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Introducing a Systematic Approach for Quantifying Architectural Style Influence: A Comparative Analysis of École des Beaux-Arts and Bauhaus on the College of Fine Arts, University of Tehran

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ABSTRACT: This research proposes a systematic approach to provide insight into quantifying the similarity/ dependency between different architectural design styles. The study utilizes the College of Fine Arts of the University of Tehran as its primary focus. It examines to what extent the architecture at the College of Fine Arts at the University of Tehran was affected by the French École des Beaux-Arts and the German Bauhaus school by examining more than a hundred architectural works from these schools. In the first half of this study, the teaching method and educational system of these schools are reviewed, and in the second half of the study, each school's main characteristics of architectural works are identified. If we consider an architectural work as the outcome of an architectural education, then the features of the created work can be attributed to the associated educational system. Based on this, the characteristics of the prominent architectural works of the two schools were investigated and used for the analysis through the proposed approach. This approach can be used for quantitatively investigating complex qualitative problems in different disciplines. On average, the results show that these two approaches influence thirty-three percent of the College of Fine Arts, while the Bauhaus approach shows a greater impact.

Keywords: *Visual assessment, Design analysis, École des Beaux-Arts, Bauhaus school, College of Fine Arts of the University of Tehran.*

INTRODUCTION

There were two pivotal points in the history of architectural education at the College of Fine Arts. The first was the introduction of architecture as an academic discipline at the College of Fine Arts, with lecturers who were mostly graduates of the École des Beaux-Arts (Gharavi Khansari, 2018, 2019; Sepehri, 2020). Second, the Bauhaus style entered Iran under the influence of modern architecture from prominent educational centers, including the Staatliches Bauhaus, which grew at a global level at that time and was embraced by some of the professors and students at the College of Fine Arts (BaniMassoud, 2015, 267; Ghaseminiaa & Soltanzade, 2016; Habibi, 2008).

To investigate the influence of these schools on the College of Fine Arts, this study first attempted to analyze the curricula of Beaux-Arts and Bauhaus. The experiences of academic teaching of architecture in the last two centuries have shown that the teaching method substantially influences architects' character and works. Accordingly, distinguished works of architecture by Beaux-Arts and Bauhaus teachers and students were analyzed to extract the main design characteristics and their level of importance. These characteristics and their importance were then used to systematically analyze the architectural works of professors

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at the College of Fine Arts (since its establishment in 1969) and to analyze prominent works of professors and students of the college in the contemporary architecture of Iran until 1979. This period was chosen before the Cultural Revolution in Iran, which led to changes in Iranian architecture.

Most of the works of architecture during this period were by the College of Fine Arts professors and students, a group considered to be pioneering and influential in contemporary architecture of Iran. Therefore, the results could serve as a source to assess the current architectural design situation and plan to improve architectural education to fulfill the needs of Iranians better today. This research focuses on addressing two fundamental questions: firstly, identifying the specific characteristics of the Bauhaus and École des Beaux-Arts styles that have impacted the University of Tehran, and secondly, assessing the extent of their influence.

Research Background

Previous studies could be categorized into two groups: First, studies on the ideas and views in each of the schools, and second, studies on the teaching methods practiced in these schools.

Ideas and views: A first instance of these studies is Lesnikowski's book on the reflection of 20th-century philosophy in architecture (Hinson & Lesnikowski, 1983), where he discusses the historical development of Western architecture based on the duality of rationalism and romanticism and probes their influence on the Bauhaus school. In his book, Curtis studies German expressionism and Bauhaus, reviewing the expressionist views of some Bauhaus teachers (Curtis, 1983). Raleigh examines the background of modern art and the views and teaching method of Johannes Itten (Raleigh, 1968). Wingler studies the Bauhaus school in its birthplace in three locations, namely Weimar, Dessau, and Berlin, surveying different teachers' methods and the formation of architecture as a discipline at Bauhaus (Wingler, 1969, 50). Henri Lefebvre's lessons from the Bauhaus emphasize the importance of integrating art, technology, and social awareness to create meaningful urban spaces (Lohtaja, 2021).

Peyman Akhgar explores the impact of École des Beaux-Arts on the architectural style of Mohsen Foroughi, an Iranian architect who blended traditional Persian elements with modern architecture (Akhgar & Moulis, 2021). The Museum of Modern Art (MoMA) collected pictures of some of the designs by Beaux-Arts teachers and students, which were displayed in an exhibition in New York City in 1976, to present the ideas and views of Beaux-Arts architecture to the public (Drexler, 1975, 30).

Teaching method: Chaffee explored how the Beaux-Arts style of architecture was taught in classrooms, lectures, and architectural ateliers (Chafee, 2016, 15). Harimurti et al. reviewed the teaching method of Bauhaus masters in the preliminary course and the general objectives, concepts, and methods (Harimurti et al., 2008). Le Masson et al. analyzed teaching at Bauhaus by focusing on the courses of Itten and Klee (Le Masson et al., 2016). In a 2003 article, Azizi provides a brief history of the formation of different College of Fine Arts departments of the University of Tehran (Azizi, 2003). In another article, Zargarinezhad looks at the history of the formation of the college and its first program (Zargarinezhad, 2007). Soltanzadeh provides information on the initiation of the College of Fine Arts of the University of Tehran and its different departments (Soltanzade, 2008, 8). Bavar (Bavar, 2008, 108) provides accounts of the curriculum at the College of Fine Arts of the University of Tehran in Memari va Farhang. Ansari (Ansari 2014, 26) describes a part of the college's curriculum in the introduction of his book. Khansari has assessed architecture education at the School of Fine Arts from its inception to the Cultural Revolution (Gharavi Khansari, 2018, 2019). In his article, Sepehri (Sepehri, 2020) has examined the educational program of architectural design at the School of Fine Arts, University of Tehran, through a historical research method. In her book, Tabibzadeh Nouri (Tabibzadeh Nouri, 2021, 20) informally interviews several graduates of the College of Fine Arts of University of Tehran during the deanship of Andre Godard with references to the architectural education of the college formed at that time. Yet, there is a gap in research on the influence of Bauhaus and Beaux-Arts on the Iranian architecture.

Tracing architectural pedigree for quantifying the impact of different design styles on each other is complex. By analyzing notable works of architecture by Beaux-Arts and Bauhaus teachers and students, this study aims to extract their key design characteristics and associated levels of importance.

Theoretical Framework

The École des Beaux-Arts Architectural Curriculum

The architectural curriculum at the École des Beaux-Arts was based on simulation exams (competitions) and conferences. The examination was a method to assess the students' designs. Many of the exams were in architecture and of two types: architectural sketches and architectural projects. From 1867, a third type of exam, i.e., analysis of elements, was added to the curriculum. The elements to be analyzed were Doric, Ionic, and Corinthian. The purpose was to introduce students to ancient architecture, and its different parts served as sources of architectural proportion and decorative patterns. The construction of architectural composition was of great importance. Accordingly, from 1823 to 1868, four constructions (stone, metal, wood, and others) were in the yearly exam (Chafee, 2016, 40).

The Beaux-Arts system was hierarchical, and the top segment was only for one person. There were four stages at the bottom segment, the lowest of which was preparation for admission. The higher level included the second class and the first class on top. The top stage was the diploma project. Finally, the last stage was for competition for the "grand prix," which was the main goal of the best students. Every student could move up the ladder at their own pace. To get to the first class, each one of the students had to be credited in the four exams (as well as in mathematics and several architectural compositions). The courses in the second class included small schools, road montage, or small railroads. Parts of buildings, houses, or rural springs were considered for sketches. The first-class program was similar to the second class's but emphasized six periods of sketches and six architectural projects. The first class was also where large projects were designed (Haberson, 2008, 200).

The regulations revised in November 1867 replaced the four examinations with one. The course was three months long, and mathematics and descriptive geometry were the prerequisites. In the

following decades, students of the second class needed a one-year program for scientific studies and design training as well as math, descriptive geometry, perspective, and construction examinations. Construction examination required twelve designs, and the objective of the designs was to show how predetermined buildings would be located. The designs paid meticulous attention to the details of stones, metals, wood, and the mathematical calculations of the building. Passing the construction requirements was the second class's most difficult part. From 1855 to 1859, dessin was also added to the curriculum. Dessin was, in fact, the students' designs of classic ornamentations, human figures, or figurative sculptures. The 1883 regulations added the history of architecture to the examination schedule in the second class. In this way, the student was seen as an archaeologist and designed buildings or parts of buildings. In the 1880s and 1890s, the designs were Roman and Greek, but in the 20th century, they resembled medieval architecture. There was an interesting way of enrolling in the architecture exams. The student would sign their name in the enrollment book and receive a program copy. They would then enter a small room ("en loge" in French) and have twelve hours to study the program and present a primary small-scale design that represented their basic architectural design (Chafee, 2016, 25).

During this limited time, primary ideas about the composition were produced. The early ideas were known as "parti" (options / for selection), a shape or diagram that highlighted the main characteristics of the program distribution and the compositional axes of the program (Fig 1). The axes that a party produced had key roles in aligning the different elements of the design and determining the dominant element and the focal point located on the continuation of the main axis. In École, the symmetrical ones were preferred over the asymmetrical ones. The goal was to select a suitable composition that met a determined program's practical and aesthetic needs (Giudici, 2015).

The École des Beaux-Arts system in architecture was based on designing a project assigned to the students at the beginning of the semester. When the primary designs were accepted, and the work continued, their progress was supervised by the instructors at the atelier. The projects were completed in a determined time, submitted on a determined day to be assessed, and moved to the next stage if they received the required score (Hautecœur, 1965). Some of the official and private ateliers in the Beaux-Arts included the ateliers of Pierre-François-Henri Labrouste in 1830, Jean-Louis Pascal in 1870, Viollet-le-Duc in 1856, Louis-Jules André in 1880, Victor Laloux in 1890, Emmanuel Pontremoli in 1920, Léon Jaussely in 1919, Auguste Perret in 1924, Roger Expert in 1934, Noël Le Maresquier in 1953, and Ottelo Zavaroni in 1957 (Chafee, 2016, 20).

The Interwar period was challenging for French architecture, during which the École des Beaux-Arts lost most of its dominance. Reinforced concrete ("le béton armé" in French) became unprecedentedly popular among the students, and the school officials welcomed modern constructions. The pioneering architects criticized the school's method of education and pedagogy and influenced the progressive students. In 1924, reinforced concrete was used for the first time in the designs of the school Grand Prix (Egbert et al., 1980, 80) and won for the first time after 1930. However, the dominance of new technologies and the growth of modern movements could not make the school stop its long-running doctrine.

On the contrary, most followers of modernism sought a way to consolidate their traditions by modernizing the appearance of buildings without sacrificing the classic principles of fine arts and design. They could save the school's glory through modern architecture and train students to design according to new technologies and materials. Therefore, this new approach was a non-decorative classicism, a balanced approach whose importance became clear in 1932 when Emmanuel Pontremoli, the new school director, encouraged students to eliminate most decorations and learn more practical actions. In the mid-1930s, most students used the classic principles of composition, including axis, symmetry, building grandeur, and modern materials such as reinforced concrete (Akhgar, 2018).

Architecture Education System Formed in Bauhaus School

Walter Gropius founded the Bauhaus school in 1919 to unify all visual arts and create a connection between industrial design and production and the ultimate goal of (construction) architecture. He sought reforms in education at the Bauhaus. These educational reforms first tried integrating practical and formal work and creating harmony between students' intellectual and manual training. Gropius stated: "Since the types of talents cannot be recognized before they manifest, the individual must be able to discover his field of activity during his development period." One of the main important points for the students

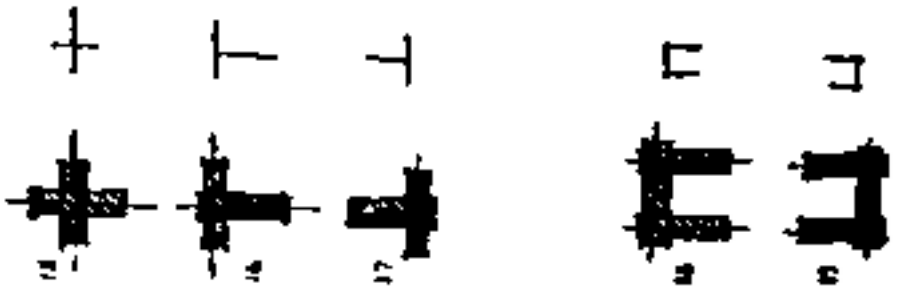


Fig. 1: Some compounds described by Curtis. Creating a good composition was the first thing to consider in the school. The initial decisions about architectural composition had to be made through design in the lodge by choosing the most suitable initial plan (Akhgar, 2018)

is to discover their capacities through creating a common learning environment. It was claimed that working together will strengthen the individual artistic creativity of students. "Workshop" was the main teaching and learning method (Füssl, 2006).

Entering the Bauhaus, students had to study a course called "Vorkurs." The literal meaning of the German word "Vorkurs" is pre-course. It meant teaching courses before the main Bauhaus courses to examine future students' personalities and levels of creativity and create equal knowledge of education for all participants (Wingler, 1969, 85). In this course, professors like Johannes Itten taught students how to build their knowledge bases by teaching principles such as seeing, feeling, and experiencing better (Whitford, 1994). The purpose of education for Itten was to let "a person free from common thought patterns." this educational approach helped a person to know his limitations, responsibilities, and also his potential with "personal experiences and discoveries" (Raleigh, 1968).

Meanwhile, Wassily Kandinsky taught the principles of design and how to use geometric shapes accurately (Poling, 1986, 85). Paul Klee taught a design process in which each step contributed to the final result. Klee taught a broad language of the designed object, and in each chapter of the lesson, he examined one aspect of the work and explained how a part relates to the "whole" (Klee, 2004, 42). Through visual communication tools, Moholy Nagy taught students how to convey a message (Moholy-Nagy, 2005). In these stages, students were taught how to think in design (Chen & He, 2013). In the next stage, they were engaged in designing and manufacturing in the workshops. Bauhaus workshops were of two types: Werklehre or classes at work, a workshop for Bauhaus students in the field of skill training in an art, craft, or architectural discipline to provide a prototype or model of the product presented in the Bauhaus workshops and to be managed for industry. Another type (Formlehre) is the one in which issues related to form or the so-called Formlehre were taught, and they were classes to provide design theory instruction in education (Wingler, 1969, 102). The recent training included artistic issues trainees use to teach and build architecture. After completing this three-year course and the internship thesis, the apprentices worked in the workshops for an indefinite period under the supervision of the master, and simultaneously they took charge of the supervision of the new apprentices and prepared for another exam, after which the master diploma was awarded (Sharp, 2002, 30).

The Bauhaus school had two types of teachers or professors. First, the senior workshop expert with special expertise in the industry, i.e., an expert in various artistic disciplines, but they only taught a specific type of knowledge for industry. Second, the main form included artists and painters, whose responsibility was to present the aspects of aesthetic quality and help the student understand the constructivist thought or idea about art and architecture through modern and constructive thoughts. In the first years of the Bauhaus school, the main emphasis was not on teaching architecture but on teaching principles of innovation and creativity in designs. In 1927, a separate department was created for teaching architecture. This department was under the responsibility of Hannes Mayer from 1928-1930, and Mies van der Rohe directed it from 1930-1933 (Wingler, 1969, 250). During Meyer's era, the most essential task of the students was to design a functional plan. He taught his students that designing practical buildings is necessary to improve the condition of society and ordinary people (Droste, 2019, 85). According to him, the new house is an industrial product. Construction is a social, technical, economic, and intellectual system. His emphasis in education was on unifying discipline, performance, and construction (Whitford, 1994). Mies van der Rohe taught functional plan design and the creation of functional buildings with elegance and explicit beauty in the work. These were among Mies van der Rohe's educational characteristics to meet the requirements: lack of emphasis on patterns and standardization, attention to inevitable social conditions, emphasis on careful selection for utilization and combination of materials, and attention to sufficient space and light (Droste, 2019, 100).

MATERIALS AND METHODS

Visual analysis is a powerful tool which has been used in different fields, such as urban design, architecture and ecosystem analysis (Bostanci, 2015; Cortesão et al., 2020; Eilouti, 2019; Gobster et al., 2019; Lenzholzer et al., 2013; Mahmoud & Omar, 2015; Mundher et al., 2022a & 2022b; Inglis & Vukomanovic, 2020; Inglis et al., 2022; Prochner & Godin, 2022). This research is a theoretical study with a qualitative and quantitative approach, which is performed in two stages: it started with an interpretive-historical research method and now continues with the descriptive-analytical research approach and seeks to describe how and to what extent Beaux-Arts and Bauhaus schools impacted the architecture of the College of Fine Arts of the University of Tehran.

In the light of the explained educational systems, unique architectural design features of architectural works from Beaux-Arts and Bauhaus schools are identified by detailed analysis of thirty prominent architectural works attributed to each school, using the available images and plans. To determine the extent of influence of each school on the architectural works, a scoring system was developed based on the identified design features. The formula for determining the belonging/influence score was created by assigning different weights to each design feature based on its significance in the architectural works. The score was then calculated for each work and used to rank the works according to their degree of influence from each school.

RESULTS AND DISCUSSION

Characteristics of École des Beaux-Arts architectural design

If we consider an architectural work as a product of its associated educational system, then the features of the work can be attributed to that system. With this in mind, the unique characteristics of prominent architectural works associated with the Beaux-Arts and Bauhaus schools were investigated.

Images and plans from thirty examples of the works performed by the professors and students of École des Beaux-Arts were examined to obtain the specific characteristics of the architectural design of this school. The works performed by this school are divided into several categories: the first category includes the works of professors and students, which were exhibited in the Museum of Modern Art in New York – 1975 (Drexler, 1975). The second category deals with the works

of professors and students of Beaux-Arts during their period of activity, the ones who taught or were trained in this school from 1819 to 1968 (Chafee, 2016). The categories of the selected works are shown in the diagram of Fig 2. Table 1 presents the unique features extracted from works associated with École des Beaux-Arts and their frequency of occurrence. These frequencies reflect the relative importance of each feature within the Beaux-Arts style. To calculate the degree of dependence of an architectural work on the Beaux-Arts style, the weight of each feature was determined by its frequency of occurrence relative to the total number of observations. Based on this, a formula was developed as follows. (Equation 1)

$$Score\ of\ a\ work\ = \sum_{n=1}^{N} Feature_n \text{value} * weight_n \quad \text{(Equation 1)}$$

The developed formula calculates the dependence score of an architectural work on the Beaux-Arts style, with N representing the total number of features. Each feature is assigned a numerical value of one if present in an architectural work and zero if not. Using this approach, all the works selected from the Beaux-Arts, Bauhaus, and fine arts schools, as shown in Table 2, were evaluated to determine their score concerning the Beaux-Arts style. The evaluation details for each work can be found in Table 3. The final score for each work concerning the Beaux-Arts approach, the sum of the product of the weights from Table 1 and feature values from Table 3, is presented in Fig 3. The numerical value 100 indicates complete dependence on the Beaux-Arts approach, while 0 represents complete independence. Error bars in Fig 3 were calculated by repeating the evaluation process using formulas

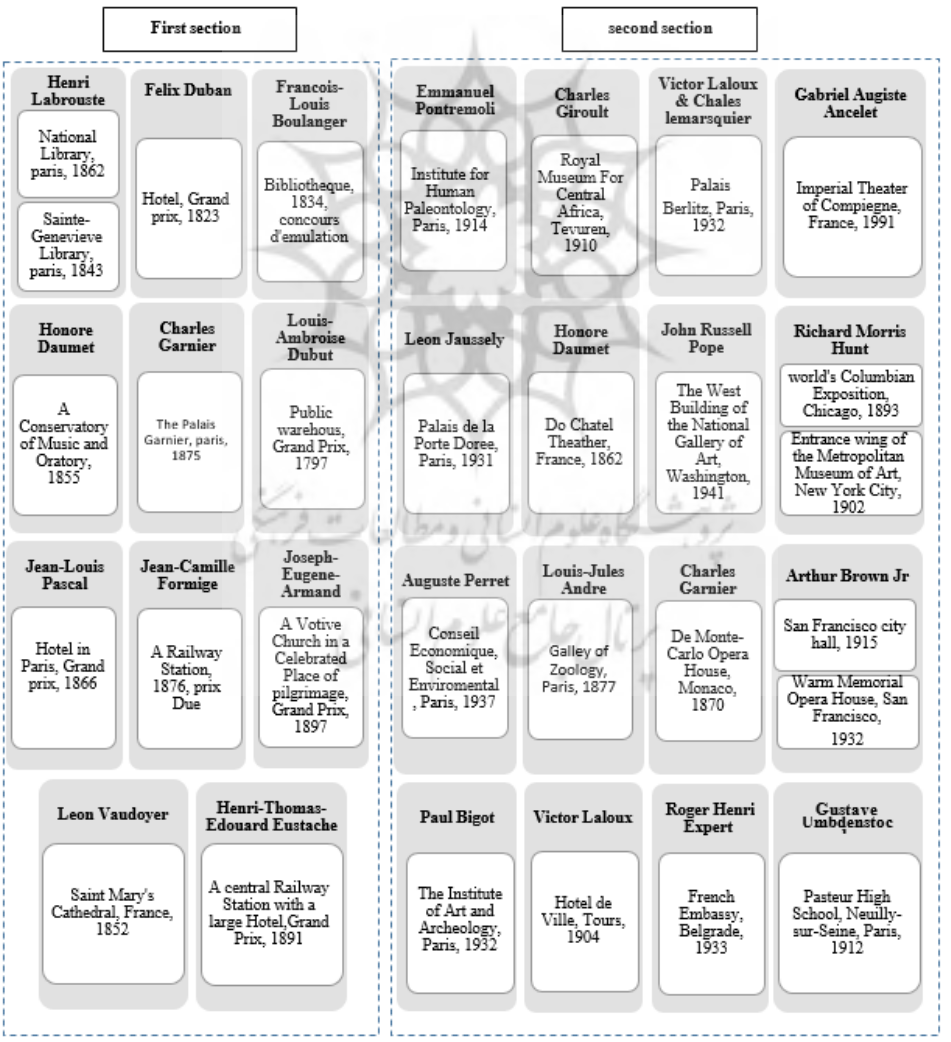


Fig 2: Categories of prominent works in Beaux-Arts approach

Table 1: Three models for the Shirāz Toopkhāneh Square and the arrangement of buildings around it

Features	Classic beauty	Symmetry in the facade concerning the input axis	The windows are elongated and vertical	Decorations on the facade	Axial principles (main and sub Axes)	Symmetry in the plan concerning the input axis	Domed or sloping roofs	Vertical divisions in the facade (vertical columns)	decoration (interior decoration)	Total
Number of occurrences	30	29	29	30	23	18	24	13	13	209
weight (percentage)	14.35	13.88	13.88	14.35	11	8.61	11.48	6.22	6.22	100

Table 2: Selected works from Beaux-Arts, Bauhaus and the college of Fine Arts

Selected works from Beaux-Arts									
1. Felix Duban, Hotel, 1823	2. Henri Labrouste, Sainte-Genevieve Library, 1843	3. Henri Labrouste, National Library, 1862	4. Francois- Louis Boulanger, Bibliotheque, 1834	5. Honore Daumet, Conservatory of Music and Oratory, 1855	6. Gabriel-Augiste Ancelet, Imperial Theater of Compiegne, 1991	7. Honore Daumet, Theater du Châtelet, 1862	8. Charles Garnier, The Palais Garnier, Paris, 1875	9. Charles Garnier, De Monte-Carlo Opera House, 1870	10. Jean-Louis Pascal, Hotel, 1866
11. Jean-Camille Formige, A Railway Station, 1876	12. Henri-Thomas-Edouard Eustache, A central Railway Station with a large Hotel, 1891	13. Joseph-Eugene-Armand, A Votive Church in a Celebrated Place of Pilgrimage, 1897	14. Paul Bigot, The Institute of Art and Archeology, 1932	15. Leon Vaudoyer, Saint Mary's Cathedral, 1852	16. Richard Morris Hunt, Enrance wing of the Metropolitan Museum of Art, New York City, 1902	17. Richard Morris Hunt, world's Columbian Exposition, 1893	18. Charles Giroult, Royal Museum For Central Africa, 1910	19. John Russell Pope, The West Building of the National Gallery of Art, 1941	20. Louis-Ambroise Dubut, Public warehouses, 1797
21. Louis-Jules Andre, Galley of Zoology, 1877	22. Victor Laloux, Town House, 1904	23. Victor Laloux & Charles Lemarsquier, Palais Berlitz, 1932	24. Emmanuel Pontremoli, Institute for Human Paleontology, 1914	25. Leon Jaussely, Palais de la Porte Doree, Paris, 1931	26. Auguste Perret, Conseil Economique, Social et Enviromental, 1937	27. Gustave Umbdenstock, Pasteur High School, Neuilly-sur-Seine, 1912	28. Arthur Brown Jr, War Memorial Opera House, 1932	29. Arthur Brown Jr, San Francisco City Hall, 1915	30. Roger Henri Expert, French Embassy, 1933
Selected works from Bauhaus									
1. Georg Much & Adolf Meyer, Haus am Horn, 1923	2. Walter Gropius, Fagus Factory, 1911	3. Walter Gropius, Office building and factory, Werkbund exhibition, 1914	4. Walter Gropius, Auerbach House, 1924	5. Walter Gropius, Torten's residential estate, 1928	6. Walter Gropius, Dammerstok residential complex, 1929	7. Walter Gropius, Siemens Stadt residential complex, 1930	8. Walter Gropius, Bauhaus school, 1925	9. Walter Gropius, House of Bauhaus professors, 1925	10. Walter Gropius, Village College, 1936
11. Walter Gropius, Gropius House, 1938	12. Walter Gropius, Allen I W Frank House, 1940	13. Walter Gropius, Harvard Graduate Center, 1950	14. Walter Gropius, Peter Thacher Junior High School, 1948	15. Walter Gropius, Interbau apartment, 1957	16. Walter Gropius, John F. Kennedy Building, 1966	17. Walter Gropius, East Tower Building, 1968	18. Walter Gropius, Pan Am Building, 1963	19. Walter Gropius, Gropiusstadt building, 1960	20. Hannes Mayer, Trade Union School, 1928

Continiue of Table 2: Selected works from Beaux-Arts, Bauhaus and the college of Fine Arts

Selected works from Bauhaus									
21. Ludwig Mies van der Rohe, Lange and stress houses, 1928	Ludwig .22 Mies van der Rohe, Villa Tugendhat, 1930	23. Ludwig Mies van der Rohe, Lamke House, Berlin, 1932	24. Ludwig Mies van der Rohe, Perlstein Hall, Illinois Institute of Technology, 1946	25. Ludwig Mies van der Rohe, Crown Hall, Illinois Institute of Technology, 1956	26. Ludwig Mies van der Rohe, Research Building, Illinois, 1957	27. Ludwig Mies van der Rohe, Research I.I.T. Building, 1955	28. Ludwig Mies van der Rohe, Seagram Building, 1958	29. Ludwig Mies van der Rohe, Lafayette Park Building, 1955	30. Toronto Dominion Centre, 1963
Selected work of the College of Fine Arts									
1. Roland Dubrulle, Palace of Justice, 1946	2. Andre Godard, Museum of Ancient Iran, 1937	3. Mohsen Foroghi, Meli Bank, Bazar branch, 1945	4. Mohsen Foroughi, in collaboration with Maxime Siroux, Faculty of Law and Political Sciences, University of Tehran, 1940	5. Mohsen Foroughi, central branch of Melli Bank, Isfahan, 1942	6. Andre Godard and Maxime Siroux, Faculty of Medicine, University of Tehran, 1940	7. Roland Dubrulle and Maxime Siroux, Tehran University Club, 1941	8. Andre Godard and Maxime Siroux, Iranshahr School, 1934	9. Roland Dubrulle, Casino Ramsar, 1936	10. Roland Dubrulle, Ghomash building, 1939
11. Eugene Aftandelian, Rudaki Hall, 1967	12. Eugene Aftandelian, in collaboration with Roland Dubrulle, Ferdowsi School, 1938	13. Roland Dubrulle, in collaboration with Eugene Aftandelian, College of Fine Arts Ateliers, 1940	14. Mohsen Foroughi, Zafar, Sadegh, Heydar Ghiai, Royal Hilton Hotel, 1962	15. Heydar Ghiai, Mohsen Foroghi, Senate-Islamic Council, 1949	16. Houshang Seyhoun, Seihun's private house, 1963	17. Houshang Seyhoun, Canada Doray Factory, 1955	18. Houshang Seyhoun, Hoshang Seihun office, 1954	19. Houshang Seyhoun, Sepah Bank Central Building, 1957	20. Houshang Seyhoun, Dolatabadi House, 1969
21. Houshang Seyhoun, Mr. Kazemi's house, 1958	22. Abdulaziz Farmanfarmayan, National Iranian Oil Company, along with Yahya etehadiye, 1958	23. Abdol Aziz Farmanfarmaian, Twin Towers of Saman, 1969	24. Abdol aziz Farmanfarmaian, Ministry of Agriculture, 1973	25. Abdol aziz Farmanfarmaian, Kar Bank building, 1963	26. Abdol aziz Farmanfarmaian, Carpet Museum, 1961	27. Abdol aziz Farmanfarmaian, Azadi sports complex, 1961	28. Bahman Paknia, Central Library, University of Tehran, 1966	29. Roland Dubrulle, Eastern Blocks of the Palace of the Ministry of Finance, 1959	30. Iraj Kalantari, Karl Schlamminger's house, 1968
31. Iraj Kalantari, Morteza Kalantari house, 1965	32. Iraj Kalantari, house of Najaf Daryabandari, 1971	33. Hamlet Hartunian apartment complex, 1959	34. Mehdi Alizadeh, Davodzadeh house, 1963	35. Mehdi Alizadeh Kuhbar, residential complex, 1973	Me- .36 hdi Alizadeh, sedaghat House, 1973	37. Mehdi Alizadeh, Shahgoli Apartments, 1969	38. Ali Akbar Saremi, Afshar House, 1976	39. Houshang Seyhoun, Picnic Restaurant (Toos and Ferdowsi Museum), 1968	40. Mohsen Foroghi, in collaboration with Ali Akbar Sadegh, Saadi Mausoleum, 1951
41. Houshang Seyhoun, Nadershah Mausoleum, 1962	42. Houshang Seyhoun, Ibn Sina, Mausoleum, 1951	43. Hossein Amanat, Azadi Tower, 1967							

Table 3: Scores of selected works of Beaux-Arts, Bauhaus and the college of Fine Arts in Beaux-Arts approach

	Beaux-Arts									
Architectural work number from Table 2	Classic beauty	Symmetry in the facade relative to the input axis	The windows are elongated and vertical	Decorations on the facade	Axial principles (main and sub Axes)	Symmetry in the plan relative to the input axis	Domed or sloping roofs	Vertical divisions in the facade (vertical columns)	decoration (interior decoration)
1	1	1	1	1	1	1	0	0	0
2	1	1	1	1	1	1	1	0	1
3	1	1	1	1	1	1	1	0	1
4	1	1	1	1	1	1	1	1	0
5	1	1	1	1	1	1	1	0	0
6	1	1	1	1	0	0	1	0	1
7	1	1	1	1	1	1	1	0	1
8	1	1	1	1	1	1	1	1	1
9	1	1	1	1	1	1	1	0	1
10	1	1	1	1	1	1	1	0	0
11	1	0	1	1	1	0	1	0	0
12	1	1	1	1	1	0	1	0	0
13	1	1	1	1	1	1	1	0	0
14	1	1	1	1	0	0	0	0	0
15	1	1	1	1	1	1	1	0	1
16	1	1	1	1	0	0	0	1	0
17	1	1	1	1	1	1	1	1	0
18	1	1	1	1	1	1	1	1	1
19	1	1	0	1	1	1	1	1	0
20	1	1	1	1	1	1	0	0	0
21	1	1	1	1	1	1	1	0	1
22	1	1	1	1	1	0	1	1	1
23	1	1	1	1	1	0	1	1	0
24	1	1	1	1	0	0	1	0	0
25	1	1	1	1	0	0	0	1	1
26	1	1	1	1	1	0	1	1	0
27	1	1	1	1	1	1	1	0	0
28	1	1	1	1	0	0	1	1	1
29	1	1	1	1	1	1	1	1	1
30	1	1	1	1	0	0	0	1	0

	Bauhaus									
Architectural work number from Table 2	Classic beauty	Symmetry in facade relative to the input axis	The windows are elongated and vertical	Decorations on the facade	Axial principles (main and sub Axes)	Symmetry in the plan relative to the input axis	Domed or sloping roofs	Vertical divisions in the facade (vertical columns)	decoration (interior decoration)
1	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0
29	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0

	The College of Fine Arts									
Architectural work number from Table 2	Classic beauty	Symmetry in facade relative to the input axis	The windows are elongated and vertical	Decorations on the facade	Axial principles (main and sub Axes)	Symmetry in the plan relative to the input axis	Domed or sloping roofs	Vertical divisions in the facade (vertical columns)	decoration (interior decoration)
1	1	1	1	1	1	1	0	1	0
2	1	1	1	1	1	1	0	0	0
3	1	1	1	1	1	1	0	1	0
4	1	1	1	0	1	1	0	1	0
5	1	0	1	1	1	0	0	1	0
6	1	1	1	1	1	1	0	1	0
7	0	0	1	1	0	0	0	1	0
8	1	1	1	1	1	1	1	0	1
9	1	1	1	1	1	1	0	1	0
10	0	0	0	0	0	0	0	0	0
11	0	1	0	0	0	0	0	1	1
12	0	1	0	0	1	0	0	1	0
13	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0
15	0	0	0	0	1	0	0	0	1
16	0	0	0	1	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	1
19	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0
26	0	1	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0
28	0	1	0	1	0	0	0	0	0
29	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0
31	0	0	0	0	0	0	0	0	0
32	0	0	0	0	0	0	0	0	0
33	0	0	0	0	0	0	0	0	0
34	0	0	0	0	0	0	0	0	0
35	0	0	0	0	0	0	0	0	0
36	0	0	0	0	0	0	0	0	0
37	0	0	0	0	0	0	0	0	0
38	0	0	0	0	0	0	0	1	0
39	0	0	0	0	0	0	0	0	0
40	0	0	0	0	1	0	0	1	0
41	0	0	0	0	0	0	0	0	0
42	0	1	0	0	1	1	0	1	0
43	0	0		1	0	0	0	0	0

developed from three different groups of works in the Beaux-Arts style, with ten works in each group.

The results obtained from the above analysis:

All of the Bauhaus works in the Beaux-Arts style received the lowest score of zero, indicating that the architectural design features chosen for the Beaux-Arts style are inclusive of that style and completely exclusive of the Bauhaus approach.

The analysis of the selected works in the Beaux-Arts style reveals that three works (10% of the 30) exhibit a full degree of dependence (100%), while the majority of the works (77%) demonstrate a high degree of dependence (over 75%) and the remaining works (23%) show an average degree of dependence (between 50% and 75%). These findings suggest that the architectural design features chosen for the

Fig 3: Final Scores of selected works of Beaux-Arts, Bauhaus, and the college of Fine Arts in Beaux-Arts approach

Beaux-Arts style have an appropriate level of coverage, allowing for a wide range of works to exhibit a strong association with this style.

As shown in Fig 3, only 14% of the College of Fine Arts works exhibit a high level of dependency (above 75%) to the Beaux-Arts style. Another 5% have a medium level of dependency (between 50% and 75%), while 11% have a low level of dependency (between 25% and 50%). The remaining 70% show a very low dependency (between zero and twenty-five percent) on the Beaux-Arts style, of which 53% show no dependency (zero) on Beaux-Arts.

The sensitivity of the scoring formula to selecting works from Beaux-Arts for developing the formula is moderately low. The average errorbar size (two standard deviations) was equal to 5.78, 0, and 2.21 for Beaux-Arts, Bauhaus, and the College of Fine Arts of the University of Tehran, respectively, exhibiting moderately low sensitivity in selecting works for developing the formula.

Characteristics of Architectural Design in Bauhaus School

The thirty examples of works performed by the professors and students at Bauhaus (Lupfer & Sigel, 2004; Carter, 1999; Zimmerman, 2006) have been similarly examined to obtain the design features specific to this school. The works associated with this school can be divided into two categories: the first category is the works done by students or in collaboration with professors. The second category is the works done by the professors of Bauhaus architecture, including Walter Gropius, Hannes Meyer, and Ludwig Mies van der Rohe, during their careers. The categories of the works used to analyze the Bauhaus school are shown in Fig 4. Table 4 presents the details of occurrence of features extracted from images and plans of the works associated with the Bauhaus school (as presented in Table 2), while Table 5 provides the weight assigned to each feature. Similarly to the methodology used for Beaux-Arts style, the weight of each feature in Bauhaus works was determined by dividing the number of occurrences of that feature by the total number of observations, and equation 1 was employed to assess the level of dependence of the selected architectural works to the Bauhaus style. The final dependency score of each work to the Bauhaus approach was calculated by summing the product of feature values from Table 4 and their corresponding weights from Table 5. The resulting scores are presented in Fig 5. Based on the above investigations, the following results can be derived:

Based on the analysis, it was found that none of the reviewed Bauhaus works received a full score, but 90% of them had a high degree of dependency (above seventy-five percent), while the remaining 10% had a medium degree of dependency (between fifty to seventy-five percent). These findings suggest that the selected design features for the Bauhaus style were appropriately inclusive.

There is very little overlap between the design features of the selected works of Bauhaus and Beaux-Arts; only four of the reviewed works of Beaux-Arts in Bauhaus have received a score greater than zero.

The analysis shows that 32.56% of the work from the College of Fine Arts of the University of Tehran strongly adheres to the Bauhaus style, with a degree of dependency above 75%. Another 32.56% of the works show a medium degree of dependency (between 50 and 75%), while 18.6% have a low degree of dependency (between 25 and 50%). The remaining 16.28% of the works show a very low degree of dependency (less than 25%) on the Bauhaus style.

The average errorbar size (two standard deviations) was equal to 11.54, 0.32, and 7.81 for Bauhaus, Beaux-Arts, and College of Fine Arts of the University of Tehran, respectively, which exhibit moderately low sensitivity in a selection of works for developing the formula.

The College of Fine Arts of the University of Tehran Architectural Design Influence from Bauhaus and Beaux-Arts Approaches

The outstanding works of professors and students of the College of

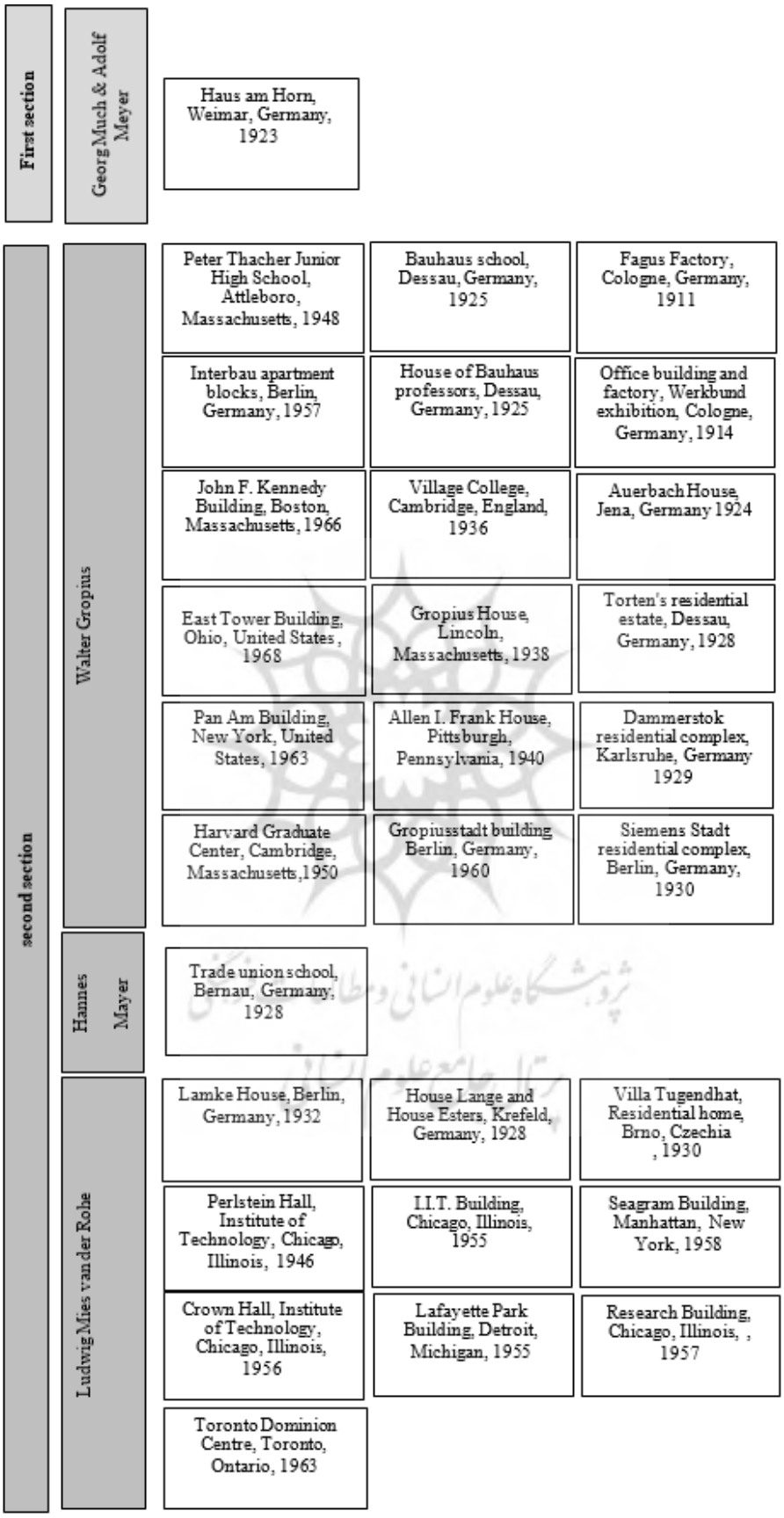
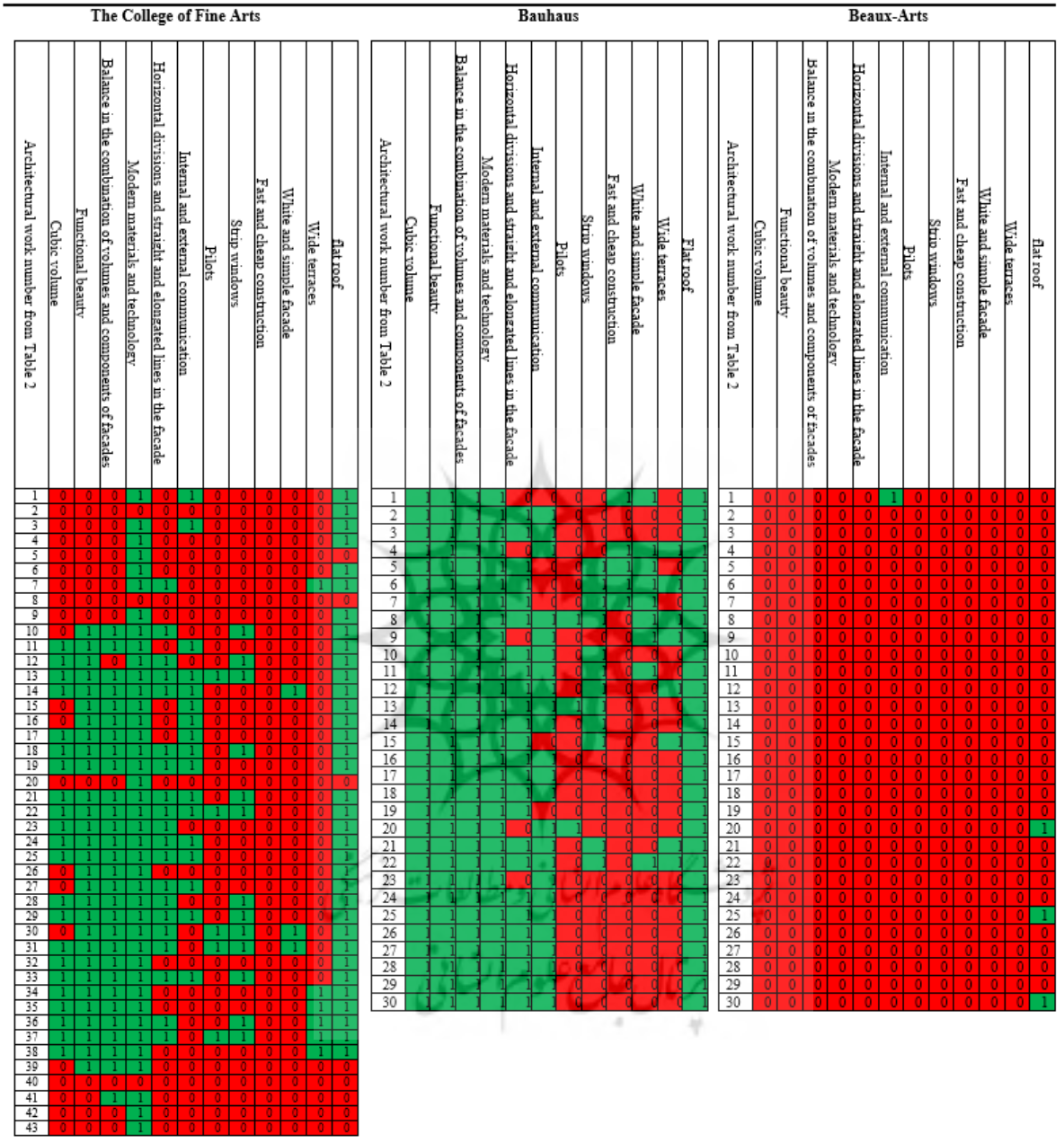


Fig 4: Main features of architectural design in Bauhaus

Table 4: Scores of selected works of Beaux-Arts, Bauhaus and the college of Fine Arts in Bauhaus approach



	The College of Fine Arts													Bauhaus												Beaux-Arts											
Architectural work number from Table 2		Cubic volume	Functional beauty	Balance in the combination of volumes and components of facades	Modern materials and technology	Horizontal divisions and straight and elongated lines in the facade	Internal and external communication	Pilots	Strip windows	Fast and cheap construction	White and simple facade	Wide terraces	flat roof	Architectural work number from Table 2	Cubic volume	Functional beauty	Balance in the combination of volumes and components of facades	Modern materials and technology	Horizontal divisions and straight and elongated lines in the facade	Internal and external communication	Pilots	Strip windows	Fast and cheap construction	White and simple facade	Wide terraces	Flat roof	Architectural work number from Table 2	Cubic volume	Functional beauty	Balance in the combination of volumes and components of facades	Modern materials and technology	Horizontal divisions and straight and elongated lines in the facade	Internal and external communication	Pilots	Strip windows	Fast and cheap construction	White and simple facade	Wide terraces	flat roof
1	0	0	0	1	0	1	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	1	1	1	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	1	0	1	0	0	0	0	0	0	1	3	1	1	1	1	0	0	0	0	0	0	1	3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	1	0	0	0	0	0	0	0	0	1	4	1	1	1	1	0	0	0	1	1	0	1	4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	1	0	0	0	0	0	0	0	0	0	5	1	1	1	1	0	0	0	1	1	0	1	5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	1	0	0	0	0	0	0	0	0	1	6	1	1	1	1	0	0	1	1	1	0	1	6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	1	1	0	0	0	0	0	0	1	1	7	1	1	1	1	0	0	1	1	1	0	1	7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	8	1	1	1	1	1	0	0	1	1	0	1	8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	1	0	0	0	0	0	0	0	0	1	9	1	1	1	1	0	1	0	0	1	1	1	9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	1	1	1	1	0	0	1	0	0	0	0	1	10	1	1	1	1	1	0	1	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0
11	1	1	1	1	0	1	0	0	0	0	0	0	1	11	1	1	1	1	1	0	1	0	1	0	1	11	0	0	0	0	0	0	0	0	0	0	0	0
12	1	1	0	1	1	0	0	1	0	0	0	0	1	12	1	1	1	1	1	0	1	1	0	0	1	12	0	0	0	0	0	0	0	0	0	0	0	0
13	1	1	1	1	1	1	1	1	0	0	0	0	1	13	1	1	1	1	1	0	1	1	0	0	1	13	0	0	0	0	0	0	0	0	0	0	0	0
14	1	1	1	1	1	1	1	0	0	0	1	0	1	14	1	1	1	1	1	0	1	0	0	0	1	14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	1	1	1	0	1	0	0	0	0	0	0	1	15	1	1	1	1	1	0	0	1	0	0	1	15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	1	1	1	0	1	0	0	0	0	0	0	1	16	1	1	1	1	1	0	0	0	0	0	1	16	0	0	0	0	0	0	0	0	0	0	0	0
17	1	1	1	1	0	1	0	0	0	0	0	0	1	17	1	1	1	1	1	0	0	0	0	0	1	17	0	0	0	0	0	0	0	0	0	0	0	0
18	1	1	1	1	1	1	1	0	1	0	0	0	1	18	1	1	1	1	1	0	0	0	0	0	1	18	0	0	0	0	0	0	0	0	0	0	0	0
19	1	1	1	1	1	1	1	0	0	0	0	0	1	19	1	1	1	1	1	0	0	0	0	0	1	19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	1	0	0	0	0	0	0	0	0	1	20	1	1	1	1	0	1	1	0	0	0	0	20	0	0	0	0	0	0	0	0	0	0	0	1
21	1	1	1	1	1	1	1	0	1	0	0	0	1	21	1	1	1	1	1	0	1	0	0	0	1	21	0	0	0	0	0	0	0	0	0	0	0	0
22	1	1	1	1	1	1	1	1	1	0	0	0	1	22	1	1	1	1	1	0	1	0	1	1	1	22	0	0	0	0	0	0	0	0	0	0	0	0
23	1	1	1	1	1	0	0	0	0	0	0	0	1	23	1	1	1	1	0	1	0	0	0	0	1	23	0	0	0	0	0	0	0	0	0	0	0	0
24	1	1	1	1	1	1	1	0	0	0	0	0	1	24	1	1	1	1	1	0	0	0	0	0	1	24	0	0	0	0	0	0	0	0	0	0	0	0
25	1	1	1	1	1	1	1	0	0	0	0	0	1	25	1	1	1	1	1	0	0	0	0	0	1	25	0	0	0	0	0	0	0	0	0	0	0	1
26	0	1	1	1	1	0	0	0	0	0	0	0	1	26	1	1	1	1	1	0	0	0	0	0	1	26	0	0	0	0	0	0	0	0	0	0	0	0
27	0	1	1	1	1	1	1	0	0	0	0	0	1	27	1	1	1	1	1	0	0	0	0	0	1	27	0	0	0	0	0	0	0	0	0	0	0	0
28	1	1	1	1	1	0	0	1	0	0	0	0	1	28	1	1	1	1	1	0	0	0	0	0	1	28	0	0	0	0	0	0	0	0	0	0	0	0
29	1	1	1	1	1	1	1	0	1	0	0	0	1	29	1	1	1	1	1	0	0	0	0	0	1	29	0	0	0	0	0	0	0	0	0	0	0	0
30	0	1	1	1	1	1	0	1	1	0	1	0	1	30	1	1	1	1	1	0	0	0	0	0	1	30	0	0	0	0	0	0	0	0	0	0	0	1
31	1	1	1	1	1	1	0	1	1	0	1	0	1																									
32	1	1	1	1	0	0	0	0	0	0	0	0	1																									
33	1	1	1	1	1	1	0	1	0	0	0	0	1																									
34	1	1	1	1	0	0	0	0	0	0	0	1	1																									
35	1	1	1	1	0	0	0	0	0	0	0	1	1																									
36	1	1	1	1	1	0	0	1	0	0	0	1	1																									
37	1	1	1	1	1	0	1	1	0	0	1	1	1																									
38	1	1	1	1	0	0	0	0	0	0	0	1	1																									
39	0	1	1	1	0	0	0	0	0	0	0	0	0																									
40	0	0	0	0	0	0	0	0	0	0	0	0	0																									
41	0	0	1	1	0	0	0	0	0	0	0	0	0																									
42	0	0	0	1	0	0	0	0	0	0	0	0	0																									
43	0	0	0	1	0	0	0	0	0	0	0	0	0																									

Fine Arts architecture from the beginning to 1979 are shown in Fig 6 (BaniMassoud, 2015, 2019; Ghobadian, 2016). The degree of influence of Beaux-Arts and Bauhaus's approach on the architectural design over different sections at The College of Fine Arts, University of Tehran, is depicted in Fig 7 and 8, based on the scores of the college's architecture from Table 3 and Table 4. These diagrams reveal a wide variation in influence among different features.

Fig 9 clearly compares the influences of The College of Fine Arts architecture from both the Beaux-Arts (Fig 3) and Bauhaus approaches (Fig 5). The diagram reveals that the Bauhaus approach and modern architecture significantly influence the architecture produced by the professors and students of fine arts. Notably, the level of high influence category (75%-100%) for the Bauhaus approach is more than twice that of the Beaux-Arts approach. Furthermore, the medium category (50%-75%) for Bauhaus has about six times the rate of Beaux-Arts. In other words, 65% of the selected works of The College of Fine Arts

Table 5: Distribution of Bauhaus's architectural design features

Features	Cubic volume	Functional beauty	Balance in the combination of volumes and components of facades	Modern materials and technolog	Horizontal divisions and straight and elongated lines in the facade	Internal and external communication	Pilotis	strip windows	Fast and cheap construction	The white and simple facade	Wide terraces	flat roof	total
Occurrence	30	30	30	30	25	24	3	12	5	9	8	30	236
Weight (percentage)	12.71	12.71	12.71	12.71	10.59	10.17	1.27	5.08	2.12	3.81	3.39	12.71	100

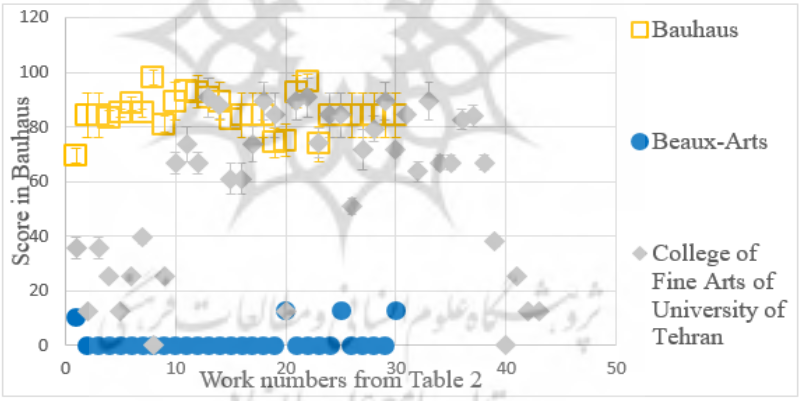


Fig 5: Final Scores of selected works of Beaux-Arts, Bauhaus, and the college of Fine Arts in Bauhaus approach

architecture show more than 50% influence from Bauhaus, whereas only 19% of the works show more than 50% dependence on the Beaux-Arts approach. After analyzing the total scores obtained for the selected works of fine arts from Table 3 and Table 4, the following results were obtained:

The works of The College of Fine Arts of the University of Tehran obtained a total score of 77 out of 387 points in the Beaux-Arts approach. This implies that the Beaux-Arts approach has influenced 19.89% of the total architecture formed by fine arts.

The works of The College of Fine Arts of the University of Tehran obtained a total score of 219 out of 516 points in the Bauhaus approach. This indicates that Bauhaus has influenced 42.44% of the architecture in the college of Fine Arts.

Fig 10 displays the accumulative dependence score of the works of The College of Fine Arts at the University of Tehran to both Beaux-Arts and Bauhaus approaches. The average value of this dependence score is 34.4%, with a standard deviation of 11.11%. Therefore, we can generally say that The College of Fine Arts education is 67.22% (with a standard deviation of 11%) independent of these two approaches. However, the high standard deviation suggests a large dispersion in

Andre Godard	Saadi Mausoleum, Shiraz, Iran 1951	**Heydar Ghiai, Mohsen Foroghi**	Canada Doray Factory, Tehran, Iran, 1955	Kar Bank building, Tehran, Iran, 1963	Karl Schlamminger's house, Tehran, Iran, 1968
Museum of Ancient, Tehran, Iran, 1937	**Roland Dubrulle and Maxime Siroux**	Senate-Islamic Council, Tehran, Iran, 1949	Sepah Bank Central Building, Tehran, Iran, 1957	Twin Towers of Saman, Tehran, Iran, 1969	Najaf Daryabandari's house, Tehran, Iran, 1971
Andre Godard and Maxime Siroux	Tehran University Club, Iran, 1941	**Hamlet Hartunian**	Kazemi's house, Tehran, Iran, 1958	Ministry of Agriculture, Tehran, Iran, 1973	**Mehdi Alizadeh**
Iranshahr School, Yazd, Iran, 1934	**Roland Dubrulle**	apartment complex, Tehran, Iran, 1959	Nadershah Mausoleum, Mashhad, Iran, 1962	**Bahman Paknia**	Davodzadeh house, Tehran, Iran, 1963
Faculty of Medicine, University of Tehran, Iran, 1940	Casino Ramsar, Iran, 1936	**Eugene Aftandelian**	Seyhoun's private house, Tehran, Iran, 1963	Central Library, University of Tehran, Iran, 1966	Shahgoli Apartments, Tabriz, Iran, 1969
Mohsen Foroghi	Ghomash building, Tehran, Iran, 1939	Rudaki Hall, Tehran, Iran, 1967	Picnic Restaurant (Toos and Ferdowsi Museum), Mashhad, Iran, 1968	**Ali Akbar Saremi**	sedaghat House, Tehran, Iran, 1973
Central branch of Melli Bank, Isfahan, Iran, 1942	Eastern Blocks of the Palace of the Ministry of Finance, Tehran, Iran, 1959	**Mohsen Foroughi, Heydar Ghiai, keyghobad Zafar, Ali Akbar Sadegh**	Dolatabadi House, Tehran, Iran, 1969	Afshar House, Tehran, Iran 1976	Kuhbar, residential complex, Tehran, Iran, 1973
Meli Bank, Bazar branch, Tehran, Iran, 1945	**Roland Dubrulle, in collaboration with Eugene Aftandelian**	Royal Hilton Hotel, Tehran, Iran, 1962	**Abdol aziz Farmanfarmaian**	**Hossein Amanat**	
Mohsen Foroughi, in collaboration with Maxime Siroux	College of Fine Arts Ateliers, University of Tehran, Iran, 1940	**Houshang Seyhoun**	National Iranian Oil Company, along with Yahya etehadiye, Tehran, Iran, 1958	Azadi Tower, Tehran, Iran, 1967	
Faculty of Law and Political Sciences, University of Tehran, Iran, 1940	**Eugene Aftandelian, in collaboration with Roland Dubrulle**	Bu Ali Sina, Mausoleum, Hamedan, Iran 1951	Carpet Museum, Tehran, Iran, 1961	**Iraj Kalantari**	
Mohsen Foroghi, in collaboration with Ali Akbar Sadegh	Ferdowsi School, Tehran, Iran, 1938	Hoshang Seihun office, Tehran, Iran, 1954	Azadi Sports Complex (sports hall), Tehran, Iran, 1961	Morteza Kalantari's house, Tehran, Iran, 1965	

Fig. 6. The outstanding works of professors and students the college of Fine Arts architecture from the beginning to 1979

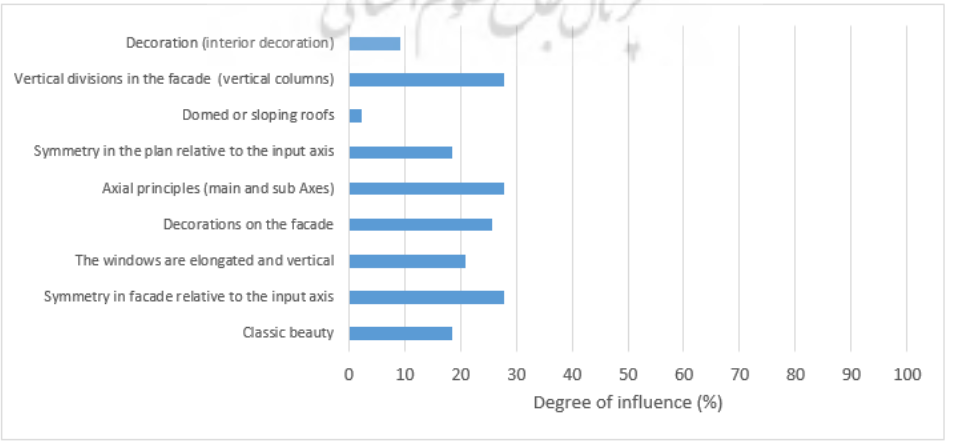


Fig. 7. The influence of the college of Fine Arts architecture from Beaux-Arts in different sections

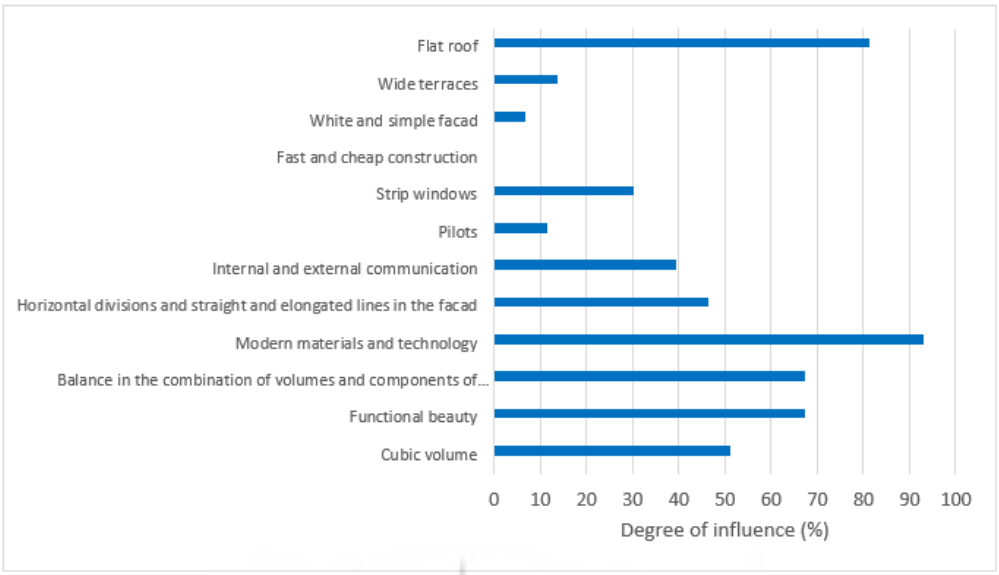


Fig. 8. The influence of the college of Fine Arts architecture from Bauhaus in different sections

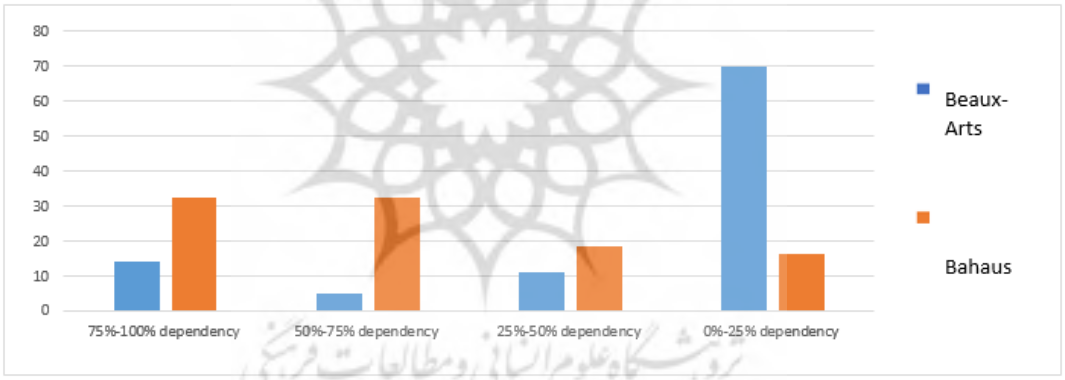


Fig. 9. The influence of the college of Fine Arts architecture from Bauhaus and Beaux-Arts

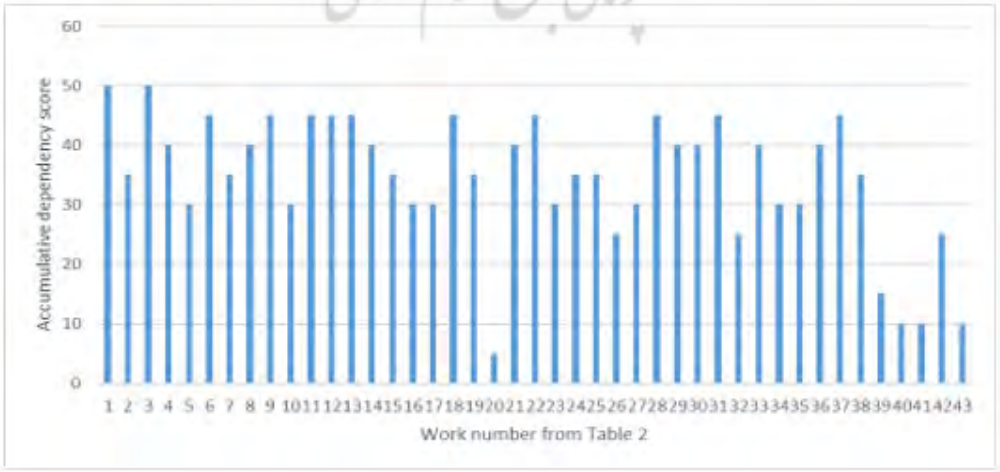


Fig.10. The influence of selected architectural works of the college of Fine Arts from both Bauhaus and Beaux-Arts approaches

the degree of dependence on these two styles among different works.

CONCLUSION

This study investigated the degree of influence of architectural education in the college of Fine Arts from the Beaux-Arts and Bauhaus approaches. The main features of each approach were introduced from the works of students and professors of each school, and numerical weighting based on the frequency of occurrence of each feature was used to develop a formula for calculating the degree of dependence of each work on each of the two approaches. It was shown that the features for each approach are independent of the other approach, and there is no significant overlap between the features. The degree of dependence of each work on each approach was calculated using the developed formulas. Although the degree of dependence of various works to each category can be different, in general, the influence of the College of Fine Arts of the University of Tehran resulted from the Bauhaus approach is more than twice that of Beaux-Arts which is in line with the historical evidence regarding the influence of Beaux-Arts education from modern architecture and Bauhaus (Emmanuel Pontermoli changed in 1932). The method presented in the study can be used to describe dependencies in architectural research, such as the influence of each work from different styles and the overlap between different styles. On average, the architecture of the College of Fine Arts of the University of Tehran has been 65.6% independent from the two approaches of Bauhaus and Beaux-Arts. In the continuation of the present research, it is possible to examine the degree of influence of architecture formed at the College of Fine Arts from other styles, for example, Traditional Iranian architecture, and analyze its influence on the contemporary architecture of Iran. The results of this research and upcoming studies can be used for the detailed pathology of contemporary architecture and for improving architecture education.

AUTHOR CONTRIBUTIONS

A. Baghalian performed the literature review, analyzed and interpreted the data, and prepared the manuscript text and edition. Gh. Keramati helped in the literature review, results analysis, and manuscript preparation. Finally, all authors discussed the results and commented on the manuscript.

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CONFLICT OF INTERESt

The authors declare no potential conflict of interest regarding the publication of this work. In addition, the ethical issues, including plagiarism, informed consent, misconduct, data fabrication or falsification, double publication and, or submission, and redundancy, have been completely witnessed by the authors.

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