom and creativity (Biesta, 1996; Anton, 2007; Turan, 2000). In this regard, the concept of "learning by doing," advocated by Rousseau, Pestalozzi, and Froebel, also laid the foundation for new schools with a cohesive educational system like Bauhaus. The educational reforms at Bauhaus initially aimed to integrate practical work and formal education and create harmony between intellectual and manual training for students (Gropius, 1959). Teaching has been one of the most powerful channels through which educated Bauhaus teachers and architects have been able to implement their ideas about design, architecture, and academic education worldwide (Ching et al., 2007). The Faculty of Fine Arts, as the first academic architectural education center in Iran, has also had continuous and explicit connections with

Table 1. Research Background. Source: Authors.

Dimension	Title & date of study	Author	Discussed issues
	Rationalism and Romanticism in Architecture	Lesnikowski	Reflection of 20th-century philosophical thoughts in architecture The narrative of the historical evolution of Western architecture relies on the duality of rationalism and romanticism
hts	Modern Architecture since 1900	Curtis	The way of expressionist thinking of some Bauhaus professors
Ideas and thoughts	Johannes Itten and the Background of Modern Art Education	Raleigh	Expression of thought and teaching method of Itten
Ideas a	The Bauhaus; Weimar Dessau Berlin Chicago	Wingler	The performance of the Bauhaus school in three locations of formation: Weimar, Dessau, and Berlin
	Hope for the Future Generation	Whitford et al.	Expressing the Ideologies and Influence of this School on Art and Architecture.
	The architecture of the École des Beaux-Arts/ed	Chafee	Addresses how architecture was taught at the École des Beaux-Arts through theoretical classes, lectures, and architectural studios.
	Bauhaus Ideology, Concept, and Method on Architecture	Harimurti et al.	The objectives, concepts, and general methods of these instructors have been addressed.
	Development and transformation of the educational groups of the School of Fine Arts (2013)	Azizi	The formation of educational groups in the Faculty of Fine Arts.
	From Mustazrafa Industrial School to Fine Arts College (2007)	Zargarinezhad	The establishment date of the faculty and its initial program.
Education	Architecture and Culture Magazine (2008)	Soltanzadeh	The issue of the formation of the Faculty of Fine Arts and the formation of various departments within this faculty has been addressed.
Edu	Some Educational Developments in Architecture Faculties (2008)	Bavar	Architectural publications such as "Memar" and "Farhang va Sharistan" have narrated a part of the educational program of the Faculty of Fine Arts.
	A selection of the works of architecture students of the Faculty of Fine Arts in the first three decades (2016)	Ansari	Description of the educational program of the faculty.
	Comparison and evaluation of two educational systems of the Faculty of Fine Arts in the field of architecture (2020)	Gheravi alkhaansari	Critique and analysis of architectural education at the faculty of fine arts from the beginning to the cultural revolution.
	Exploration: Faculty of Fine Arts during the presidency of Andre Godard (2021)	Tabibzadeh Nouri	Interviews have been conducted with individuals who studied during Godard's presidency at the Faculty of Fine Arts, and they have made references to architectural education.

these schools, following their innovative educational approaches (Bani Masoud, 2015, 267). Mozayeni believes that among the educational institutions that played a significant role in the expansion and advancement of modern architecture worldwide, the contributions of the École des Beaux-Arts in Paris and Bauhaus in Germany are greater compared to other schools (Mozayeni, 1997).

The period between the two world wars was challenging in French architecture, during which the École des Beaux-Arts lost much of its dominance in teaching classical principles (Fig. 2). Reinforced concrete technology gradually gained

unprecedented popularity among students, and the school authorities embraced modern construction. Pioneering architects criticized traditional education and influenced progressive students of the school. In 1924, the use of reinforced concrete appeared for the first time in designs for a Grand Prix (Egbert, 1980, 107) and became the winning material after 1930.

The significance of this new approach became apparent in 1932 when Emmanuel Pontremoli, the new director of the school, encouraged students to remove a significant portion of the decorations and learn "more practical actions" (Moentmann, 1998).

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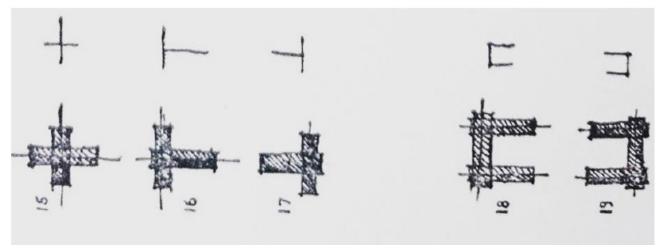


Fig. 2. Composition in Architecture Schools, Bauhaus. Source: Curtis, 1935.

This period is important in the sense that most of the leading professors and students of the Faculty of Fine Arts, including Seyhoun (1949), Foroughi (1937), Dubrulle (1934), Ghiyaii (1947), Farmanfarmayan (1950), Siro (1934), and Paknia (1958), had received their education at the École des Beaux-Arts in the years following 1932. In other words, during a period when the teachings of modern architecture and Bauhaus had an influential impact on the École des Beaux-Arts and globally.

• The Bauhaus School's approach to architecture

Walter Gropius established the Bauhaus School in 1919 with the idea of uniting all visual arts and bridging the gap between design and industrial production, with the ultimate goal of achieving architecture (creation). He sought reforms in education at the Bauhaus. These educational reforms aimed to integrate practical work and formal training and create harmony between intellectual and manual teachings for the students. Gropius stated, "Since talents cannot be recognized before they become visible, the individual must be able to discover his sphere of activity during his period of growth". One example of the students' primary importance in discovering their capacities was the creation of a shared learning environment. It was claimed that collaboration among students would enhance individual artistic creativity. The "workshop" was the main method used for teaching

and learning (Gropius, 1959: 78-87). Upon entering the Bauhaus, students initially had to engage in a period called "Vorkurs," which can be translated as a preliminary course. The purpose of this was to teach subjects prior to the main Bauhaus courses, to assess the character and creative level of future students, and to create equal knowledge for all participating students (Wingler, 1980, 49). During this period, instructors like Johannes Itten taught students how to establish the foundations of their knowledge through principles such as better seeing, better feeling, and better experiencing (Itten, 1974, 96). The purpose of education at the Bauhaus for Itten was "the liberation of the individual from conventional patterns of thought". This educational approach, through personal experiences and discoveries, helped individuals identify their limitations, responsibilities, and potentials (Raleigh, 1968, 302). Vasily Kandinsky taught the principles of design and the precise use of geometric forms (Kandinsky, 2012). Paul Klee taught a design process in which each stage had a significant contribution to the final result. Klee taught a wide range of designed objects and in each chapter of the education, not only he examined one dimension of the work but also taught how one part relates to the "whole" (Klee, 2005). László Moholy-Nagy taught students how to convey messages through visual communication tools (Moholy-Nagy, 1932). Students learned

the thinking process in design during these stages (Chen & He, 2013, 323-328). In the next stage, students engaged in design and construction workshops. Bauhaus workshops were divided into two types: Werklehre or on-site classes, are workshop classes for Bauhaus students in the field of skill training in an artistic, craft, or architectural discipline, to present the initial prototype or model of the product produced in Bauhaus workshops to the industry. The other type focused on formrelated issues or what is commonly referred to as formlehre and essentially served as classes to provide theoretical design instructions in education (Wingler, 1980, 49). Essentially, the latter education included artistic issues that would be used by apprentices in education and architectural construction. After completing this three-year course and apprenticeship thesis, apprentices worked in workshops under the supervision of a master craftsman for an unspecified period. They also took on the supervision of new apprentices and prepared for another examination, upon successful completion of which they would be awarded the title of master craftsman (Sharp, 2002). The Bauhaus school had two types of teachers or professors. First, there were workshop master craftsmen with special industry expertise, meaning they were specialists in various artistic fields but only taught a specific type of industry. Second, there were the main formgiving artists and painters whose responsibility was to present aspects of aesthetic quality and help students understand constructive thoughts or ideas in art and architecture through modern and constructive thinking (Gropius, 1959, 78-87). In the early years of Bauhaus school's activities, the main emphasis was not on teaching architecture, but on teaching principles for fostering innovation and creativity in designs. In 1927, architecture was taught in a separate department that was established for this field. The responsibility for this department was held by Hannes Meyer from 1928 to 1930, and then by Mies van der Rohe from 1930 to 1933 (Soleimani, 2013). During Meyer's tenure, the most

essential task for students was to design a functional plan. He taught his students that designing practical buildings was essential for improving the conditions of society and ordinary people. According to him, a new house is an industrial product. Building construction is a system: a social, technical, economic, and intellectual system. His emphasis in education was on unity in organizing order, function, and construction (Winford, 2013). Mies van der Rohe, on the other hand, taught the design of functional plans and the creation of practical buildings along with explicit refinement and beauty in work. He did not stress the importance of relying on patterns and standardization and instead paid attention to the inevitable social conditions. He emphasized precise selection in the use and combination of materials, as well as attention to space and sufficient light to meet the requirements. These were the educational characteristics of Mies van der Rohe (Soleimani, 2013).

· Bauhaus School in Iran

Modern architecture, or the change in the definition of architectural beauty, was born out of the perspective that space is a positive architectural quality, as stated by Peter Collins (Collins, 1996, 13). Modern architecture is characterized by breaking away from previous forms and frameworks. Rejecting the past as a source of inspiration for artistic works and embracing technology purely were key concerns of modern architects (Burden, 2001, 210). Eliminating ornamentation, disregarding history and historical elements, free plans unrestricted by classical geometry, emphasizing the function and purpose of a structure, combining simple and pure geometric volumes such as cubes, cylinders, and cones, and ultimately creating a structure that can accommodate all people, cultures, and races (Saremi, 1996, 64). It marks the end of historical-oriented architecture, the invention of new and innovative forms, emphasis on functionality, adherence to new science and technology, and consideration of geometric and mathematical proportions, as well as a positive outlook on logical and scientific solutions (Ghobadian, 2017, 178).

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The beginning of modern architecture in Iran (as a style of modernist architecture) started relatively actively in the late period of the first Pahlavi era. In essence, it involved a departure from history and the rejection of historical and classical architectural signs and forms, which was a principle of Western modern architecture. This trend also occurred later in contemporary Iranian architecture, where modern architecture sought to completely detach from the past and traditions in a definitive manner (Kiyani, 2004, 8). During the second Pahlavi era, under the influence of Western modern architecture, the dominant and influential trend of modern architecture took shape (Bani Masoud, 2015, 267). One of its prominent features, similar to the past, is the focus on the external and adherence to a theory that promotes global, uniform, and standardized ways of life, including architecture (Naghizadeh, 2001, 87).

Architectural characteristics of the Bauhaus school

Characteristics indicate the most general, important, and fundamental perceptions of a recipient regarding the qualities of architecture and manifest the most significant attributes in architectural works (Haji Ghasemi, 2011, 8).

Bauhaus, from 1919 to 1933, nurtured artists and architects between World War I and II. Two of the main proponents of modern architecture, Walter Gropius and Mies van der Rohe, were among

the principal instructors at the Bauhaus school. Bauhaus was one of the most important art schools in the 1920s and the first academic institution to academically express the teachings of modern architecture (Ghobadian, 2017). Therefore, Bauhaus architecture characteristics can share a common chapter with the elements and principles that emerged in modern architecture between the two world wars. However, considering the theoretical approaches, perspectives, and methodologies in the realm of the Bauhaus school of architecture, it is possible to find common viewpoints in their definitions and categorize their characteristics dimensions: physical (including form and volume), tangible dimension (including ornamentation and facade), and functional dimension (including spatial relationships), as depicted in Fig. 3.

Research findings

To obtain the design features of the Bauhaus school, considering the described educational system, an examination of thirty samples of works carried out by the school's professors and students has been conducted. These works can be divided into two categories: the first category includes works done by students or in collaboration with professors, and the second category includes works carried out by Bauhaus architecture professors such as Walter

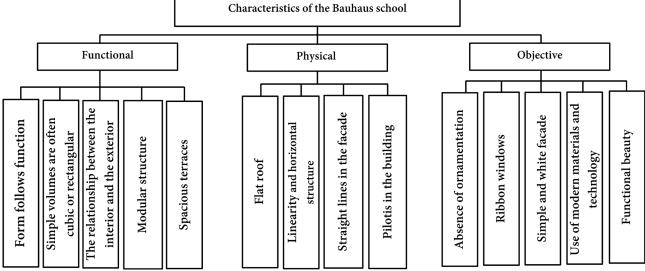


Fig. 3. Categorization of Bauhaus Architectural Characteristics. Source: Authors.

Gropius, Hannes Meyer, and Ludwig Mies van der Rohe during their active period. The obtained features from the analysis of these works are shown in Fig. 4. The number of occurrences of the extracted features from the examined works of the Bauhaus school can be observed in Table 2. The

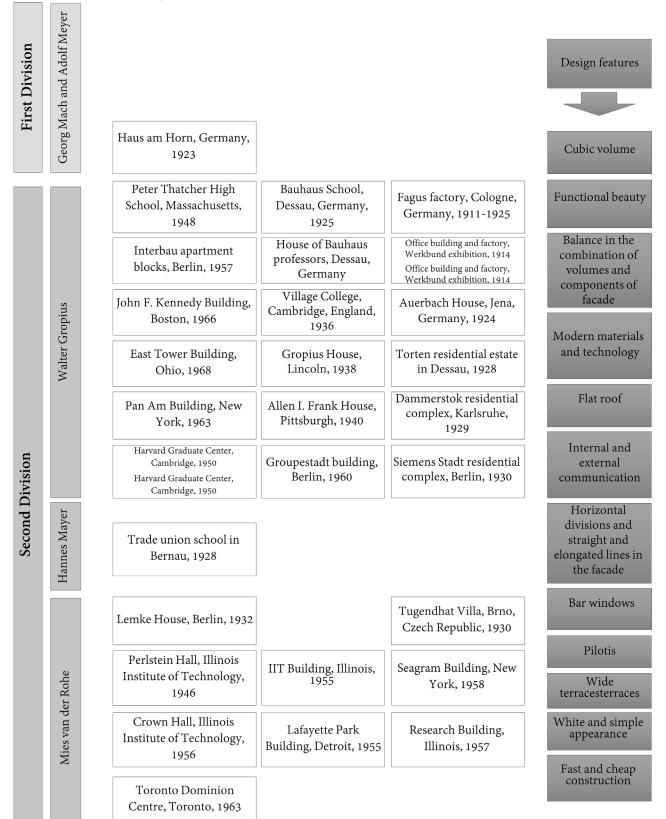


Fig. 4. Characteristics of architectural design in the Bauhaus School. Source: Authors.

weight of each feature is determined by the number of its occurrences relative to the total number of observations. Accordingly, a formula can be developed to quantify the degree of affiliation of an architecture to the Bauhaus style as follows:

(1) Score of a work =
$$\sum_{1}^{N} Characteristic_n score * weight_n$$

In this formula, N represents the total number of features. In this method, if an architectural work contains one of these features, it is assigned a numerical value of 1, and if it lacks that feature, it is assigned a numerical value of 0. Thus, all selected works from Bauhaus and the Faculty of Fine Arts, as shown in Table 3, have been evaluated using this method. The scoring details for the selected works, as indicated in Table 3, using Bauhaus characteristics for each work, can be observed in Table 4. The final score (percentage of influence) for each architecture in the Bauhaus style is shown in Fig. 5.

Based on the scoring in Table 4 for the Fine Arts' architectures, the degree of influence of Fine Arts architectures from the Bauhaus approach in different sections is shown in Fig. 6. As can be observed from the mentioned diagrams, there is a varying degree of influence in different sections.

Furthermore, from an analysis of the total scores

Table 2. Distribution of Bauhaus Architectural Design Features. Source: Authors.

Features	Number of views	Weight (percentage)
Flat roof	30	12.71
Wide terraces	8	3.39
White and simple facade	9	3.81
Fast and cheap construction	5	2.12
Strip windows	12	5.08
Pilotis	3	1.27
Internal and external communication	24	10.17
Horizontal divisions and straight and elongated lines in the facade	25	18.59
Modern materials and technology	30	12.71
Balance in the combination of volumes and components of facades	30	12.71
Functional beauty	30	12.71
Cubic volume	30	12.71
Total	100	236

obtained from the selected works of Fine Arts (Tables 3 & 4), the following results are obtained:

- 9.30% of works at the Fine Arts College show a high affiliation (above 75%) to the Bauhaus style.
- 46.51% of works at the Fine Arts College demonstrate a moderate affiliation (between 50% and 75%) to the Bauhaus style.
- 18.60% of works at the Fine Arts College exhibit a low affiliation (between 25% and 50%) to the Bauhaus style.
- The remaining 25.58% of the selected Fine Arts College works indicate a very low affiliation (less than 25%) to the Bauhaus style.

Conclusion

The present study aims to examine the Bauhaus style in Germany, identify its patterns, and trace its presence in the architecture of the Pahlavi era, specifically in the works of professors and students of the School of Fine Arts at the University of Tehran. The main question addressed is: What characteristics of the Bauhaus school are employed in the architectural works of Fine Arts? And to what extent have these characteristics influenced the prominent structures of that period? Continuing the research, using a descriptiveanalytical method and focusing on architectural patterns in the areas of plan, volume, and facade, the most significant buildings (Table 3) in this style were selected as symbols of Bauhaus architecture and used as a basis for analysis, while other structures were compared against this standard. The patterns have had an influential role in all three areas of the selected buildings. Additionally, based on Table 5 and considering the detailed parameters of the Bauhaus style, similarities can be observed in the tangible, formal, and functional aspects of each of the selected structures. According to the results (Fig. 6), it appears that parameters such as modern materials and technology, balance in the composition of volumes and facade elements, functional beauty, and flat roofs have had a significant impact of over

Table 3. List of selected works of Bauhaus and Fine Arts. Source: Authors.

No.	Selected works from Bauhaus	Selected work of the College of Fine Arts
1	Georg Mach and Adolf Meyer, Haus am Horn, 1923.	Roland Dubrulle, Palace of Justice Department, 1946.
2	Walter Gropius, Fagus Factory, 1925.	Andre Godard, Museum of Ancient Iran-1937.
3	Walter Gropius, Office Buildings and Werkbund Factory, 1914.	Mohsen Foroughi, Melli Bank, Bazar branch, 1945.
4	Walter Gropius, House of Auerbach, 1924.	Mohsen Foroughi in collaboration with Maxim Siro, Faculty of Law and Political Sciences, University of Tehran, 1940.
5	Walter Gropius, Thornton Estate, 1928.	Mohsen Foroughi, central branch of Melli Bank, Isfahan, 1942.
6	Walter Gropius, Dammerstok residential complex, 1929.	Andre Godard and Maxim Siro, Faculty of Medicine, University of Tehran, 1940.
7	Walter Gropius, Siemensstadt Residential Complex, Berlin, 1930.	Roland Dubrulle and Maxim Siro, Tehran University Club, 1941.
8	Walter Gropius, Bauhaus School, 1925.	Andre Godard and Maxim Siro, Iranshahr School, Yazd, 1934.
9	Walter Gropius, Bauhaus faculty house, 1932.	Roland Dubrulle, Casino Ramsar, 1936.
10	Walter Gropius, Village College, 1936.	Roland Dubrulle, The Qomash building, 1939.
11	Walter Gropius, House of Gropius, 1938.	Eugene Aftandelian, Rudaki Hall, 1967.
12	Walter Gropius, Alan I. Frank House, 1940.	Eugene Aftandelian in collaboration with Rolan Dubrol, Ferdowsi School, 1938.
13	Walter Gropius, Harvard Graduate Center, 1950.	Roland Marcel Dubrol in collaboration with Eugene Aftandelian, Fine Arts Faculty studios, 1940.
14	Walter Gropius, Peter Thatcher High School, 1948.	Ghayaei, Foroughi, Zafar, Sadegh, Royal Hilton Hotel- 1962.
15	Walter Gropius, Interbau Apartment Blocks, 1957.	Haider Ghayaei-Mohsen Foroghi, Senate-Islamic Council, 1949.
16	Walter Gropius, John F. Kennedy Building, 1966.	Houshang Seyhoun, Seyhoun's private house, Darrous, Tehran, 1963.
17	Walter Gropius, Eastern Tower Building, 1968.	Houshang Seyhoun, Canada Dry factory, 1955.
18	Walter Gropius, Pan Am Building, 1963.	Houshang Seyhoun, Hoshang Seyhoun's office, 1954.
19	Walter Gropius, Gropiusstadt Building, 1960.	Houshang Seyhoun, Sepah Bank Central Building, 1957.
20	Hans Meyer, Trade Union School, 1930.	Houshang Seyhoun, Dolatabadi House, 1969.
21	Ludwig Mies van der Rohe, The Houses of Lange and Stress, 1928.	Houshang Seyhoun, Mr. Kazemi's house, 1958.
22	Ludwig Mies van der Rohe, Villa Tugendhat.	Abdulaziz Farmanfarmayan, National Iranian Oil Company, along with Yahya Ettehadieh, 1958.
23	Ludwig Mies van der Rohe, Lemke House, 1932.	Abdulaziz Farmanfarmayan, The twin towers of Saman, 1969.
24	Ludwig Mies van der Rohe, Perlstein Hall, Illinois Institute of Technology, 1946.	Abdulaziz Farmanfarmayan, Ministry of Agriculture, 1973.
25	Ludwig Mies van der Rohe, Crown Hall, Illinois Institute of Technology, 1956.	Abdulaziz Farmanfarmayan, Kar Bank building, 1963.
26	Ludwig Mies van der Rohe, Research Building, 1957.	Abdulaziz Farmanfarmayan, Carpet Museum, 1961.
27	Ludwig Mies van der Rohe, IIT Building, 1955.	Abdul Aziz Farmanfarmayan, Azadi Sports Complex, 1961.
28	Ludwig Mies van der Rohe, Seagram Building, 1958.	Bahman Paknia, Central Library, University of Tehran, 1966.
29	Ludwig Mies van der Rohe, Lafayette Park Building, 1955.	Roland Dubrol, the eastern blocks of the Palace of the Ministry of Finance, 1959.
30	Ludwig Mies van der Rohe, Toronto Dominion Centre, 1963.	Iraj Kalantari, Karl Schlaminger's house, 1968.
31	-	Iraj Kalantari, Morteza Kalantari's House, 1965.
32	-	Iraj Kalantari, Najaf Daryabandari's house, 1971.
33	-	Hamlet Hartounian, apartment complex, Tehran, 1959.
34	-	Mehdi Alizadeh, Dawoodzadeh house, 1963.
35	_	Mehdi Alizadeh, Kohbar residential complex, 1973.
	-	• •
36	-	Mehdi Alizadeh, The Sedaqat House, 1973.

Rest of Table 3.

No.	Selected works from Bauhaus	Selected work of the College of Fine Arts
37	-	Mehdi Alizadeh, Shahgoli Apartments, Tabriz, 1969.
38	-	Ali Akbar Saremi, The Afshar House, 1976.
39	-	Seyhoun, Picnic Restaurant, Tous and Ferdowsi Museum, 1968.
40	-	Foroughi in collaboration with Ali Akbar Sadegh, Saadi Tomb, 1951.
41	-	Seyhoun, Nadershah tomb, Mashhad, 1962.
42	-	Seyhoun, Ibn Sina's tomb, Hamadan, 1951.
43	-	Hossein Amanat, Azadi Tower, 1967.

Table 4. Scores of selected works of Fine Arts in Bauhaus characteristics. Source: Authors.

											Prop	erties	8											
	Bauhaus											The College of Fine Arts												
Architectural work number from Table 3	Flat roof	Wide terraces	White and simple facade	Fast and cheap construction	Strip windows	Pilots	Internal and external communication	Horizontal divisions and straight and elongated lines in the facade	Modern materials and technology	Balance in the combination of volumes and components of facades	Functional beauty	Cubic volume	Flat roof	Wide terraces	White and simple facade	Fast and cheap construction	Strip windows	Pilots	Internal and external communication	Horizontal divisions and straight and elongated lines in the facade	Modern materials and technology	Balance in the combination of volumes and components of facades	Functional beauty	Cubic volume
1	1	0	1	1	0	0	0	0	1	1	1	1	1	0	0	0	0	0	1	0	1	0	0	0
2	1	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0		0
3	1	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	1	0	1	0		0
4 5	1	1	1 1	1	1	$\begin{bmatrix} 0 \\ 0 \end{bmatrix}$	0	1	1	1	1	1	0	0	0	0	0	0	0	$\frac{0}{0}$	1 1	0		0
6	1	1	1	1	1	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	1	0		0
7	1	0	I 1	1	1	0	0	1	1	1	1	1	1	1	0	0	0	0	0	1	1	0		0
8	1	1	1	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0		0
9	1	1	1	0	0	0	1	0	1	1	1	1	1	0	0	0	0	0	0	0	1	0		0
10	1	0	0	0	1	0	1	1	1	1	1	1	1	0	0	0	1	0	0	1	1	1	1	0
11	1	0	1	0	1	0	1	1	1	1	1	1	1	0	0	0	0	0	1	0	1	1	1	1
12	1	1	0	0	1	0	1	1	1	1	1	1	1	0	0	0	1	0	0	1	1	0	1	1
13	1	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	1	1	1	1	1	1	1	1
14	1	0	0	0	1	0	1	1	1	1	1	1	1	0	1	0	0	0	1	1	1	1	1	1
15	1	1	0	0	1	0	0	1	1	1	1	1	1	0	0	0	0	0	1	0	1	1	1	0
16	1	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	1	0	1	1	1	0
17	1	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	1	0	1	1	1	1
18	1	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	1	0	1	1	1	1	1	1

Rest of Table 4.

											Prop	erties	<u> </u>											
Bauhaus														Т	he C	ollege	of Fi	ne Ar	ts					
Architectural work number from Table 3	Flat roof	Wide terraces	White and simple facade	Fast and cheap construction	Strip windows	Pilots	Internal and external communication	Horizontal divisions and straight and elongated lines in the facade	Modern materials and technology	Balance in the combination of volumes and components of facades	Functional beauty	Cubic volume	Flat roof	Wide terraces	White and simple facade	Fast and cheap construction	Strip windows	Pilots	Internal and external communication	Horizontal divisions and straight and elongated lines in the facade	Modern materials and technology	Balance in the combination of volumes and components of facades	Functional beauty	Cubic volume
19	1	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	1	1	1	1	1	1
20	1	0	0	0	0	1	1	0	1	1	1	1	0	0	0	0	0	0	0	0	1	0	0	0
21	1	1	0	0	1	0	1	1	1	1	1	1	1	0	0	0	1	0	1	1	1	1	1	1
22	1	1	1	0	1	0	1	1	1	1	1	1	1	0	0	0	1	1	1	1	1	1	1	1
23	1	0	0	0	0	0	1	0	1	1	1	1	1	0	0	0	0	0	0	1	1	1	1	1
24	1	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	1	1	1	1	1	1
25	1	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	1	1	1	1	1	1
26	1	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	1	1	1	0
27	1	0	0	0	0	0	1 1	1	1	1	1	1	1	0	0	0	0	$\begin{bmatrix} 0 \\ 0 \end{bmatrix}$	1	1 1	1	1	1	0
28 29	1	0	Δ.	0	0	0	1	1	1	1	1	1	1	Δ	0	Δ	1	0	1	1	1	1	1	1
30	1	0	0	0	0	0	1	1	1	1	1	1	1	0	1	0	1	1	0	1	1	1	1	0
30	1	0	1	1		0	0	0	1	1	1	1	1	0	1	0	1	1	0	1	1	1	1	1
31	-	-	-	-	-	-	-	-	-	-	-	-	1	0	0	0	0	0	0	0	1	1	1	1
32	-	-	-	-	-	-	-	-	-	-	-	-	1	0	0	0	1	0	1	1	1	1	1	1
33	-	-	-	-	-	-	-	-	-	-	-	-	1	1	0	0	0	0	0	0	1	1	1	1
34	-	-	-	-	-	-	-	-	-	-	-	-	1	1	0	0	0	0	0	0	1	1	1	1
35	-	-	-	-	-	-	-	-	-	-	-	-	1	1	0	0	1	0	0	1	1	1	1	1
36	-	-	-	-	-	-	-	-	-	-	-	-	1	1	0	0	1	1	0	1	1	1	1	1
37	-	-	-	-	-	-	-	-	-	-	-	-	1	1	0	0	0	0	0	0	1	1	1	1
38	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	1	1	1	0
39	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0	0	0	0
40	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	1	1	0	0
41	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	1	0	0	0
42	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	1	0	0	0
43	-	-	-	-	-	-	-	-	-	-	-	-	1	0	0	0	0	0	1	0	1			

Bagh-e Nazar 💯

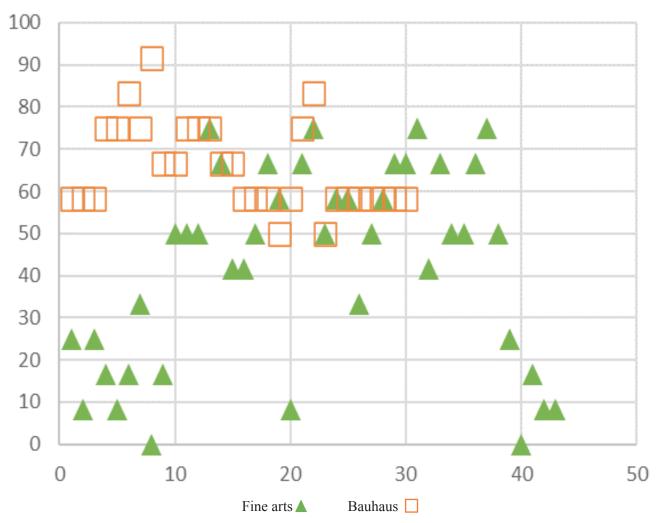


Fig. 5. Final score of works of Fine Arts in Bauhaus characteristics. Source: Authors.

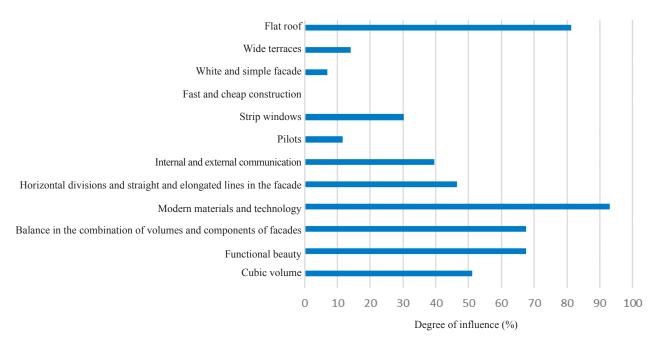


Fig. 6. The influence of the Bauhaus approach on the Fine Arts architecture of Tehran University in different sections. Source: Authors.

Table 5. Ten examples of Fine Arts and Bauhaus buildings with high and medium affiliation scores. Source: Authors.

Bauhaus

Image

Architectural features

Image Architectural features

Fine Arts



Residential properties in Torten in Dessau, designed by Gropius and Meyer, 1928-1926

Cubic volume, fast and costeffective construction, simple and white façade, ribbon windows, functional beauty, balance in combining volumes and façade elements, modern materials and technology, horizontal divisions and straight lines in the façade, flat roof.



Ateliers of the Faculty of Fine Arts, Roland Marcel Dubrulle in collaboration with Yogina (Eugene) Aftandelian, 1940-1952

Cubic volume, functional beauty, balance in combining volumes and façade elements, modern materials and technology, flat roof, horizontal divisions and straight lines in the façade, ribbon windows, pilotis.



Dammerstok residential complex, Gropius, 1928-1929

Cubic volume, simple and white façade, ribbon windows, functional beauty, spacious terraces, fast and cost-effective construction, balance in combining volumes and façade elements, modern materials and technology, horizontal divisions and straight lines in the façade, flat roof.



Royal Hilton Hotel - Foroughi, Zafar, Sadeq, Haider Ghayaei, 1962

Cubic volume, functional beauty, balance in combining volumes and façade elements, modern materials and technology, flat roof, horizontal divisions and straight lines in the façade, integration of interior and exterior spaces.



Gropius House, Gropius, 1938

Cubic volume, simple and white façade, functional beauty, integration of interior and exterior spaces, ribbon windows, balance in combining volumes and façade elements, modern materials and technology, horizontal divisions and straight lines in the façade, flat roof.



Morteza Kalantari's House, Iraj Kalantari, 1965

Cubic volume, functional beauty, balance in combining volumes and façade elements, modern materials and technology, horizontal divisions and straight lines in the façade, flat roof, ribbon windows, pilotis.



Bauhaus School, Gropius, 1925-1932

Cubic volume, simple and white façade, ribbon windows, functional beauty, integration of interior and exterior spaces, pilotis, balance in combining volumes and façade elements, modern materials and technology, horizontal divisions and straight lines in the façade, spacious terraces, flat roof.



Eastern blocks of the Ministry of Finance, Roland Dubrulle, 1959

Cubic volume, integration of interior and exterior spaces, functional beauty, balance in combining volumes and façade elements, modern materials and technology, horizontal divisions and straight lines in the façade, flat roof, and ribbon windows.



Alan I. Frank House, Gropius and Breuer, 1940–1939

Cubic volume, spacious terraces, ribbon windows, integration of interior and exterior spaces, functional beauty, balance in combining volumes and façade elements, modern materials and technology, horizontal divisions and straight lines in the façade, flat roof.



Dr. Kazemi's house, Seyhoun, 1958

Cubic volume, integration of interior and exterior spaces, functional beauty, balance in combining volumes and façade elements, modern materials and technology, horizontal divisions and straight lines in the façade, flat roof, and ribbon windows.



Siemens Stadt residential complex, Gropius, 1929-1930

Cubic volume, simple and white façade, ribbon windows, functional beauty, fast and cost-effective construction, balance in combining volumes and façade elements, modern materials and technology, horizontal divisions and straight lines in the façade, flat roof



Iran National Oil Company, Fermanfarmayan, 1337

Cubic volume, integration of interior and exterior spaces, functional beauty, balance in combining volumes and façade elements, modern materials and technology, horizontal divisions in the façade, flat roof, pilotis, ribbon windows

Reat of Table 5.

Bauhaus Fine Arts Image Architectural features Image Architectural features



Harvard Graduate Center, Gropius, 1949–1950

Cubic volume, ribbon windows, integration of interior and exterior spaces, pilotis, functional beauty, balance in combining volumes and façade elements, modern materials and technology, horizontal divisions and straight lines in the façade, flat roof, pilotis



Ministry of Agriculture, Farmanfarmayan, 1973

Cubic volume, interior and exterior connection, functional beauty, balance in combining volumes and façade elements, modern materials and technology, horizontal divisions and straight lines in the façade, flat roof



Peter Thatcher High School, Gropius, 1948

Cubic volume, ribbon windows, interior and exterior connection, functional beauty, balance in combining volumes and façade elements, modern materials and technology, horizontal divisions and straight lines in the façade, flat roof



Kar Bank building, Abdulaziz Farmanfarmayan, 1992

Cubic volume, integration of interior and exterior spaces, functional beauty, balance in combining volumes and façade elements, modern materials and technology, horizontal divisions and straight lines in the façade, flat roof



Lange and Stress Houses, Van der Rohe, 1928

Cubic volume, spacious terraces, ribbon windows, integration of interior and exterior spaces, functional beauty, balance in combining volumes and façade elements, modern materials and technology, flat roof, horizontal divisions, and straight lines in the façade



Tehran apartment complex, Hamlet Hartounian, 1959

Cubic volume, functional beauty, balance in combining volumes and façade elements, modern materials and technology, horizontal divisions and straight lines in the façade, flat roof, and ribbon windows.



Tugendhat Villa, Van der Rohe, 1930

Cubic volume, spacious terraces, simple and white façade, ribbon windows, integration of interior and exterior spaces, functional beauty, balance in combining volumes and façade elements, modern materials and technology, horizontal divisions, and straight lines in the façade, flat roof



Shahgoli Apartments, Tabriz, Mehdi Alizadeh, 1969

Cubic volume, functional beauty, balance in combining volumes and façade elements, modern materials and technology, flat roof, pilotis, spacious terrace, horizontal divisions, and straight lines in the façade

60%. On the other hand, features such as simple facades, pilotis form, and rapid and inexpensive construction have had the least influence or have been completely eliminated. Additionally, numerical weighting based on the frequency of each feature was used to develop a calculation formula for the affiliation of each work to the Bauhaus approach. It was demonstrated that the extracted features and the degree of affiliation of each work to the Bauhaus approach were calculated using the developed formula. Overall,

the influence of Fine Arts from the Bauhaus approach aligns with historical evidence since the time of Emmanuel Pontremoli's changes in 1932. The method presented in this study can be utilized to describe other complex issues and similar overlapping influences between different styles in the future. Furthermore, in future research, it is possible to delve into the examination of other details of architecture formed by Fine Arts and explore the criteria shaping this architecture and its impact on contemporary Iranian architecture.

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