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Investigation of the Rectorate Buildings in Ankara Built before 1950 as an Example of National Architecture[1]

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Abstract

In the early years of the Republic, the changes(transformation) in Turkey also affected the education system, and a "national" educational mobilization was initiated. With the influence of the economic conditions of the period, the construction of important and compulsory public buildings such as "health and education buildings" was prioritized. This study aims to examine the relationship between the campuses where the service buildings of Gazi University Rectorate, Ankara Medipol University Rectorate and Ankara Social Sciences University Rectorate are located and the architectural composition of the rectorate buildings as an example of national architecture. It was observed that the Rectorate buildings of Ankara Medipol University and Ankara Social Sciences University had different functions before and were re-functionalized and used as rectorate service buildings today. It is possible to say that the examined examples are designed in a similar architectural style, registered as cultural assets requiring protection, located in the city center, and that holistic design is important in the green area/development ratios of the campuses and the relations they establish with their surroundings. In this context, it is thought that this study is important in terms of emphasizing the place of rectorate buildings in the social framework and their importance in the history of Turkish education and will contribute to the research and literature on this subject.

1. INTRODUCTION

In the early years of the Republic, the changesb(transformations) in the social, political and societal structure in Turkey affected the education system as well. Under the leadership of Mustafa Kemal Atatürk, a "national" educational mobilization was initiated and important steps were taken to restructure education. Educational buildings fulfilled their function as a tool (medium) for social change (transformation, reform) and at the same time became the core of the spatial reflection of Turkish education policy. Constructed using new construction techniques and new materials, these buildings became symbols of national architecture with their architectural composition and design principles. At the same time, they were designed large in comparison to the urban scale in the years they were built and became the first and important constructions in the formation of the urban macroform. Studies on educational buildings of the early republican period have mostly focused on primary school buildings. In the first years of the Republic, there are educational buildings such as Ankara University Science Faculties, Gazi University Rectorate Service Building (Gazi Muallim Mektebi ve Terbiye Enstitüsü), which are examples of national architecture built for educational purposes, as well as buildings that were not built for this purpose but are now used as rectorate service buildings as a part of education.

The study aims to examine the relationship between the campuses where the service buildings of Gazi University Rectorate, Ankara Medipol University Rectorate and Ankara Social Sciences University Rectorate are located and the architectural composition of the rectorate buildings as an example of

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national architecture. It is thought that this study, which deals with the rectorate buildings built in Ankara before 1950 as an example of national architecture, is important in terms of emphasizing the place of rectorate buildings in the social framework and their importance in the history of Turkish education, and will contribute to the research and literature on this subject.

2. METHOD

The study is a qualitative research conducted by data collection and tracing method. In addition to archival documents related to the rectorate buildings in Ankara, which are examples of national architecture built before 1950, studies on this subject in various disciplines such as architecture, art history and civil engineering were investigated and analyzed.

The site plans of the campuses where the service buildings of Gazi University Rectorate, Ankara Medipol University Rectorate and Ankara Social Sciences University Rectorate are located, the functions of the buildings in the past and present, and their architectural composition (plan design and construction system, façade design, ornamentation / decoration etc. features) were evaluated. The building used as the Rectorate of Gazi University and the Rectorate Building of Ankara Medipol University were specifically included in the scope of the study since they were designed by Architect Kemaleddin Bey, an important representative of national architecture.

3. EDUCATION POLICIES AND EDUCATIONAL STRUCTURES IN THE EARLY REPUBLICAN PERIOD

Social changes are influential in the shaping of the educational policies of the Early Republican period and the educational structures that are the spatial reflection of these policies. In studies on theories of social change, social change is generally defined as "the differentiations experienced by a particular social structure over time" [1]. In the classification of the course of social change studies, the period between 1920-1960 is called the transition period. The main factors that bring about change in this period are demographic, social, political and economic factors. With the establishment of the Republic in Turkey (1923), a new form of government was introduced politically. The country had limited economic opportunities due to the post-war period and a comprehensive social modernization project was aimed to be realized. In the early years of the Republic, state institutions were important instruments of this change with their functions, representational values and roles in social life.

Science, technology and education are important factors in social change and education is central to change in modern society [2]. At the time of the proclamation of the Republic, the proportion of the population who could read and write was approximately 10% and the field of education has some problems from the past [3]. The low literacy rate made it impossible to reach this segment of society with political discourses [4]. A "national" educational mobilization was launched under the leadership of Mustafa Kemal Atatürk, the founder of the Republic, through the restructuring of the existing education system. During these years, foreign education experts and scientists were invited to Turkey to modernize and improve the education system. John Dewey, a social scientist and educator, came to Turkey in 1924 as one of these experts and prepared an 8-point report titled "Memorandum on the Necessary Allocation to the Budget" after making various examinations. In this report, Dewey stated that "experts should be trained in the construction and equipping of school buildings, a special commission should be established and this commission should examine the educational environment and equipment such as school buildings, gardens, playgrounds, etc. in different countries". In the report, it was stated that real reform in education could only be possible through the training of qualified teachers and the professional development of teachers, and that Turkey needed teacher schools. It is possible to say that Dewey's views and this report had an impact on the Turkish education system. As a matter of fact, based on this report, in 1926, construction, sanitation and higher education directorates and departments were established in the central organization of the Ministry [5]. Along with these regulations, the foundations of the Secondary School of Education and the Institute of Education were laid in Konya in the same year upon the request of Mustafa Kemal Atatürk.

In the Early Republican Period, the First National Architectural Style (1908-1927) is seen to be defining. Vedat Bey and Kemalettin Bey, the pioneers of this style, continued the architectural approach they had initiated after the Second Constitutional Monarchy in the early years of the Republic. In parallel to the orientations of the political and cultural environment influenced by the ideals of nationalism, the formal elements of Classical Ottoman architecture were used in the newly constructed public buildings, particularly in Ankara [6]. In the construction program of the 1920s, priority was given to compulsory and functional investments such as "health and education buildings". Compared to the limited financial conditions and urban scales of the period, most of them are large buildings; new construction techniques (reinforced concrete, etc.) and new materials are used in most of them; many of them have contemporary reinforcements; and they bear the design and formal characteristics of the National Architectural Style. They generally have symmetrical and axial mass arrangements and plans; they show a structure parallel to European neo-classicism in terms of the schemes used, the dimensions and proportions in masses and spaces, and the rules of composition; there are lines and forms selected and taken from Seljuk, Ottoman and Islamic architecture in structural or non-structural architectural elements such as columns, capitals, arches, doors, windows, etc. and in the design and motifs of decoration and façade arrangement [7],[8],[9],[10].

4.PRE-1950 RECTORATE BUILDINGS AS EXAMPLES OF NATIONAL ARCHITECTURE IN ANKARA

Studies on educational buildings of the early republican period have mostly focused on primary school buildings [11],[12],[13]. In the first years of the Republic, there are educational buildings such as Ankara University Science Faculties, Gazi University Rectorate Service Building (Gazi Muallim Mektebi and Terbiye Enstitüsü), which are examples of national architecture built for educational purposes, as well as buildings that were not built for this purpose but are now used as rectorate service buildings as a part of education. This study aims to examine the relationship between the campuses where the service buildings of Gazi University Rectorate, Ankara Medipol University Rectorate and Ankara Social Sciences University Rectorate are located and the architectural composition of the rectorate buildings as an example of national architecture. A general evaluation was made on the site plans, past and present functions of the buildings and their architectural composition (plan design and construction system, façade design, ornamentation/decoration etc.).

4.1. Gazi University Rectorate Building

Founded in 1927 as "Gazi Mustafa Kemal Pasha Teacher Training School", the building was the last work of Architect Kemaleddin and one of the last works of the 1st National Architecture Period. It is understood from the date on the ground floor plan of the original project that the design of the Gazi Primary School (Gazi First Teacher Training School) was completed in 1927. The construction of the school was completed in the 1930s and education began in the same year. The first institution established to meet the country's need for teachers and to train qualified teachers, the Secondary School of Teachers and the Institute of Education (Middle School of Teaching and Institute of Education) moves to a new building in Ankara designed by Architect Kemaleddin in 1929, together with the Ankara Boys' Primary Teacher Training School, and takes the name "Gazi Primary School of Teachers and the Institute of Education"[14].

Information from the late 1970s and early 1980s, when the building was used as the Gazi Education Institute, reveals that it was symmetrically planned, with large classrooms lined up side by side in the front section on the ground floor, dining halls in three large halls in the back section, and large laboratories on the side wings. Opposite the entrance, a large meeting hall, now known as the Mimar Kemaleddin Hall, with a balcony and a stage, was placed two stories high. At that time, service spaces such as toilets, showers, etc. were arranged around the courtyards on both sides of the meeting hall, and the connections between the floors were provided by four staircases symmetrically placed according to the entrance, two of which were illuminated from the back and two from the courtyards in the middle. (Figure 1). The side sections of the building have four floors, including the basement, while the central section has five floors, with a sixth floor above the entrance, which is intended to be used as an observatory. The observatory was never used because it was not equipped with the necessary tools. The exterior facades of the school are covered with cut stone and covered with a hipped wooden roof covered with tiles [14]. The general view of Gazi University Rectorate Building is shown in Figure 2, and the current and past status of the Mimar Kemalettin Hall in Gazi University Rectorate Building is shown in Figure 3 and 4.

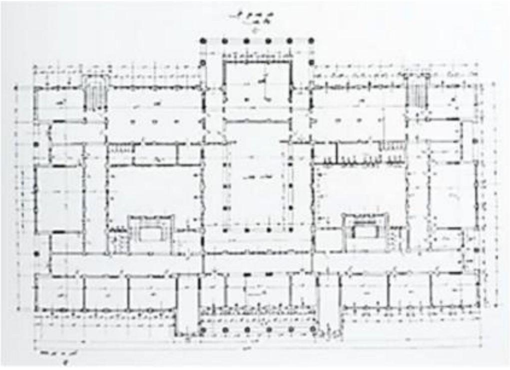

Figure 1. *Ground Floor Plan of Gazi Education Institute [15]*

Figure 2. *The general view of Gazi University Rectorate Building [14]*

***Figure 3**. Current Status of Mimar Kemalettin Hall in Gazi University Rectorate [16]*

Figure 4. *Past Status of Mimar Kemalettin Hall in Gazi University Rectorate [16]*

On the building surfaces, which are symmetrically arranged according to the central directions, the first floor windows are crossed with pointed arches; the other windows are shaped as large rectangular or square openings. The central part of the building is projected outwards from the general building surface on the front and back sides, emphasizing the central direction; the rooms on either side of the entrance on the front side and the staircases at the corners on the back side are projected outwards from the general eaves surface and covered with gable roofs, giving them the appearance of towers reinforcing the symmetry. In front of the main entrance, there is a high entrance portico defined by five pointed arched openings carried by white marble columns two stories high and a covered balcony above it, defined by square openings. Above this covered balcony is an open terrace accessed from the top floor. In the rear section, there is another entrance portico with an open terrace formed by openings with basket arches that surround the dining hall projection in the center and provide access to the entrances on either side of it. The symmetry on the side faces is emphasized by the recesses on either side of the laboratories, which are defined by a pair of open terraced openings with pointed arches, two stories high. The basement floor of the building is separated from the other floors by a continuous stone belt passing through the ground floor slab level; all windows are opened into vertical panels indented from the surface, and the surface arrangement is finished with wide eaves [14]. (Figure 5)

Stalactite capitals were placed on the marble columns of the porticoes in front of the front and rear entrances (Figure 5), and the openings of the covered balcony above the main entrance portico were separated by four columns of red marble. It can be seen that the upper floor windows of the tower-shaped projections on either side of this entrance are topped with rumi-decorated capitals with medallions in the center. The columns in this building were used by Architect Kemaleddin Bey, in accordance with the principles of national architecture, for their visual features that soften the sharp lines on the surfaces, rather than their load-bearing qualities. Architect Kemaleddin Bey did not use columns for structural or visual reasons in any of the schools or madrasas other than the Gazi Primary School. The front and rear entrance porticoes of the Gazi Primary School, which was built with a reinforced concrete skeleton system, and the carriers of the balcony in the meeting hall were solved with reinforced concrete columns made with the cast mosaic technique, so that they were emphasized for their visual qualities rather than their load-bearing qualities [14]. (Figure 6)

***Figure 5**. Gazi University Rectorate Building Front Facade View [17].*

***Figure 6.** Marble Column Detail in Gazi University Rectorate Building [18].*

In this period, modernization is represented by the built environment in cities through state initiatives, and these are primarily public buildings that modernize the state. Before 1950, the modernization of the army, which had begun at the beginning of the 19th century, was represented by monumental barracks at the endpoints of cities, while groups of buildings showing a new organization of social services such as hospitals and schools were built in places that would not interfere with the traditional fabric of cities [19]. From this point of view, the fact that the Gazi School of Education and the Institute of Education are located in a geographical area that has not yet been urbanized suggests that modernization may have had an impact on the choice of location. In 1930, the view of Gazi Teachers' School and Institute of Education from the city center is shown in Figure 7.

***Figure 7.** View of Gazi School of Education and Institute of Education from the city (1930) (marked in red circle)* [20].

Initially established to train secondary school Turkish teachers, the Department of Pedagogy was added in the 1927-1928 academic year, and the departments of Mathematics, Physical and Natural Sciences, History-Geography were added in the 1928-1929 academic year and the education period was extended. In 1932, the education period was extended to four years and the Departments of Painting and Drawing and Physical Education were opened. In 1937-1938 the Department of Music, in 1941-1942 the Department of French, in 1944-1945 the Department of English, and in 1947-1948 the Department of German were opened (Çetin & Gülseren, 2003). In the late 1940s, the need for educated teachers increased and by utilizing the infrastructure of teacher schools, Educational Institutes operating together with these institutions started to be opened (Dursunoğlu, 2003). In these years, the name of the school was changed to "Gazi Education Institute". The development of Gazi Education Institute over the years (1934-1950-1960-1967) and its location within the city are shown on the maps in Figure 8,9,10,11. It can also be seen that by 1957, with the additional buildings and arrangements made, the Institute expanded towards its surroundings and became an educational focus.

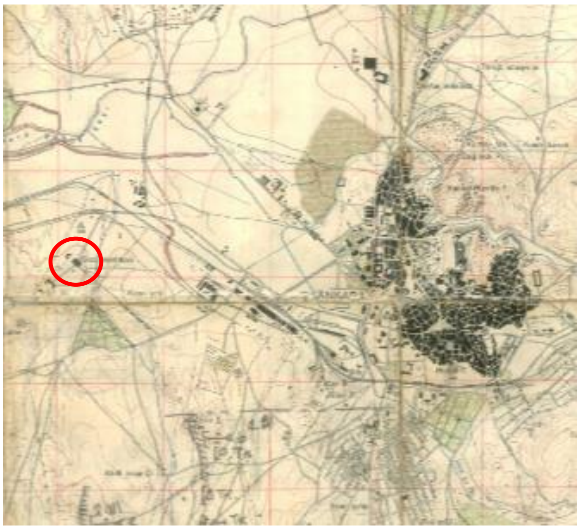

Figure 8. *1934 Map of Ankara and the Location of Gazi Teachers' College and Institute of Education [21].*

Figure 9. *1950 Map of Ankara and Location of Gazi Education Institute [22].*

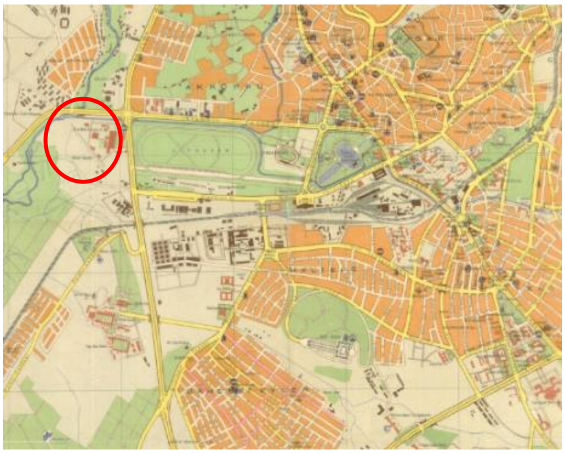

Figure 10. *1960 Map of Ankara and Location of Gazi Education Institute [23]*

Figure 11. *1967 Map of Ankara and Location of Gazi Education Institute [24].*

After 1982, the institution was affiliated to universities and started to be used as the Rectorate building of Gazi University in 1984. Today, the building houses the Rectorate and offices of the University and the Dean's Office and laboratories of Gazi Faculty of Education. In addition to the Rectorate Building, the campus also includes the Faculty of Pharmacy, Faculty of Science, Faculty of Education, Faculty of Technology, Faculty of Sports Sciences, Institutes, Polyclinic, Gazi Concert Hall, Gazi Cultural Center, Art Galleries, Museum, Sports Center, Gymnasium, Library, Technology Development Center, Student Guesthouse, Kindergarten, etc. The current site plan of the campus is shown in Figure 12.

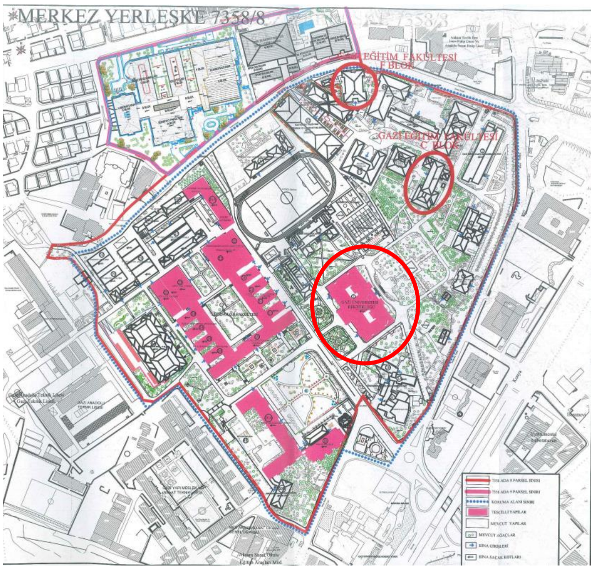

Figure 12. *Gazi University Central Campus Site Plan [16].*

4.2. Ankara Medipol University Rectorate Building

Located in the Ankara Station Area, the building, designed by Architect Kemalettin and completed in 1927-1928, is an example of the First National Architecture Period. In the archival records of the building, it is understood that the building was designed and constructed as a lodging house from the inscription "An Apartment in Ankara for the State Railways and Ports Administration". It is known that the building, which was used as the lodging building of the State Railways and Ports Administration in the early period, was used as a railway vocational high school for a period in the 1940s. In the recent past, it was used as the 2nd Regional Directorate Building and later as T.C.D.D. Taşımacılık A.Ş. Today, it remains in the private university area and is used as Medipol University Rectorate Service Building. To the west of the building is the State Railways Museum Building; to the east are buildings such as old lodging buildings and buildings used as service buildings belonging to TCDD. In the west, there are buildings such as Ankara Station Building and Tower Restaurant Building, one of the important buildings of Ankara, and TCDD General Directorate Building [16]. The site plan of the area where the Ankara Medipol University Rectorate Building is located is shown in Figure 13 and the views of the building from the city are shown in Figure 14,15.

Figure 13. *Site plan of the area where Ankara Medipol University Rectorate Service Building is located (marked in blue circle) [16].*

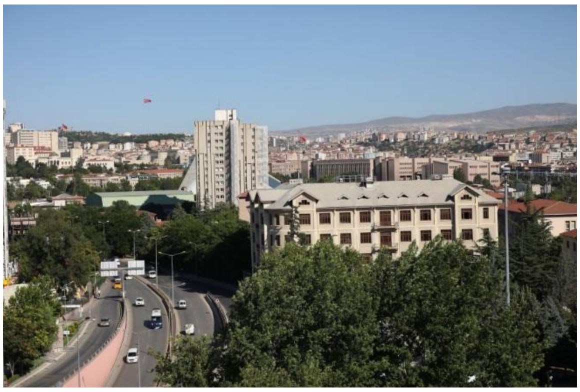

Figure 14. *View of Ankara Medipol University Rectorate Service Building from the city [25].*

Figure 15. *View of Ankara Medipol University Rectorate Service Building from the city [25].*

According to archival documents, although the building was designed to surround a large courtyard with a central courtyard, as in the plan schemes of Ankara Foundation Inn II and Ankara Foundation Hotel (Ankara Palas), only a third of the building was constructed due to economic impossibilities. The building is shaped like a U-plan with a wide base, short arms and open ends facing east, and the short arm facing Talat Pasha Boulevard has a curved plan (Figure 16). The building, which has 7 floors in total, including two basements + ground + 4 floors, was built according to the reinforced concrete skeleton construction system and has skylights. On the facades, which are symmetrical in themselves, it is seen that the symmetry is reinforced by covering the towers, which protrude outward from the general facade surface from the first floor level and are carried by ornamented stone consoles, with gable roofs with wider eaves [26].

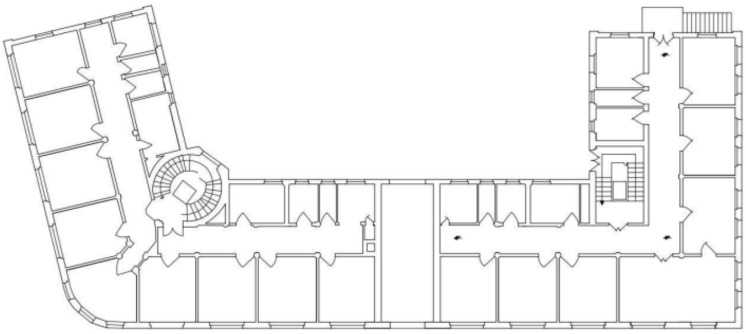

Figure 16. *Ground Floor Plan of Medipol University Rectorate Building [27].*

On the facades, the first floor windows have pointed arches and the other windows are shaped as large rectangular or square openings. The sections of the first basement floor above the ground floor and the ground floor facade surfaces, whose windows are visible from the facades, are covered with cut stone and this coating pattern continues on the Talat Paşa Boulevard façade (Figure 17 and 20) On the front facades of the building, the ground floor and the first floor are divided into three horizontally with stone material moldings passing through the floor levels, and balconies with iron railings carried by stone consoles decorated with relief motifs in front of the rooms over the covered passage providing access to the courtyard (Figure 18 and 19). There are molding with Turkish triangle motifs under all the eaves. On the facade facing Talat Pasha Boulevard, the symmetry is reinforced by covering the towers, which protrude outward from the general facade surface from the first floor level and are carried by ornamented stone consoles, with triangular pedimented and floral ornamented window jambs and gable roofs with wider eaves. To the left of the façade is a large courtyard entrance leading to the inner courtyard of the building. The horizontal stone moldings on the front facade continue on the right and left side facades. The rear façade of the building extending in the northeast-southwest direction faces the inner courtyard towards the southeast. The inner courtyard facades are simpler and unadorned compared to the front façade (Figure 21). On the rather large double-winged door, iron bars in the form of rose windows are embroidered with floral and rumi motifs and become the remarkable ornamentation element in the building (Figure 22).

Figure 17. *The facade of Ankara Medipol University Rectorate Building [25].*

Figure 18. *On the front facade of Ankara Medipol University Rectorate Building [25].*

Figure 19. *The facade of Ankara Medipol University Rectorate Building [28].*

Figure 20. *Talat Paşa Boulevard facade of Ankara Medipol University Rectorate Building [28].*

Figure 21. *The inner courtyard facades of Ankara Medipol University Rectorate Building [28].*

Figure 22. *Rose windows embroidered with floral and Rumi motifs [28].*

4.3. Ankara Social Sciences University Rectorate Building

The building, which is now used as the Ankara Social Sciences University Rectorate Service building, is the Former Ministry of Finance Building. The Old Ministry of Finance Building is located in the Vilâyet Square in Ulus. While the Redif Barracks built during the Ottoman period was located on the site of the building, the unusable barracks were demolished and the Ministry of Finance Building was built in its place. İş Bank (now a museum) is located to the south of the building. Built in 1925, the Ministry of Finance Building is the first ministry building of the Republican era. The architect of the building is Yahya Ahmet Bey and the engineer is İrfan Bey. The building, which was also used as the Prime Ministry for a period, has survived to the present day with the additions made in 1927 and after the 1950s. Built during the First National Architecture Period, it is considered to be a living witness and one of the landmarks of the period. The building, which preserves its originality to a large extent, has not been massively intervened until recently, and in 2017, it was repaired and started to be used as the rectorate service building [29]. The location of the area where the Ankara Social Sciences University Rectorate Building is located and its general view in the city are shown in Figures 23 and 24.

Figure 23. *Ankara Social Sciences University Location of the area where the Rectorate Building is located [16].*

Figure 24. *General view of the area where Ankara Social Sciences University Rectorate Building is located within the city [30].*

The back of the building facing the old Vilayet Square was organized as a park with sculptures, pools and sets descending to Çankırı Street. The garden arrangements planned in the area where the building is located were very effective on the general appearance. Although the date of the terraced garden arrangement in the western direction is unknown, it is thought that it was built in 1929, the same date as the entrance. Within the garden descending to Çankırı Street in sets, two separate ellipse-shaped pools can be seen. There are water nymph sculptures on the fountains in the middle of the pools (A.K.V.K.K Archive).The site plan of the area where the Ankara Social Sciences University Rectorate Building is located is shown in Figures 25 and 26.

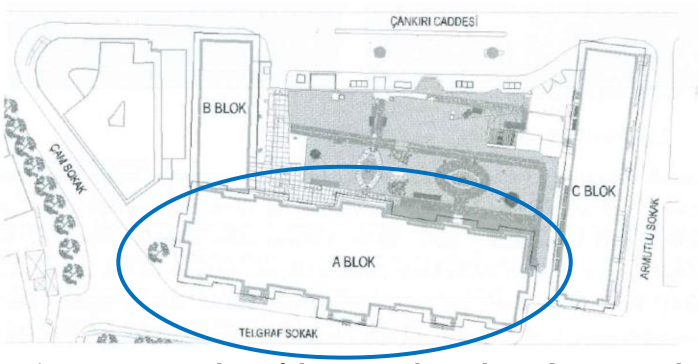

Figure 25. *Site plan of the area where the Ankara Social Sciences University Rectorate Building is located [31].*

Figure 26. *Site plan of the area where the Ankara Social Sciences University Rectorate Building is located [30].*

The building, which has a rectangular plan in the south-north direction, consists of three main sections protruding according to the initial design and intermediate wings connecting them (Figure 27). One wing of this mass was used as the Ministry of Finance, the other wing as the Ministry of Customs and Monopoly, and the middle section as the Prime Ministry (until the 1950s). In today's long mass, which was formed with the additions made after 1927, the central section with the main entrance protruding outwards, the corners and the axes with secondary entrances with stairs were raised and took the appearance of a tower (Figure 28). The rectangular main entrance door is located in the central part of the eastern façade of the hipped-roofed and wide eaves building consisting of a basement and two floors. The main entrance hall on the axis of symmetry is the most magnificent part of the building with its monumental marble staircase and muqarnas cornices (Figure 29). The door, which is accessed by marble stairs, has a flat arch. The arch is built with two colored stones. Covered with a hipped roof with wide eaves, the structure is characterized by Seljuk and Ottoman motifs, turquoise tiles and muqarnas on the interior and façade, indicating the style of the First National Architecture Period [7].

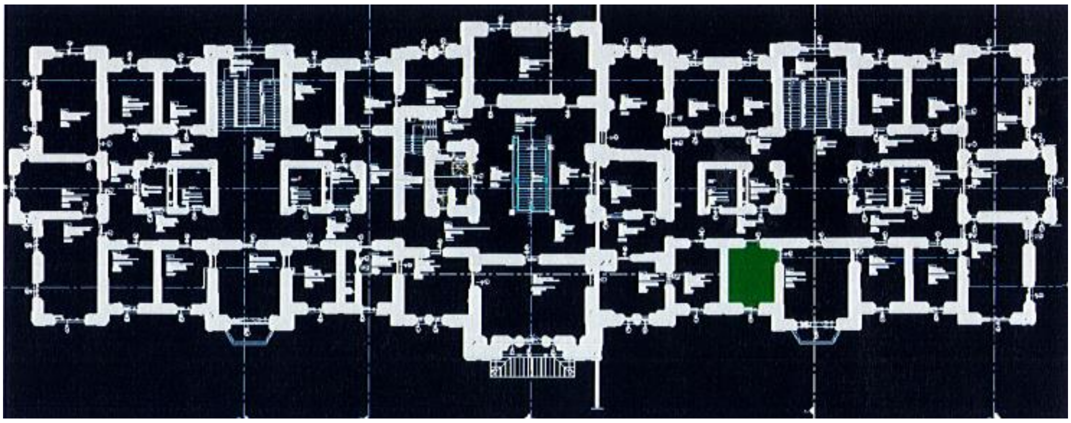

Figure 27.*1 st floor plan of Ankara Social Sciences University Rectorate Building [32].*

Figure 28. *On the front facade of Ankara Social Sciences University Rectorate Building [30].*

Figure 29. *Monumental marble staircase and muqarnas cornices of Ankara Social Sciences University Rectorate Building [33].*

5.CONCLUSION

The site plans of the campuses where the service buildings of Gazi University Rectorate, Ankara Medipol University Rectorate and Ankara Social Sciences University Rectorate are located, the functions of the buildings in the past and present, and their architectural composition (plan design and construction system, façade design, ornamentation/decorations, etc.) were examined;

- considering the year of construction, the oldest building is the building used as the Ankara Social Sciences University Rectorate Service Building (Former Ministry of Finance Building),
- all three of the artifacts are registered as group 1 cultural assets in need of protection(conservation),
- that the artifacts have survived to the present day, largely preserving their authenticity,
- were built according to reinforced concrete frame construction system,
- The Rectorate buildings of Ankara Medipol University and Ankara Social Sciences University used to have different functions and were re-functionalized and are now used as rectorate service buildings,
- The examined examples were designed in a similar architectural style; symmetry was emphasized in their plan schemes and façades, symmetry was reinforced with towers protruding from the façade surface, and the towers were covered with gable roofs with wider eaves,
- It is possible to say that the rectorate buildings examined are located in campuses in the city center and that holistic design is given importance in the green area/building ratios of the campuses and the relations they establish with their surroundings.

The general characteristics of the structures are summarized in Table 1.

Table 1. *The General Characteristics of The Structures*

General View			
Structure	**Gazi University Rectorate Building**	**Ankara Medipol University Rectorate Building**	**Ankara Social Sciences University Rectorate Building**
Architect, Year of Construction	Architect Kemaleddin Bey, 1927-1930	Architect Kemaleddin Bey, 1927-1928	Yahya Ahmet Bey, engineer İrfan Bey, 1925
First Intended Use	Gazi Teacher Training School and Institute of Education	Lodging (Housing)	Ministry of Finance (Ministry of Finance)
Present function	Gazi University Rectorate Service Building	Ankara Medipol University Rectorate Service Building	Ankara Social Sciences University Rectorate Service Building
Architectural Style	The First National Architecture Period	The First National Architecture Period	The First National Architecture Period
Plan Design and Construction System ya da Plan Structure and Construction System	The building is a rectangular mass forming a courtyard in the center and is symmetrical according to the central directions. The side sections have 4 floors, the central section has 5 floors and the observatory is located on the 6th floor and was built according to reinforced concrete frame construction system.	It has a U-shaped plan with a wide base, short arms and open ends facing east, and the short arm facing Talat Pasha Boulevard has a curved plan. The building, which has a total of 7 floors including two basements + ground + 4 floors, was built according to reinforced concrete frame construction system.	The building is a rectangular mass in the north-south direction and the plan and facade are symmetrically arranged according to the entrance axis. The basement+2-storey building was constructed according to reinforced concrete frame construction system.
Facade Design	The first floor windows have pointed arches, the other windows have large rectangular or square openings. The central section is projected outwards from the general building surface on the front and back sides, emphasizing the central direction, and the rooms on either side of the entrance on the front side and the stair buckets at the corners on the back side are projected outwards from the general eaves surface and covered with gable roofs, giving them the appearance of towers reinforcing symmetry.	The first floor windows have pointed arches, while the other windows have large rectangular or square openings. On the facades; the symmetry is reinforced by covering the towers, which protrude outward from the general facade surface from the first floor level and are carried by ornamented stone consoles, with gable roofs with wider eaves.	There are pointed windows on the upper floor and flat arched windows on the lower floor. The central section where the main entrance is located, the corners and the axes where the secondary entrances with stairs are located have been raised and taken the appearance of a tower. The parts of the building are covered with wooden supported tile roofs with wide eaves.
Interior Features	It consists of rows of spaces arranged around corridors.	It consists of rows of spaces arranged around corridors.	It consists of spaces arranged around two parallel corridors running along the building.
Features such as ornamentation/decorations etc.	A high entrance portico defined by five pointed arched openings carried by white marble columns two stories high. The marble columns of the porticoes in front of the front and rear entrances are topped with stalactite capitals, and the upper-storey windows of the tower-shaped projections on either side of the entrance are topped with rumi-decorated capitals with medallions in the center.	On the central axis of the façade, there is a transition space with a gable arch and metal work. There are masonry handrails in this section. The stone facade cladding and iron railings in the form of rose windows above the rather large double-winged door on the facade are decorated with floral and rumi motifs. There are molding with Turkish triangle motifs under all eaves.	It has a monumental marble staircase and cornices with muqarnas. The arch pediments and decorations with intricate Ottoman motifs, turquoise tiles and vertical geometric Seljuk patterns between the axes are elements taken from traditional Turkish architecture.
Recent Repairs	2019	2021	2017
Registration Date and Conservation Group	14.10.1972 /1	08.05.1981 /1	14.10.1972/1

Education is an intersection point and a starting point as the interface of urban and cultural construction. The “Orta Muallim Mektebi ve Terbiye Enstitüsü" can be characterized as the focal point of social change, not only as a tool for social change, but also as the first educational institution to train the teachers who would provide the education that would fundamentally affect social change. The construction of a monumental educational structure and the planning of a campus in comparison to the urban scale is very impressive for that period. The nucleus of the spatial reflection of the Turkish education policy, "Gazi Muallim Mektebi ve Terbiye Enstitüsü" was one of the first and important constructions in the formation of the urban macroform. In this context, it can be said that it creates a collective memory with its location in the city, its architectural composition, its place in the social framework, its place in the history of Turkish education and thus its importance in the history of the Republic.

According to Assmann [34], "It is the monument that manages to go beyond the present." From this point of view, "Gazi University Rectorate Building" has been able to transcend time even though it is located in a built environment in the city today, it was registered and taken under protection by the Ministry of Culture and Tourism in 1972, and the entire campus was designated as a conservation area in 2009. Today, it is planned that the buildings to be constructed in this area will not exceed the height of the "Gazi University Rectorate Building". This is considered to be a positive approach in terms of the importance of the building and the area in the history of the Republic and the history of Turkish education.

Examining the national architectural rectorate buildings built in Ankara before 1950 contributes to the research and literature on this subject in terms of emphasizing the place of rectorate buildings in the social framework and their importance in the history of Turkish education. On the other hand, it is thought that examining other buildings of national architecture on the campuses where the buildings examined within the scope of the study are located and large-scale university buildings of national architecture (such as Ankara University Science Faculties, etc.), which are very important in the history of Turkish education, will provide important data to researchers and enrich the literature.

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Analysis of Spatial Organization in Architectural Works of Kemaleddin Bey Using Space Syntax: A Case Study of The 4th Vakıf Han[1]

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Abstract

Architect Kemaleddin was a leading figure in the first modern architectural movement in Turkey, known as the National Architecture movement. He combined Ottoman architectural elements with modern construction techniques to create innovative buildings that reflected the changing social structure of cities during the last periods of the Ottoman Empire.
The 4th Vakıf Han is one of the office buildings designed by Architect Kemaleddin. Its courtyard plan scheme is particularly noteworthy. The aim of the study is to examine the spatial organization of the building, interpret the interaction between the user and space, evaluate the building's positioning within the region, and reveal how users perceive the spaces through spatial analysis.
The study is unique as it contributes to the literature by providing insights into the social and economic structure of the period through space and by measuring how users perceive the space. The Space Syntax method was used to analyze the floor plans of the Fourth Vakıf Han, which provided visual and numerical data for the study. Based on these values, spatial readings were made.
The research findings showed that commercial spaces had the highest user circulation, social interaction, and communication, and that they were located in the right places in the planning. The building's location within the region was designed to increase user-space interaction. This study provides valuable insights into the socio-cultural and economic structure of the period in which the building was constructed.

1. INTRODUCTION

The 1st National Architecture movement emerged in response to the westernization movements that impeded the progress of Turkish architecture and heavily influenced it with foreign styles. Architects Kemaleddin and Vedat Bey were pioneers of this modernization movement. Although this period marks the beginning of Turkish architecture's modernization, it is noteworthy that the buildings of this era still incorporated classical Ottoman traditional architectural elements. The designs of Ottoman architecture were evident in the buildings, while the Western concept of architectural mass was combined with Ottoman architectural features. (Köroğlu,2004). In this era, masonry, reinforced concrete and steel bearing structures were commonly used, blending both new and traditional techniques. (Dabanlı,2021).

Following the 2nd Constitutional Monarchy, there was a pressing need to revamp the state's institutions. This involved restoring and upkeeping various structures, including mosques and social complexes under the purview of the "Evkaf Nezareti" (Ministry of Foundations). To execute this responsibility, the esteemed Architect Kemaleddin was appointed. Drawing from his extensive training overseas, Kemaleddin revolutionized Ottoman architecture by incorporating innovative construction techniques in all his projects. (Yavuz ve Özkan,1985). During this period, a number of Ottoman buildings were repaired. When evaluating the spatial characteristics of the architecture of this era, it becomes apparent

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that the stylistic effects were more evident in the design of building facades rather than the architectural plans. (Sözen, 1984). The architectural designs of a particular era reflect the predominant influence of Western design. However, it is observed that the Ottoman style of spatial arrangement in monumental structures was retained. Consequently, a symmetrical plan and facade design was commonly employed. (Çolak ve Eraslan,2021). During the National Architecture period, European construction techniques were incorporated into national culture, resulting in a unique approach to building. Notably, architect Kemaleddin's foundation office buildings showcase early examples of reinforced concrete and steel being used together in construction. The facades of these buildings exhibit a symmetrical structure, while the ground floors are dedicated to shops and the upper floors to offices. Of these buildings, 4th Vakıf Han stands out as a prime example of architecture being defined by its facade design during this era. (Tekeli ve İlkin,1997). The 4th Vakıf Han is an exemplary building that encompasses all the characteristics of the 1st National Architecture era. This investigation seeks to analyze the spatial arrangement of the 4th Vakıf Han, a creation of the renowned Architect Kemaleddin, which has a significant place in the history of Turkish architecture. Additionally, the aim is to decipher the interplay between the occupant and the space. It was selected as the focal point of the study due to its innovative courtyard plan, a unique spatial configuration that broke new ground in Ottoman architecture. (URL1). The objective of this study is to gain insight into the spatial arrangement of the 4th Vakıf Han, a structure designed by Architect Kemaleddin. Through this investigation, we aim to interpret the interplay between the user and the physical environment, establish the semantic dimension of the building's spaces, and assess the sociocultural infrastructure of the era in which it was constructed, as well as its location within the settlement. To achieve these goals, we utilized the Space Syntax methodology, employing the Syntax 2D and DepthmapX 0.30 software tools.

2. METHOD

The study employed the Space Syntax method, a popular spatial analysis technique utilized in various scientific investigations. This methodology involves a morphological and typological analysis of space, which provides insights into how it is experienced and perceived by users, whether indoors or outdoors. By concentrating on spatial features, it seeks to comprehend design in terms of form, aesthetics, orientation, and context (Zolfagharkhani, M.; Ostwald, M.J. 2021). It allows the dominant social infrastructure and hierarchical order of society to be read through spaces (Hiilier,1984, Peponis, J & Wineman,2002, Memerian 2022). According to Oswalt and Dawes (2018), the arrangement of buildings, specifically the spatial relationships between various spaces, can reveal important insights into the social fabric of a community. This approach was taken in the study to gather both visual and numerical data that could shed light on the cultural, economic, and social aspects of the 4th Vakıf Han during its construction, as well as provide a deeper understanding of user behavior, tendencies, and lifestyles within these spaces. The Space Syntax method, utilizing the Syntax 2D software, was used to obtain integration, connectivity, and mean depth values for the ground and first floors, which formed the basis of the study's database. Other floors were not considered, as their plan schemes were identical to that of the first floor. These three key values were then used to determine how spatial relationships and locations impacted the overall spatial organization. According to Syntax, centrally located spaces within a plan tend to promote greater social interaction and togetherness, with higher integration values. Areas with a high depth value, on the other hand, are typically more private and used for individual purposes. However, these spaces with higher user traffic tend to be the most integrated within the system, indicating a direct link between numerical values and behavioral patterns. (Khaki,2008, Oswald & Dawes,2008). Following an in-depth analysis of the building's interior, axial analysis was conducted using the DepthmapX 0.30 program to assess its placement within the urban landscape. Axial analysis, a method employed in Space Syntax, is commonly used in urban research to predict user mobility and distribution within the city. With the creation of axial maps, the longest viewing distance for pedestrians navigating through the urban space from their current location can be determined. These maps depict the longest and shortest lines passing through open areas within the settlement, indicating mobility and integration values. Streets with long and dense lines suggest high integration values, making them the most integrated areas within the system with intense mobility. (Alemdar ve Özbek,2021). In the axial analysis of the 4th Vakıf Han structure, the study questioned the building's position within the settlement and the correct location of spaces in it, on an urban scale.

3. 4th VAKIF HAN

During the late 19th and 20th centuries, Istanbul became an important trade center. Although it has received criticism for damaging the city's historical texture, the areas between Eminönü, Laleli, and Beyazıt have seen an increase in the number of commercial buildings constructed, making them the most densely built places for business establishments (Köroğlu, 2004) (Figure 1). During the XV and XX centuries, Ottoman foundations operated hans as commercial enterprises to generate income. These hans were typically two-story structures that featured ground floors used as shops and storage areas, while upper floors were designated for offices. Although there were changes in their design, function, and material properties over time, they generally followed a two-story architectural plan with an inner courtyard. (Hakyemez ve Gönül, 2014). During the 15th and 19th centuries, Han architecture progressed and advanced, but later started to slow down. Materials such as steel, glass and cement became more widely used in Turkish architecture. Steel allowed for long spans to be bridged, while glass was used as a cover over open courtyards. The 4th Vakıf Han, which is the subject of this study, consists of ground floor shops for commercial activities and upper floors with administrative offices that were necessary during the period when companies began to form. (Gülenaz, 2010). During this period, it was observed that the residential structures were built vertically with multiple stories instead of horizontally (Fıgure 2).

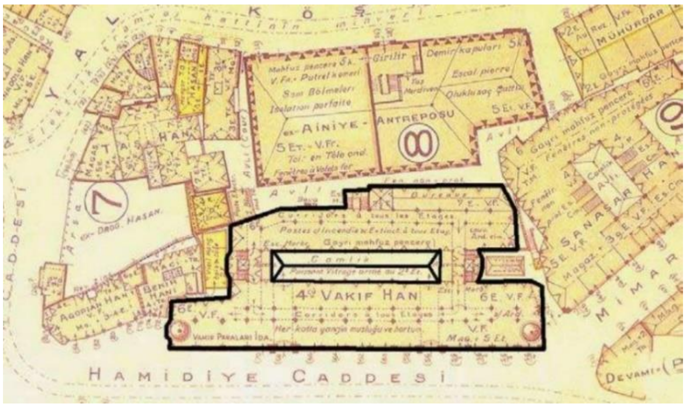

Figure 1. *Plan of 4th Vakıf Han*

Figure 2. *Old View of Vakıf Han*

In 1911, a decision was made to sell the old buildings of the foundations and replace them with new buildings that could generate commercial income. As a result, 4th Vakıf Han was constructed between 1911 and 1926. The new building was built on the site of the almshouse that belonged to the Abdulhamid I Complex, at the intersection of Mimar Kemaleddin and Hamidiye Streets in the commercial center of Istanbul (Erol, 2013). The construction of an office building began in 1912. However, due to the war, the project was left incomplete and finally finished in 1926. The usable area of the building is approximately 1936 m². It was named 'Caserne Victor' and used as a military headquarters by French soldiers for a while, even though its interior was not completely finished. (Ortabağ, 2008). Although initially designed as an office building, it was also utilized as a military barracks and a business center at times. (Hakyemez and Gönül, 2014). (Figure 3, Figure 4).

Figure 3. *4th Vakıf Han Earth View*

Figure 4. *4th Vakıf Han Today*

The building had been in commercial use for several years after 1926. However, it was not utilized for this purpose in 2000. Instead, it was given the function of the Istanbul Courthouse and served as a commercial office and Istanbul Chamber of Commerce and Industry until 1948, undergoing several repairs throughout this period. On June 25, 1983, the Istanbul No. 1 Cultural and Natural Heritage Real Estate Works Board registered the building with decision number 15185 (Istanbul No. IV Cultural Heritage Protection Regional Board Directorate). After remaining idle for many years, the office building was rented from the General Directorate of Foundations and converted into a hotel in 2007, serving in the field of tourism.

3.1. 4th Vakıf Han Spatial Features

The building is unique in that it is designed to take the exact shape of the land on which it is located, resulting in a trapezoidal shape and a courtyard plan. One of its sides is next to another office building. The building's rear part has been gradually expanded over time to match the shape of the land perfectly. The building has six floors above the basement, and one of its facades is adjacent to the building. On the ground floor, there are shops along Hamidiye Street on the front facade and in the inner courtyard shaped as a "U". Offices are located on the upper floors, with stairs and elevators connecting them. The mezzanine floors of the 24 shops on the ground floor are accessed from two entrances on this floor. (Hakyemez ve Gönül,2014). (Figure 5).

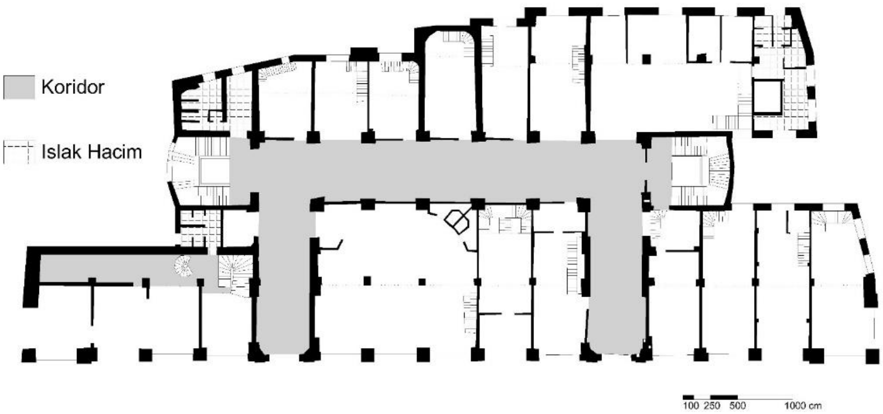

Figure 5. *4th Vakıf Han ground floor plan*

There are a total of 148 offices in the building, where there are 37 offices on each floor ranging in size from 17-28 square meters and interlocking (4th Vakıf Han, 2005, Restitution Report). It is thought that the transition between the offices is due to the corporatization understanding of the period, and the fact that companies work by renting the entire floor instead of renting an office one by one (Hakyemez and Gönül, 2014). In addition, on this floor, apart from the offices, there are service spaces such as stairs, elevators, warehouses, WCs. The staircase at the back is a service staircase. There is also a boiler office and warehouses in the basement of the building. (Figure 6).

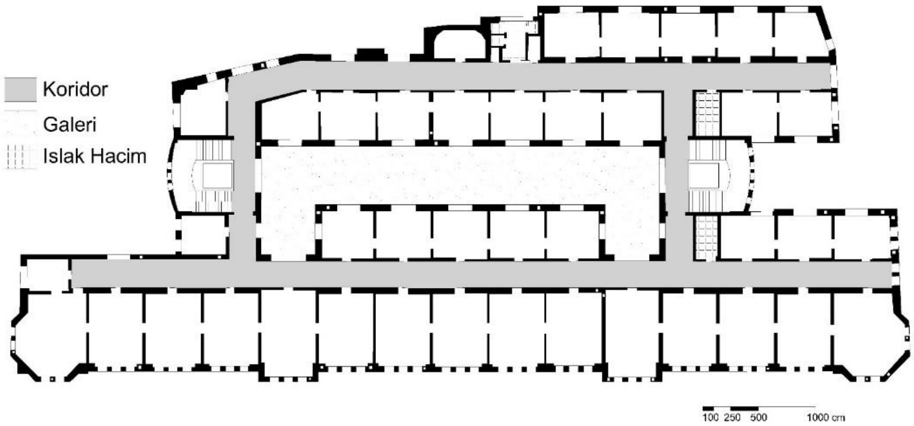

Figure 6. *4th Vakıf Han upper floor plan*

3.2. 4th Vakıf Han Facade Features

A symmetrical setup stands out on the front façade (Batur, 2008). To emphasize the entrances, overhangs carried by stone consoles were placed on the two entrance doors. It is seen that the front façade of the building was designed more carefully and ostentatively compared to the rear façade, and this understanding was also reflected in the interior design. While the back façade is made entirely of brick, the front façade features significant embellishments including cut stone columns, muqarnas, decorative plates between floors, and colored tile decorations. The entire façade consists of 15 modules in the vertical plane, and when evaluated horizontally, it gives the impression that it consists of 3 separate sections passing through the first and fourth floors. The arches on the windows have a character that narrows and becomes thinner as you go to the upper floors. At the corners of the top floor of the building, there are domes that give the dome a monumental effect. (Figure 7).

Figure 7. *4th Vakıf Han Facade Details*

3.3. 4th Vakıf Han Material and Structural Properties

The front façade of the building, which was built with a steel frame, is plastered with cut stone and the back façade is plastered with brick material. The roof form of the building is a hipped roof carried by steel trusses, and the top of this roof is covered with asbestos sheets (Yavuz, 1981). The building, which has 70 cm load-bearing walls, is also the first building in Istanbul with a concrete foundation (Hastaoğlu, Martinidi,2011).

4. FINDINGS

The 4th Vakıf Han's ground floor and 1st floor plans were analyzed using the Syntax 2D program. The program generated integration maps that provided both visual and numerical data. The maps showed color transitions between blue and red, which are illustrated in Figure 8 and Figure 9. Furthermore, the integration values, depth, and connectivity of all areas were obtained and are presented in Table 1 and Table 2.

4.1. 4th Vakıf Han Spatial Analysis

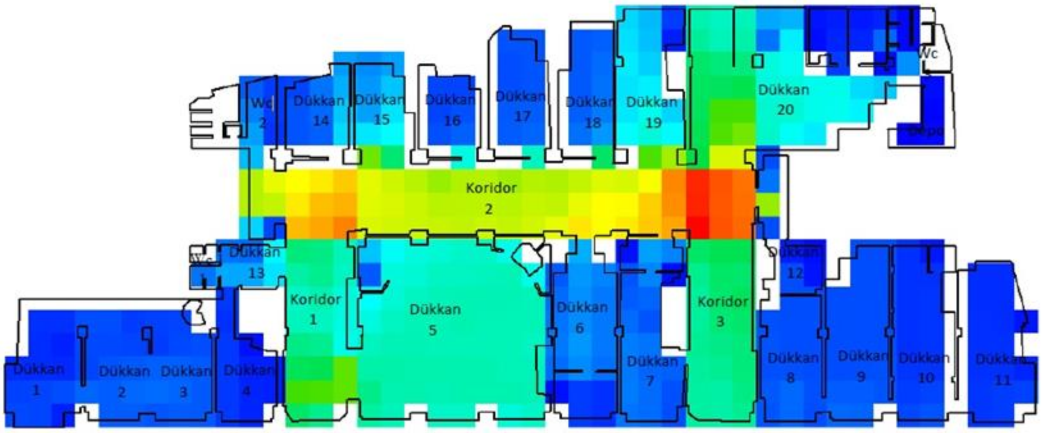

Figure 8. Ground Floor İntegration Map

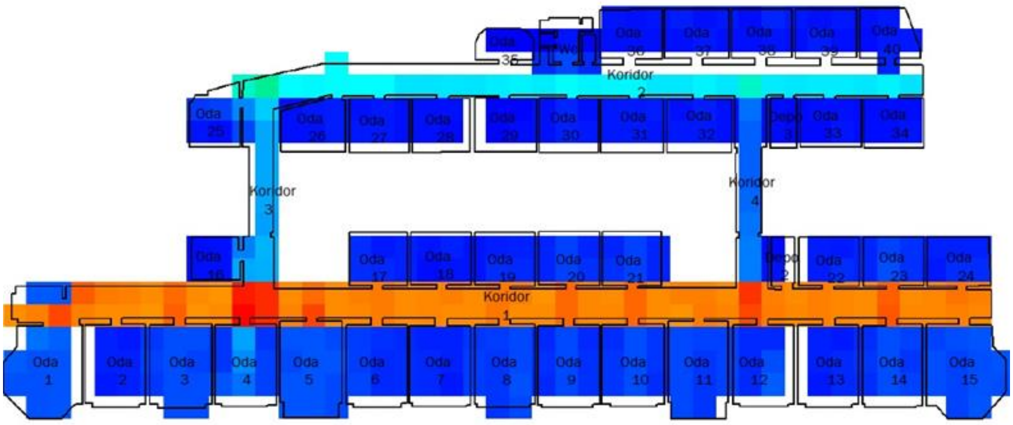

Figure 9. *1st Floor İntegration Map*

The three values that are used to assess the accessibility and connectivity of a space: depth, connectivity, and integration are shown in Table I and Table II. Depth refers to the degree of accessibility of a space, with a higher value denoting a greater level of difficulty in reaching it and a more pronounced disconnection from the system. Connectivity, on the other hand, quantifies the direct connections between a space and its surrounding areas. Meanwhile, integration pertains to the position and interrelationships of the space within the system as a whole. A higher integration value indicates that the space is more significant and integrated into the system. In syntactic analyses, the values of depth and cohesion are typically inversely related. (Hillier and Hanson, 1984). The concept of depth and integration values refers to the level of accessibility of a space. A higher depth value means that the space is more difficult to access and less connected to the overall system. On the other hand, the transition to the target space is an important factor. The value of connectivity is also relevant in this context. (Hillier and Hanson, 1984). The importance of connectivity is determined by the direct connections of a space with its surrounding spaces, while the significance of integration is related to the location and relationships of the space within the entire system. The greater the value of integration, the more dominant and integrated the space is within the system. In syntactic analyses, depth and cohesion values typically have an inverse relationship (Hillier and Hanson, 1984).

Table I. *Syntactic Values Obtained From Ground Floor Spatial Analysis*

Venue name	**Depth**	**Connectivity**	**Integration**
Shop 1	5.63	15	757
Shop 2	5.25	25	1444
Shop 3	4.68	29	1691
Shop 4	4.89	8	584
Shop 5	3.76	67	6157
Shop 6	3.38	23	2444
Shop 7	4.20	16	1464
Shop 8	4.09	16	1302
Shop 9	3.26	12	1326
Shop 10	4.91	20	1291
Shop 11	4.97	14	878
Shop 12	3.26	12	1326
Wc 1	3.03	24	2907
Shop 13	3.03	24	2907
Wc 2	3.11	18	2208
Shop 14	3.23	14	1780
Shop 15	3.31	20	2740
Shop 16	3.46	10	1213
Shop 17	3.53	12	1294
Shop 18	3.40	13	1507
Shop 19	3.27	33	4102
Shop 20	3.25	44	5215
Wc 3	4.25	2	181
Depot	5.24	2	131
Corridor 1	3.03	44	5817
Corridor 2	2.63	76	11.483
Corridor 3	2.96	68	8321

Table II. *Syntactic Values Obtained From First Floor Spatial Analysis*

Venue name	**Depth**	**Connectivity**	**Integration**
Office 1	3.45	12	1122
Office 2	3.47	6	507
Office 3	3.44	12	1072
Office 4	2.81	17	1894
Office 5	3.44	13	1191
Office 6	4.41	8	626
Office 7	3.46	7	615
Office 8	4.38	10	777
Office 9	3.43	12	1051
Office 10	3.43	12	1073
Office 11	4.41	10	795
Office 12	3.16	10	1058
Office 13	3.47	6	508
Office 14	3.43	12	1074
Office 15	4.37	12	950
Office 16	3.77	4	318
Office 17	3.44	7	617
Office 18	4.45	3	250
Office 19	3.43	8	658
Office 20	3.44	10	951
Office 21	3.44	10	950
Depot 1	3.49	3	357
Office 22	3.47	6	663
Office 23	3.44	11	1089
Office 24	3.43	8	682
Office 25	3.43	10	924
Office 26	4.12	6	379
Office 27	4.12	6	378
Office 28	4.14	4	276
Office 29	5.13	3	165
Office 30	4.10	9	580
Office 31	4.12	6	411
Office 32	4.11	7	445
Depot 2	5.14	3	181
Office 33	4.13	4	277
Office 34	5.10	5	267
Office 35	5.14	1	65
Wc	4.11	5	346
Office 36	5.09	5	283
Office 37	4.12	6	379
Office 38	3.51	4	341
Office 39	4.12	7	444
Office 40	4.12	6	394
Corridor 1	2.49	85	11775
Corridor 2	3.16	34	3260
Corridor 3	2.79	18	2267
Corridor 4	2.89	11	1350

4.2. 4th Vakıf Han Urban Location Analysis

The road network around the 4th Vakıf Han was created on satellite images and subjected to axial analysis with the DepthmapX 0.30 program. The connectivity values obtained from the spatial layout analysis of the building were ranked from one to six, with one being the lowest and six being the highest. The analysis revealed that Hamidiye Street, located to the south of the building, had a connectivity value of 5, while the side street entered from Yalı Köşkü Street, which the shops in the north overlook, had a connectivity value of 1. This means that the shops facing the south facade have higher connectivity values compared to the northern shops that are accessed through the building, which confirms the findings of the spatial layout analysis at the urban scale. (Figure 10).

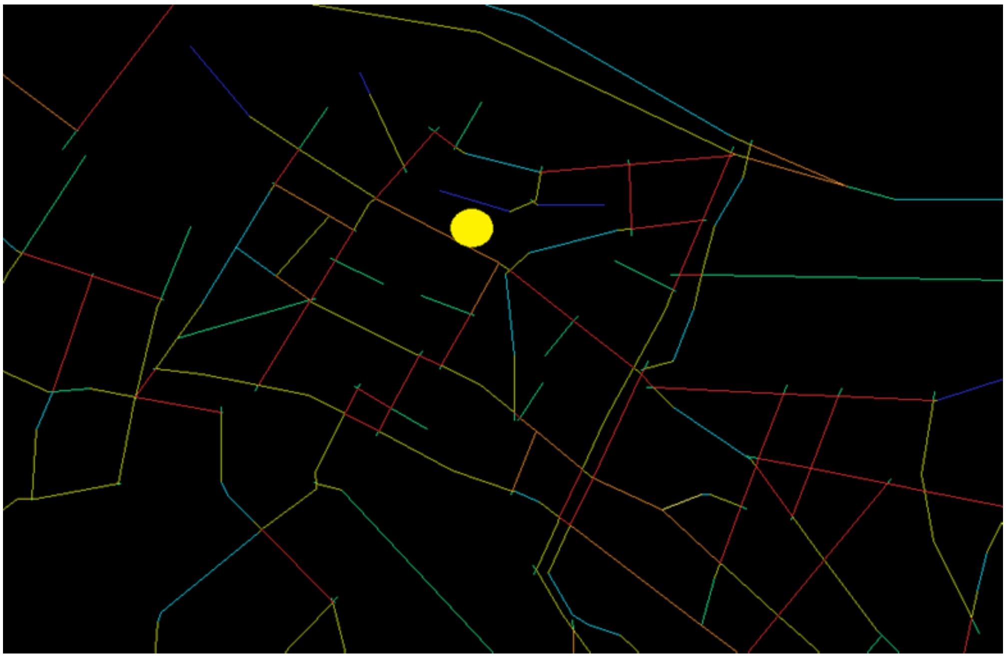

Figure 10. *4th Vakıf Han Axial Analysis Map*

5. DISCUSSION and EVALUATION

- ✓ According to the syntactic results of ground floor spatial analysis, the integration value ranking of the spaces is as follows:

Corridor 2> Corridor 3>Shop 5> Corridor 1>Shop 20> Shop 19> Shop 15> Shop 14

As seen in Table 1, Corridor 2, which is the place with the highest integration value on the ground floor, is located in the courtyard, at the intersection of the shops facing the rear and front facades, and is the area with the highest pedestrian circulation. This location holds the most central and prominent position in the system, with the lowest depth value. By providing access to the back shops through this corridor, the integration value of these shops has increased. Corridor 3, connecting to Hamidiye Street, the axis with the highest integration value in the main street and axial analyses, is the second most integrated area in the system after Corridor 2. The primary entrance into the building along the street being through Corridor 3 aligns with pedestrian movement and direction on Hamidiye Street, confirming the accuracy of this finding. Additionally, shop number 5's position on the integrated axis (Hamidiye Street), right next to the entrance axis of the building (Corridor 1), where access is more frequent, and with its entrance from here, has resulted in high integration values for both Shop 5 and Corridor 1. The shops numbered 7, 8, and 4, despite being located on the main entrance axis, cannot be accessed from Corridor 3. This is due to the dividing walls between them, which have reduced their integration values. On the other hand, shops 20 and 19 have been connected to Corridor 3 and Corridor 2, which has increased their integration values. Shop number 5 has a higher integration value than shop number 20 because it is not divided by any walls.

The more a space is divided, the more its depth value increases. However, since shops 19 and 20 are directly connected to Corridor 2, they have less depth value than shop number 5. Shops 15 and 14, located at the intersections of Corridor 2 and Corridor 1, have high integration values and are on the entrance axis. The shops and toilets numbered 1, 2, 10, and 11 have the lowest integration values and are generally disconnected and isolated from the system. They are located at the corners of the plan scheme and have the highest depth value. The shops facing Hamidiye Street have external entrances and higher circulation, resulting in higher integration values than the shops facing the inverted "U" shaped corridor. Therefore, the shops facing the corridor are identified as deeper spaces.

- ✓ According to the syntactic results of the 1st floor spatial analysis; The integration value ranking of the offices is as follows:

Corridor 1> Corridor 2> Corridor 3>Office 4> Corridor 4>Office 5>Office 1>Office 23

After analyzing the plan scheme values, it was found that the corridors had the highest integration values. Corridor 1 had the highest value because it had more offices on the side of the building facing Hamidiye Street, and it was the most accessible. Corridors 2 and 3 also had high integration values because they connected to all the offices. Office 4 also had a high value because it opened to Corridor 1. Offices 5, 12, and 1 were also highly integrated because they connected to Corridor 1. The integration value of offices on Corridor 1 was higher than those on Corridor 2. Offices 35 and 29 were identified as the deepest and most isolated parts of the system, as they were farthest from the stairs and elevators. As the distance from the stairs increased, the depth of the spaces increased, making access more difficult.

6. CONCLUSION

The 4th Vakıf Han is a significant building that bears witness to its era's architecture, design, and impact on the city. It is a testament to the 1st National Architecture movement and has maintained its unique planning approach, design decisions, façade layout, and workmanship to this day. The building features shops and offices on the ground and upper floors, respectively. Unlike other foundation office buildings designed by Kemaleddin, the bedroom floors have a uniform plan scheme with a skylight space between the corridors. A spatial analysis of the building was conducted using the Space Syntax method, which determined its spatial organization and evaluated the relationships between spaces. The building's location on Hamidiye Street, an important touristic route that connects to the Spice Bazaar and Eminönü Square, was also evaluated. Based on axial analysis, it was determined that the strongest pedestrian axis is in the south direction, and pedestrian movement on Hamidiye Street continues intensively in the east and west directions. The building's positioning parallel to the street has been deemed advantageous in terms of pedestrian accessibility, resulting in a higher value for the property. The shops located on the south side of the building, with entrance points facing the functional street, have facilitated pedestrian access, resulting in increased foot traffic. The shops are situated in the part of the building that dominates the overall spatial organization, emphasizing the interaction between space and user. To optimize the design principle, more shops were placed facing Hamidiye Street, with ground floors reserved for shopping areas and upper floors for offices. The concentration of offices on the upper floors, close to the main street and vertical circulations, further highlights the building's optimal design. Space Syntax principles suggest that areas closer to the most integrated areas in the general system show high integration values. The corridors on both the ground and upper floors of the 4th Vakıf Han have the highest integration values, indicating frequent and easily accessible use by the user.

The 4th Vakıf Han, a hotel designed by the renowned architect Kemaleddin Bey, is a significant piece of our cultural heritage that reflects the architectural style, socio-cultural influences, and economic structure of its time. Analyzing the spatial layout of buildings from the Republican era and the work of Kemaleddin is crucial to gaining insight into the social context of that era. Therefore, it is imperative to increase research in this area and prioritize the conservation of historical buildings.

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PART B: ART, HUMANITIES, DESIGN AND PLANNING

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Evaluation of Thermal Performance of Traditional Houses and Suggestions for Improvement: Case of Beypazarı Mehmet Üsdün House

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Abstract

Traditional buildings should be studied to increase their thermal performance in order to preserve cultural heritage for future generations and ensure proper functionality. This study presents a model proposal for simulating the thermal performance of traditional houses using DesignBuilder software. The results of this evaluation will be used to create suggestions for improving historical buildings. It is possible to evaluate the thermal performance of traditional houses with current analysis software and make suggestions for improving their capacity through preservation activities. Firstly, data were collected, and standards and simulation tools related to thermal performance were examined. A traditional house was chosen as a case study for creating a proposal model and conducting thermal analysis. In the second step, the data processing stage was performed, and the house model was created in DesignBuilder. The collected data were entered into DesignBuilder and simulated. The simulation results were compared with the Turkish Standards (TS 825 - Thermal insulation requirements for buildings). Finally, suggestions were presented as proposals and solutions to improve the thermal performance of historical buildings based on the findings of this study. As a result of this study, it was found that implementing underfloor heating systems in Mehmet Üsdün House increased the thermal performance of the house by 30-35%. It can be concluded that the thermal performance of historical buildings can be effectively improved through the proper utilization of these buildings.

1. INTRODUCTION

The basis of energy efficiency policies is the oil crisis in the 1970s, the depletion of fossil fuels and the awareness of climate change [1]. Countries are working to completely stop the gas emissions of all sectors, especially the reduction of greenhouse gas [2]. Looking at the energy consumption graph by sectors, it is known that the construction sector ranks third [3] and efforts are made to reduce emissions in this sector (Figure 1).

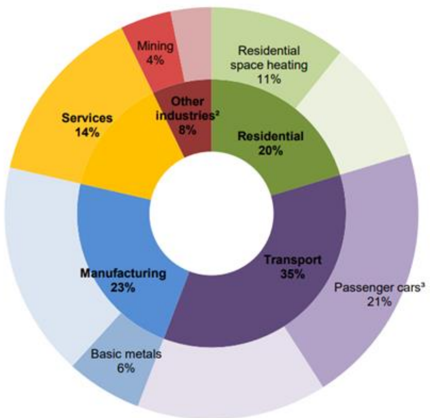

Figure 1. *Total final consumption by sector [3].*

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In the construction sector, which is responsible for approximately one third of the energy consumption, 80% of this consumed energy is used for heating [4]. Studies show that with attention to the energy consumption used in buildings, 50% energy savings can be achieved [5]. Improvement of thermal performance in buildings is one of the most effective ways to reduce excessive energy consumption for heating and cooling and to provide optimum thermal comfort conditions.

ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers) STANDARD 55-2020 Thermal Environmental Conditions for Human Occupancy can be cited as an international standard for thermal comfort [6]. The basis of thermal performance studies in Turkey is the 'TS 825, Turkish Thermal Insulation Standard' published in 2000. The aim of this standard is to improve the energy performance of new buildings [7]. However, the building sector does not only consist of new buildings, but also traditional architectural heritages are included in the building stock.

In the last decade, three important voluntary standard guidelines have been developed to increase energy efficiency in historic buildings, to give evaluation criteria and recommendations. The first of these is the guide published by the organization called AiCARR (Italian Association of Air Conditioning, Heating and Refrigeration) in 2014 and deals with the protection of architectural heritage as its basis. This guide explains the process of evaluating performance differences before and after increasing the energy efficiency of the building. The second is the guide published by the European Standards Committee (EN 16883:2017) in 2017, and it describes the process to be used when renovating historic buildings, containing similar items to the previous guide. The third, similar to the previous two guides, is the 'Energy Guideline for Historic Buildings' published in 2019 by ASHRAE [8]. In February 2019, ASHRAE made recommendations to improve energy efficiency in historic buildings and manage the process [9]. In Turkey, there is no guide on improving the thermal performance of traditional buildings. The only regulation that makes a statement about the historical buildings that need to be protected is the Regulation on Energy Performance in Buildings, published on December 5, 2008. However, there is no detailed explanation in this regulation [10]. Energy efficiency measures are a tool for the effective use of historical buildings in conservation studies. As stated in the Venice Charter, all science and techniques should be used in the preservation and restoration of historical buildings [11]. However, compatibility, minimum intervention, distinguishability, durability, originality of expression and respect for original texture are important [12]. Interventions should not mislead future work [13] should be given equal attention to all building elements, including the structural system, roofs, timber infill, floors, doors and windows [14] and should only be performed by trained professionals.

1.1. Energy Efficiency in Historic Buildings

Historical buildings are heritage items that reflect the past to the present. It is essential to preserve it and pass it on to future generations. However, while preserving historical buildings, adapting them to contemporary life is necessary. The studies aim to increase historical buildings' thermal performance and energy efficiency, maximize the relationship between improving energy efficiency, preserving architectural heritage, and increasing thermal comfort [15]. Thermal performance improvement studies make historical buildings more suitable for use and contribute to the preservation of the buildings. Preserving the built heritage also reduces energy consumption [16]. According to the BPIE, by 2050, small and medium-scale interventions will be possible to reduce CO2 and recover energy in historic buildings [17].

Many studies have been conducted to increase energy efficiency and thermal comfort in historical buildings. Dili et al. [18] investigated the difference in thermal comfort between traditional and modern houses in the Kerala region of India. Oikonomou and Bougiatioti [19] examined the thermal comfort of forty traditional buildings in the Florina region of Greece. Morelli et al. [20] aimed to renovate a historical building in the Denmark-Copenhagen region as a zero-energy building. Galvez et al. [21] aimed to restore a historical building in the Seville region of Spain to increase its energy efficiency. Ben and Steemers [22] examined the effect of physical variables on energy savings for historical buildings in London. Alev et al. [23] proposed renovation alternatives to improve the energy performance of historic rural houses in Estonia, Finland, and Sweden. Salata et al. [24] examined the change of thermal properties of a historical texture in Rome with vegetation. Asadi et al. [25] evaluated a selected historical building in the Yazd region of Iran within the scope of energy efficiency. Studies: The researchers, year, location, purpose, method, and result are given in Table 1.

Table 1. *Energy efficiency studies in historical buildings*

Researchers	Year	Location	Study purpose	Tools	Conclusion
Dili, Naseer, and Varghese	2010	India Kerala	The results of scientific analyses affecting thermal comfort were compared with user responses.	Survey	Kerela's traditional residential buildings provide thermal comfort regardless of the season.
Oikonomou and Bougiatioti	2011	Greece Florida	The design elements of forty traditional houses built in the 19th and 20th centuries were identified, and their thermal comfort was examined.	Ecotect v5.2	The form and building materials of traditional houses are a guide for today's buildings.
Morelli,Ronby, Mikkelsen, Minzari, Kildemoes and Tommerup	2012	Denmark Copenhagen	Improvement methods have been proposed to transform a historic house built in 1896 into a zero-energy building.	Be10	A 68% saving was achieved in energy use.
Galvez, Hita, Martin, Conde and Linan	2013	Spain Seville	Two different restoration plans were compared to increase the energy efficiency of a historical building.	LIDER CALENER Survey	Of two restoration plans heat loss in winter and for cooling in summeris better has been detected.
Ben and Steemers	2014	London	The effect of users' behavior on energy savings in the house was examined.	IESVE	It has been determined that positive behavior change corresponds to 62-86% of total energy savings.
Alev,Eskola, Arumagi, Jokisalo, Donarelli, Siren, Brostrom and Kalamees	2014	Estonia Finland Sweden	Different improvements have been made to the energy performance of historic houses in three countries.	IDA- ICE	Improving the energy source provided the most significant energy savings.
Salata, Golasi, Lietovollaro	2015	Rome	Five proposed models were created to examine the effect of vegetation on thermal comfort in the historical environment.	ENVI	The potential of vegetation to reduce the thermal load of buildings in summer and winter has been determined.
Asadi,Fakhari and Sendi	2016	Iranian Yazd	The energy performance of a traditional house was evaluated.	Ecotect EnergyPlus	It has been determined that the thermal performance of the house's ground floor is more suitable than the other floors.

In this study, the historical Mehmet Üsdün House, located in Ankara/Beypazarı was chosen for the case study. The aim of the study is to analyze and evaluate the thermal performance and to make suggestions to improve performance without damaging the building. The traditional buildings in Beypazarı have preserved their authenticity. The living floors of the houses in the urban texture are similar and the houses are actively used. For this reason, the findings obtained from the case study will be useful for other traditional houses in the urban texture.

2. METHOD

In the study, a model proposal has been made that evaluates the thermal performance of historical buildings and offers suggestions for improvement by preserving the authenticity of the building, and the model has been tested for the historical Mehmet Üsdün House in Beypazarı. The model consists of three stages; data collection phase, data processing phase and solution proposal phase. The structure of the model proposal is shown in Figure 2. With this model, it is aimed to preserve the architectural heritage value while increasing the thermal performance and thermal comfort conditions of the house.

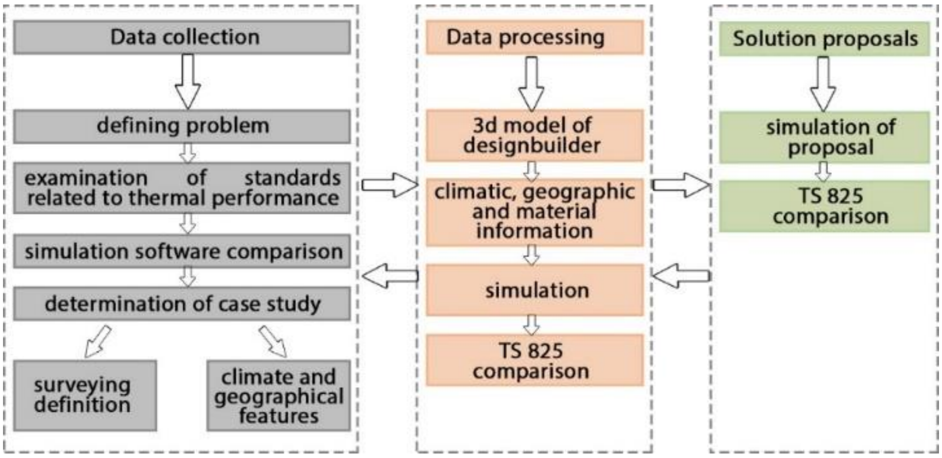


Figure 2. *Structure of the model proposal*

2.1. Data Collection Phase

At this stage, the climate and geographical information of Mehmet Üsdün House were obtained. Then, components such as building layout, building geometry, openings, building elements, physical values of building elements, building utilization rate, existing air conditioning and electrical systems were determined.

Mehmet Üsdün House is located in Beypazarı traditional housing pattern and the house is an architectural heritage that should be transferred to the future with its authentic features that have survived to the present day. Similar to many examples of civil architecture, this house cannot adapt to today's comfort conditions and has a protection problem. For this reason, research is required to adapt the building to today's comfort conditions. Mehmet Üsdun House is located in Beytepe neighborhood, which is the first residential area of Beypazarı. The house is located in a large garden and there are no other buildings in its nearby area (Figure 3). Within the scope of the study, the survey of Mehmet Üsdün House was created and the plan, section and views of the building were drawn in Autocad 2018 software (Figure 3). Architectural details are ignored as they will not be evaluated in the thermal performance analysis.

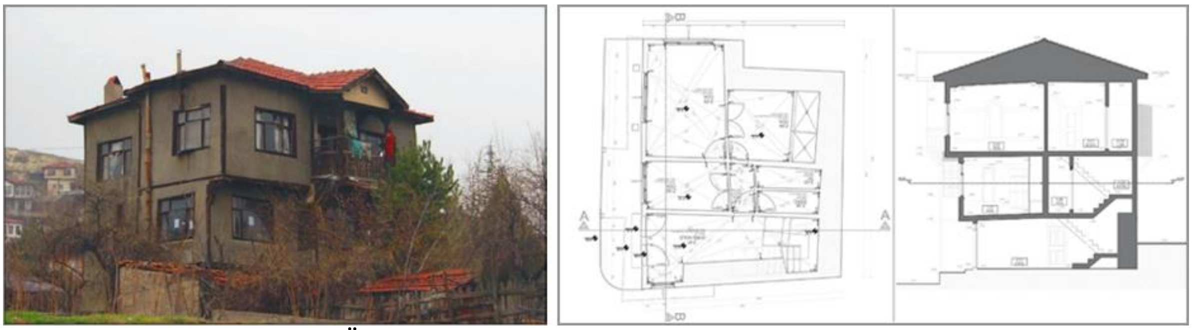
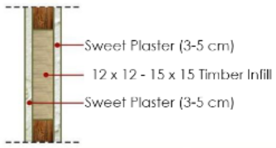


Figure 3. *Mehmet Üsdün House (left) and Ground floor plan / A-A section (right)*

Mehmet Üsdün House consists of three floors and on the ground floor, as in all Beypazarı houses, there are service, warehouse, etc. space are located. The first floor is the winter floor, and on this floor there are two rooms with the functions of resting, sitting and working. The second floor is a repetition of the first floor in terms of plan layout. As the house is located on a sloping land, the ground floor is half buried. The buried walls of the house were built with a stone masonry system, and the first and second floors were built with a timber framed system.

For the thermal performance analysis, the properties of the building materials used in the house were calculated. These; thickness (mm), density [d(kg/m3)], thermal conductivity [λ (W/mK)], thermal resistance [R (m2.K/W)] and thermal conductivity value [U(W/m2) .K)]. The type and thickness value of the materials were determined by the survey study. Other values (such as, thermal conductivity, density) of the materials were calculated based on TS 825. According to these calculations, details were created for all the walls, floors and roofs that make up the house. The details created for the timber framed wall, timber floor and ceiling are shown in Figure 4 and Figure 5. After calculating the material properties, some assumptions are made for the thermal performance analysis. These; the functions of the spaces in the house are the heating system and the lighting system.

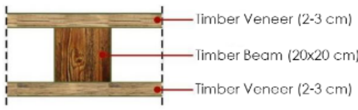
TIMBER WALL



		Material	Thickness (mm)	Thermal Conductivity λ (W/mK)	Density d (kg/m3)	Thermal Resistance R (m2.K/W)	Thermal Conductivity Value U(W/m2) .K
TIMBER FRAMED SYSTEM		Sweet Plaster	30-50	2,2	2500	0,02	0,74
		Timber Frame with Timber Infill	120-150	0,13	600	1,15	
		Sweet Plaster	30-50	2,2	2500	0,02	
HEAT TRANSFER RESISTANCE	Ri					0,13	
	Re					0,04	
Rtotal						1,36	

Figure 4. *Physical values of timber wall detail*

TIMBER FLOOR



		Material	Thickness (mm)	Thermal Conductivity λ (W/mK)	Density d (kg/m3)	Thermal Resistance R (m2.K/W)	Thermal Conductivity Value U(W/m2) .K
TIMBER BEAM SYSTEM		Timber Veneer (floor)	20	0,13	600	0,15	0,48
		Timber Beam	200	0,13	600	1,54	
		Timber Veneer (ceiling)	20	0,13	600	0,15	
HEAT TRANSFER RESISTANCE	Ri					0,13	
	Re					0,13	
Rtotal						2,1	

Figure 5. *Physical values of timber floor and ceiling*

Since each room is used as a house in traditional houses, it accommodates all functions such as sitting, resting and eating. Other spaces consist of circulation areas and wet areas such as kitchen and toilet. For this reason, space functions are divided into three groups for thermal performance analysis. The first group consists of sitting, resting and eating functions. The second group consists of circulation areas and the third group includes wet areas.

The heating system of traditional houses used to provide furnace or barbecues in the past, but today the stove is used as the heating system. It has been determined that the heating system of Mehmet Üsdün House is also a stove and it is accepted that heating is provided in all the spaces where the stove chimney is located.

In the past, the lighting need in traditional houses was provided by gas lamps and candles. However, today the lighting system has changed and fluorescent lamps have begun to be used. In the current situation of Mehmet Üsdün House, it has been determined that the lighting is provided by fluorescent lamps.

The timber framed walls of Beypazarı traditional houses are covered inside and outside with a plaster called 'sweet plaster', which is unique to the region. However, the sweet plaster on the exterior walls of the Mehmet Üsdün House was covered with cement plaster to provide insulation. In this study, the effect of the original material properties of the house on the thermal performance result is important. For this reason, cement plaster has been ignored.

Finally, for the thermal performance analysis, the outside temperature values of the area where the house is located should be known. The outside temperature value of Mehmet Üsdün House is taken from the table of monthly average outdoor temperature values given in TS 825 (Table 2). Beypazarı, where Mehmet Üsdün house is located, is in the 3rd zone in the table.

Table 2. *Average outdoor temperature values, TS 825 [7]*

	Zone 1	*Zone 2*	*Zone 3*	*Zone 4*	*Zone 5*
Jan	8,4	2,9	-0,3	-5,4	-10,5
Feb	9,0	4,4	0,1	-4,7	-9,1
Mar	11,6	7,3	4,1	0,3	-2,9
Apr	15,8	12,8	10,1	7,9	5,3
May	21,2	18,0	14,4	12,8	10,6
Jun	26,3	22,5	18,5	17,3	14,6
Jul	28,7	24,9	21,7	21,4	18,6
Aug	27,6	24,3	21,2	21,1	18,6
Sep	23,5	19,9	17,2	16,5	14,1
Oct	18,5	14,1	11,6	10,3	7,8
Nov	13,0	8,5	5,6	3,1	0,6
Dec	9,3	3,8	1,3	-2,8	-6,7

2.2. Data Processing Phase

There are many evaluation methods for thermal performance analysis. AiCARR (Associazione Italiana Condizionamento dell`aria, Riscaldamento Refrigerazione) has divided the thermal performance evaluation methods in historical buildings into three groups. The first group is evaluation with visual inspection, the second group is evaluation with stationary computational models. The third group is analysis with dynamic computational models [12]. In this study, the second and third group methods specified in AiCARR were used to analyze and evaluate the thermal performance of Mehmet Üsdün House. In other words, the current and post-improvement thermal performance of Mehmet Üsdün House was calculated and compared with both building simulation software and stationary computational models.

Building simulation softwares, provides opportunities to break through the limitations of conventional building energy modelling and calculations. In addition, these software incorporate building energy modeling into the building design process [26]. In the building sector, energy simulation software is used for energy modeling, energy improvement, carbon-mitigation, and energy efficient- designs [27].

Some of the commonly used building energy simulation software include: EnergyPlus, TRNSYS, DOE-2, DeST, ESP-r, IDA-ICE, TRNSYS IES-VE, Modelica and Trane Trace 700 [28]. However, four popular BES tools from these software are EnergyPlus, TRNSYS, IDA-ICE and IES-VE [29]. These software are used in energy efficiency and thermal performance analysis of buildings.

Compared to other software, Energyplus was developed by the US Department of Energy and is constantly being renewed. However, EnergyPlus software has a complex interface. But, DesignBuilder software, which was developed using EnergyPlus infrastructure, provides an easy-to-use interface [30]. For this reason, DesignBuilder was used as a simulation software in this research. In the continuation of this study, the analysis results obtained in the DesignBuilder software were compared with the data in TS 825, a Turkish standard.

During the data processing phase, in the first step, the climate and geographical location features of Mehmet Üsdün House were defined to the DesignBuilder software. A 3d model of the house was made with the measurements obtained from the survey work (Figure 6). All the data obtained during the data collection phase were defined on this 3d model. The analysis process has started within the scope of the data obtained from the case study and the accepted assumptions.

Figure 6. *Mehmet Üsdün House DesignBuilder model*

The internal temperature of the Mehmet Üsdün House was calculated as 10.62 °C in winter. It was observed that the highest heat loss was in the outer walls (19, 65 w/m2), and the second highest heat loss (16,78 w/m2) was caused by the windows. It has been observed that some surfaces provide heat gain, unlike elements that heat lose. While 3.20 w/m2 heat gain was achieved from the stone flooring, which is the floor of the ground floor, 1.03 w/m2 heat gain was achieved from the timber floors (Figure 7).

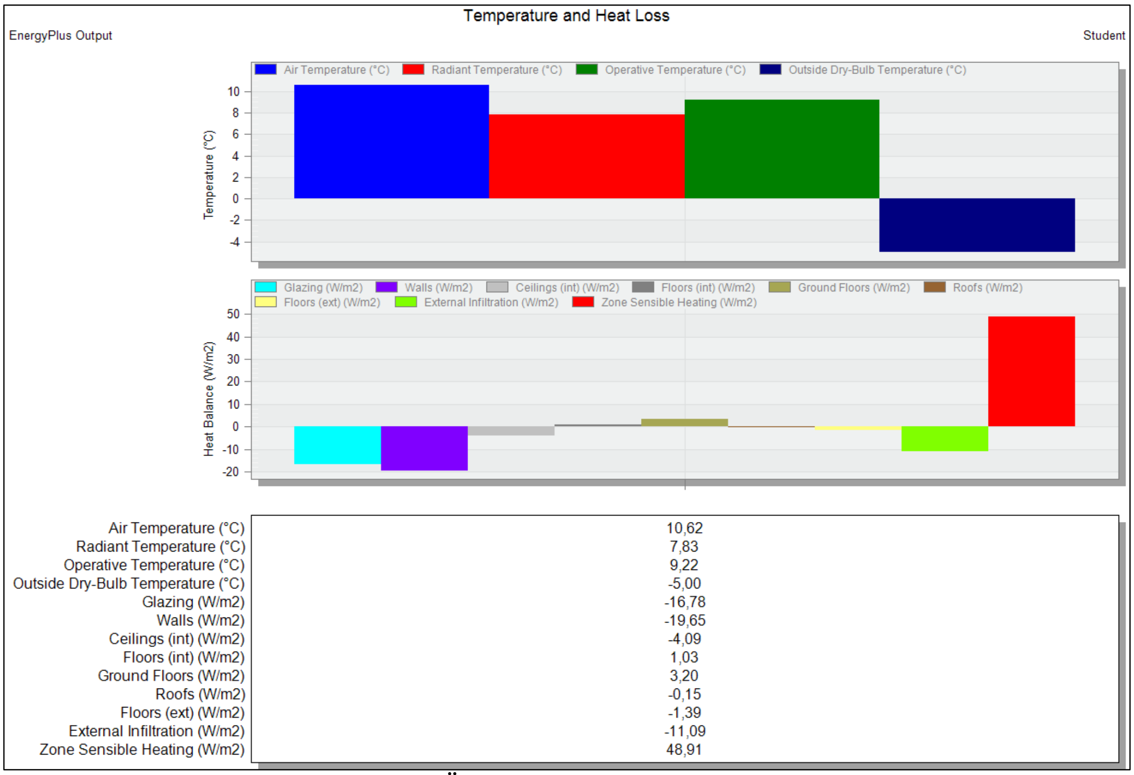


Figure 7. *Mehmet Üsdün House heating design calculation*

The floors in Mehmet Üsdün House differ in terms of floor height and total volume. For this reason, besides the general calculations, the heat capacity and heat loss of each floor must be calculated. The average temperature of the ground floor (12.84 °C) was calculated higher than the general building temperature. It was observed that the room (Z-04), buried in the slope and surrounded by stone masonry walls, had a better comfort temperature of 16.25 °C compared to the other rooms (Figure 8). Since there is heating system in only two rooms on the first floor, the calculated average temperature value (9.99 °C) is lower than the general building temperature value. It was observed that the room with the best comfort temperature (15, 37 °C) on the first floor was room 1-03. This room is oriented towards the south façade and has the function of sitting, living, eating and resting (Figure 9). The average temperature value of the second floor (9.58 °C) was calculated lower than the ground floor and the first floor. The reason why the average temperature of the second floor is lower than the first floor can be associated with the use of the middle floor as a winter floor and the upper floor as a summer floor in traditional houses. This showed that the second floor needed more energy to be heated compared to the other floors. The room with the best comfort temperature (15.09 °C) on the second floor is room 2-05. This room is the most important room of the house, called the 'başoda' (Figure 10).

Zone	Comfort Temperature (°C)	Steady-State Heat Loss (kW)	Design Capacity (W/m2)
Mehmet Üsdün Total Design Heating Capacity = 10,410 (kW)			
Ground Floor Total Design Heating Capacity = 2,630 (kW)			
Z-01 entrance hall	2,32	0,00	0,0000
Z-02 room	16,03	0,43	101,0258
Z-03 room	15,85	0,91	89,3645
Z-04 room	16,25	0,76	68,4069
Z-05 wc	7,77	0,00	0,0000
Z-06 warehouse	6,24	0,00	0,0000
Z-07 hall	9,57	0,00	0,0000

Figure 8. *Heating design calculation for ground floor*

Zone	Comfort Temperature (°C)	Steady-State Heat Loss (kW)	Design Capacity (W/m2)
Mehmet Üsdün Total Design Heating Capacity = 10,410 (kW)			
Ground Floor Total Design Heating Capacity = 2,630 (kW)			
First Floor Total Design Heating Capacity = 3,270 (kW)			
1-01 room	14,85	1,22	134,6913
1-02 sofa	2,20	0,00	0,0000
1-03 room	15,37	1,40	97,8264
1-04 kitchen	1,87	0,00	0,0000
1-05 bathroom	-0,40	0,00	0,0000
1-06 stairs	-0,82	0,00	0,0000

Figure 9. *Heating design calculation for first floor*

Zone	Comfort Temperature (°C)	Steady-State Heat Loss (kW)	Design Capacity (W/m2)
Mehmet Üsdün Total Design Heating Capacity = 10,410 (kW)			
Ground Floor Total Design Heating Capacity = 2,630 (kW)			
First Floor Total Design Heating Capacity = 3,270 (kW)			
Second Floor Total Design Heating Capacity = 4, 510 (kW)			
2-01 sofa	0,44	0,00	0,0000
2-02 room	14,88	1,59	144,2475
2-03 rhall	2,54	0,00	0,0000
2-05 room	15,09	2,03	117,9482
2-06 kitchen	-1,74	0,00	0,0000
2-08 wc	-2,99	0,00	0,0000
2-09 bathroom	-3,64	0,00	0,0000

Figure 10. *Heating design calculation for second floor*

After the heating design calculation, the thermal performance analysis of the house and the evaluation of the energy use were made. The simulation used for the calculations was run annually because the Turkish standard (TS-825) gives the values annually. The simulation results showed that the annual energy consumption of Mehmet Üsdun House is 242.84 kWh/m2 per square meter (Figure 11).

Site and Source Energy

	Total Energy [kWh]	Energy Per Total Building Area [kWh/m2]	Energy Per Conditioned Building Area [kWh/m2]
Total Site Energy	23421.56	137.39	242.84
Net Site Energy	23421.56	137.39	242.84

Figure 11. *Total energy consumption per square meter, DesignBuilder*

The calculated total energy consumption includes the sum of all energy consumptions (such as lighting energy). In order to evaluate the thermal performance, it is important to determine the amount allocated for the heating system. DesignBuilder simulation results showed that of the total energy consumption calculated as 242.84 kWh/m2, 221.98 kWh/m2 was used for heating and 20.86 kWh/m2 was used for lighting (Table 3).

Table 3. *Distribution of total energy consumption*

	Electric (kWh/m^2)	*Heating (kWh/m^2)*
Lighting	20,86	0,00
HVAC	0,00	221,98
Total	20,86	221,98

It has been compared whether this energy used for heating is suitable according to TS 825. For this reason, using the values given in TS-825, the maximum amount of energy that the house should consume has been calculated. TS 825 has limited the maximum annual heating energy consumed by the building according to zones and Atot/Vbrut ratio (Table 4).

Table 4. *Q value calculation table of TS 825 [7].*

Zone 1	A_{tot}	Q’ $_{1.DG}$ =	36,7×A/V+6,0	[kWh/m^2]
	V_{brut}	Q’ $_{1.DG}$ =	11,9×A/V+1,9	[kWh/m^3]
Zone 2	A_{tot}	Q’ $_{2.DG}$ =	63,7×A/V+14,9	[kWh/m^2]
	V_{brut}	Q’ $_{2.DG}$ =	20,3×A/V+4,7	[kWh/m^3]
Zone 3	A_{tot}	Q’ $_{3.DG}$ =	74,2×A/V+4,7	[kWh/m^2]
	V_{brut}	Q’ $_{3.DG}$ =	23,2×A/V+7,4	[kWh/m^3]
Zone 4	A_{tot}	Q’ $_{4.DG}$ =	83,4×A/V+31,0	[kWh/m^2]
	V_{brut}	Q’ $_{4.DG}$ =	27,1×A/V+9,8	[kWh/m^3]
Zone 5	A_{tot}	Q’ $_{5.DG}$ =	88,7×A/V+30,6	[kWh/m^2]
	V_{brut}	Q’ $_{5.DG}$ =	24,5×A/V+12,1	[kWh/m^3]

‘Atot’ is the total area of the house's heat-losing surfaces (such as windows, doors, walls, floors) and ‘Vbrut’ is the building gross volume heated. These values were taken from the 3d data created in the DesignBuilder program. For Mehmet Üsdün House, the Atot value was calculated as 342.46 m2, the Vbrut value was calculated as 285.40 m3 and the ratio of these values was found to be 1,199. This ratio has been substituted in the equation given for the zone 3 where Mehmet Üsdun House is located (Table 4), and the maximum heat requirement of this house is calculated as 111.37 kWh/m2.

However, in the simulation studies, the annual heating energy need of this house was calculated as 221.98 kWh/m2 (Table 3). As a result, it has been observed that the heating system of the house is not suitable according to the calculation method given in TS 825. For this reason, it has been observed that the thermal performance of Mehmet Üsdün House is low and the performance needs to be increased. In the third phase, solution suggestions were presented to increase the thermal performance of the house.

2.3. Solution Proposal Phase

Intervention methods to increase thermal performance can be very various in contemporary buildings, but are limited in historical buildings. This limitation is within the scope of preserving the authenticity of the cultural property. In this context, authenticity is mentioned in the The Nara Document on Authenticity as follows “The understanding of authenticity plays a fundamental role in all scientific studies of the cultural heritage, in conservation and restoration planning, as well as within the inscription procedures used for the World Heritage Convention and other cultural heritage inventories” [31]. Regarding authenticity, The Burra Charter gives the opportunity to intervene with the following principles: ‘do as much as necessary, but change it as little as possible' and ‘Traditional techniques and materials are preferred for the conservation of significant fabric’ [32].

Methods to increase thermal performance in traditional architectural heritage buildings; removal of moisture, insulation of inconspicuous spaces such as attics and basements, double glazing application by preserving the original window joinery, if the existing heating system is not sufficient, replace it with minimal intervention, deciding on the usage scenarios of the spaces etc.

Within the scope of the study; In order to increase the thermal performance, it was decided to replace the heating system (stove) used in the house. For the new heating system, underfloor heating system was chosen. Because there is no radiator in this system and the hot water pipes remain under the floor. Thus, the interior originality of the building will be preserved.

There are many types of underfloor heating system. Underfloor heating system without screed was preferred for Mehmet Üsdün House. This system is used in the renovations of existing houses and is easy to apply. In this system, hot water pipes can be placed inside a foam board with a thickness of 3-4 cm. Then the floor covering can be applied directly on it. Since it is a low thickness of 3-4 cm, it does not change the floor height in traditional houses and interferes with the building at a minimum.

In the underfloor heating system, the temperature of the hot water coming out the heat source can be adjusted. In this system, the hot water comes out at a maximum temperature of 60°C and returns at 30°C. These temperatures are such that they do not damage the original timber floor covering of the building.

In the proposed underfloor heating system, it is envisaged to remove the original timber coverings and put them back in place after the heating system. The detail of the underfloor heating system created for the timber flooring on the first and second floors of the house is shown in Figure 12. It is envisaged that the stone paving on the ground floor will be removed and placed back after the heating system. This work is possible within the scope of restoration work. The detail of the underfloor heating system created for the stone paving is shown in Figure 13.

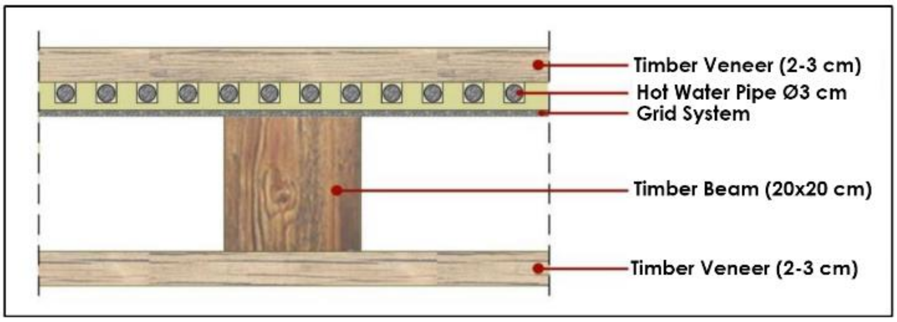


Figure 12. *Underfloor heating system detail for timber floor*

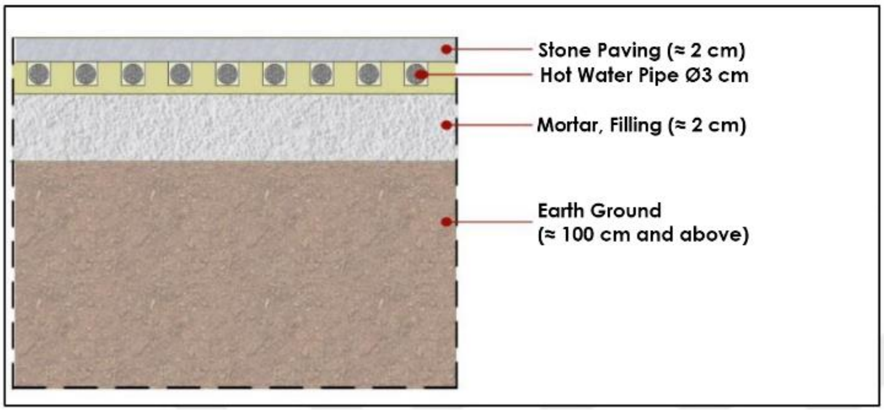


Figure 13. *Underfloor heating system detail for stone paving*

It is important where the heat source will be located in the heating system and where the vertical circulation pipes will pass. Because for vertical circulation pipes, holes must be made in the original floor covering. For this reason, it was decided to locate the heat source on the ground floor, which is less important than the other floors, in the space used as a storage. Vertical circulation pipes are passed from the ground floor to the inconspicuous bathroom spaces of the first and second floors. It has been decided that the pipes that will circulate between the rooms of the house will pass under the door. Because drilling holes in original walls is not appropriate within the scope of preservation work. The schematic plan and sectional representation of the floor heating system proposed for the house is shown in Figure 14.

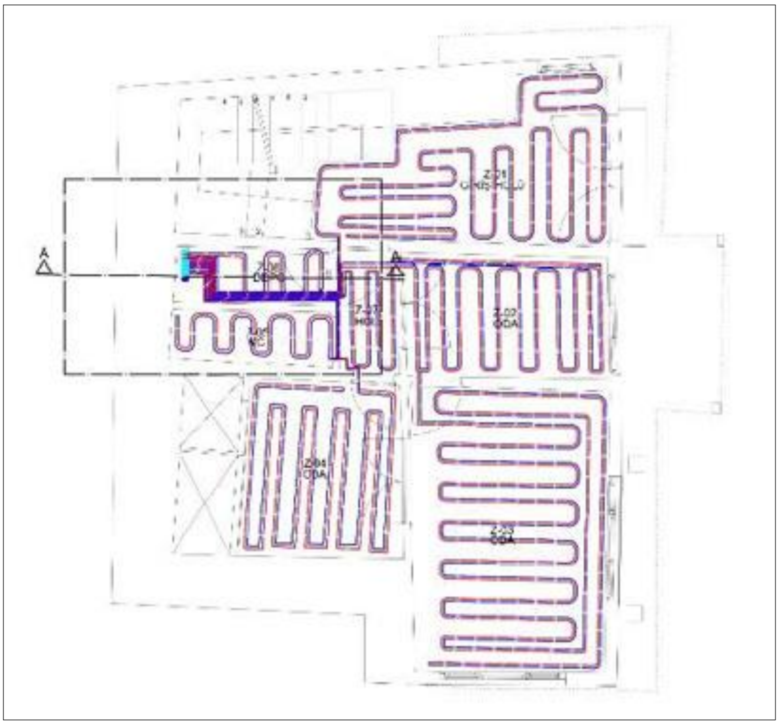


Figure 14. *Underfloor heating system detail for stone paving*

In the simulation studies, the fuel type used in the heating system was evaluated on two different scenarios, natural gas and electricity. Because, the difference in fuel type varies in terms of energy efficiency and intervention. As an example of these;

- Natural gas is a more sustainable fuel type than electricity in terms of CO2 conversion factor.
- Traditional houses do not have natural gas installations and new installations require an additional investment cost. However, the electricity infrastructure is available in many houses, so the investment cost is low.
- It is mandatory to open a chimney hole in the natural gas heating system, but there is no such requirement in the electric heating system.
- For this reason, the electric heating system is more suitable in terms of protection rules than the natural gas one.
- Since natural gas is an explosive and flammable material, it is more dangerous for timber structures than electricity.
- Turkey is a foreign-dependent country in terms of electricity and natural gas energy. However, it increases its electricity production day by day. Therefore, electricity is more economically sustainable.

2.3.1 Underfloor Heating System with Natural Gas

In DesignBuilder software, the existing heating system has been replaced with a natural gas underfloor heating system. The simulation results showed that the comfort temperature has increased in all spaces of the house and the amount of heat provided by the heating system has increased (Figure 15).

In the simulations of the current situation of the house, the annual heating energy calculated as 221.98 kwh/m2 has decreased to 153.47 kwh/m2 with the natural gas underfloor heating system (Table 5). This indicates that the thermal performance has increased by 30-35%.

Zone	Comfort Temperature (°C)	Steady-State Heat Loss (kW)	Design Capacity (W/m2)
Mehmet Üsdün Total Design Heating Capacity = 17,390 (kW)			
Ground Floor Total Design Heating Capacity = 4,250 (kW)			
Z-01 entrance hall	15,63	1,19	121,6786
Z-02 room	16,55	0,32	74,9309
Z-03 room	15,67	0,98	98,5809
Z-04 room	16,52	0,65	58,6159
Z-05 wc	17,32	0,10	53,4014
Z-06 warehouse	17,22	0,12	56,6000
Z-07 hall	17,54	0,05	37,9587
First Floor Total Design Heating Capacity = 4,990 (kW)			
1-01 room	15,45	0,97	107,2074
1-02 sofa	16,14	0,75	92,1330
1-03 room	15,79	1,16	81,3095
1-04 kitchen	16,75	0,44	66,9887
1-05 bathroom	17,11	0,17	53,3409
1-05 stairs	16,51	0,50	157,5640
Second Floor Total Design Heating Capacity = 6,440 (kW)			
201 sofa	16,82	0,60	73,6811
2-02 room	15,33	1,34	121,3978
2-03 hall	16,44	0,32	113,3278
2-05 room	15,64	1,63	95,1074
2-06 kitchen	16,25	0,81	92,3336
2-08 wc	16,91	0,09	147,0861
2-09 bathroom	16,22	0,36	147,3548

***Figure 15**. Underfloor heating system with natural gas, summary table*

***Table 5.** Q Distribution of total energy consumption per square meter as a result of natural gas underfloor heating*

	Electric (kWh/m^2)	*Heating (kWh/m^2)*
Lighting	20,86	0,00
HVAC	0,44	153,47
Total	21,03	153,47

2.3.2. Underfloor Heating System with Electric

In the DesignBuilder software, the data entry for the heating system is exactly the same for natural gas and electric systems. For this reason, only the fuel type has been changed. After changing the fuel type to electric, the simulation results gave almost the same results as the natural gas heating system. The only thing that changed was the fuel type (Table 6).

***Table 6.** Q Distribution of total energy consumption per square meter as a result of electric underfloor Heating*

	Electric (kWh/m^2)	*Other heating (kWh/m^2)*
Lighting	20,86	0,00
HVAC	153,64	0,00
Total	174,50	0,00

In the heating system, it was concluded that only the differentiation of the fuel type does not make a difference in the total energy consumption. This is due to the fact that the following are the same: Ventilation time, user density, hot water from the boiler, etc.

The simulation data obtained for the proposed natural gas and electric underfloor heating system were evaluated according to TS 825. Together with the proposed heating systems, the amount of heat consumed by the house was found to be 153 kWh/m2. This value is higher than the value obtained from TS 825 (111,37 kWh/m2). The proposed systems could not meet the required value given in TS 825. However, 30-35% thermal improvement was achieved. Since the aim of the study is to improve the thermal performance, the study has achieved its purpose. There was no difference between the effects of natural gas and electric heating systems on thermal performance. However, it was observed that there was a significant difference in the CO2 ratios caused by the fuel types. The amount of CO2 produced by the existing heating system of the house and the amounts produced by the proposed heating systems are given in figure 16, 17 and 18.

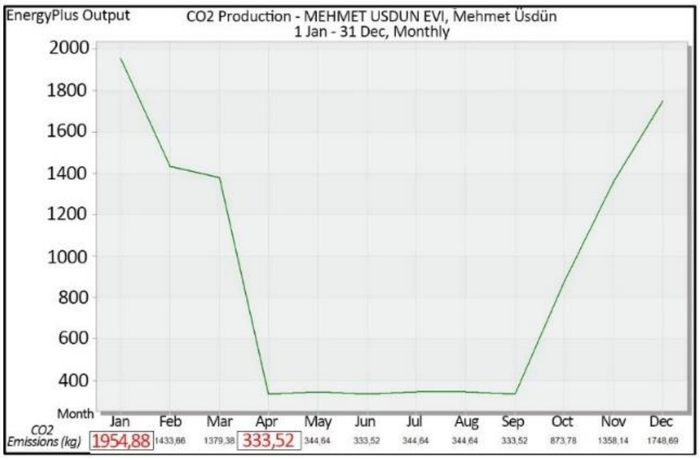


***Figure 16**. Underfloor heating system with natural gas, summary table*

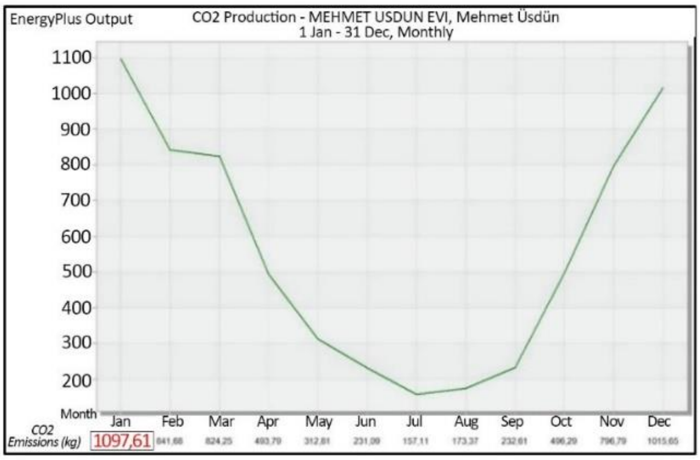


***Figure 17**. CO2 production distribution of the house's natural gas heating system by month*

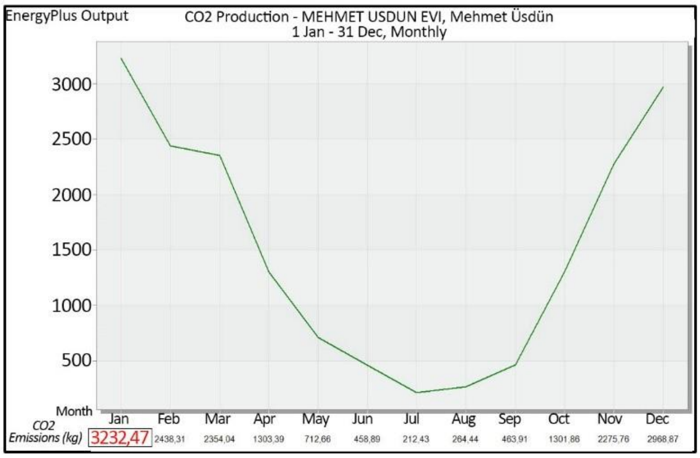


***Figure 18**. CO2 production distribution of the house's electric heating system by month*

Considering the distribution of CO2 emissions from the existing heating system, it is seen that the highest emission was in January and reached 1954.88 kg and started to decrease with April. For a natural gas underfloor heating system, the fuel type was converted from coal to natural gas in DesignBuilder.

Natural gas is a more efficient fuel type than coal in terms of CO_2 conversion coefficient. For this reason, with the use of natural gas, CO_2 emissions decreased to 1097.61 kg, resulting in a 50% reduction. When the fuel type is converted to electricity, the amount of CO_2 produced by the house has increased by 60%, reaching 3232.47 kg. This is related to the fact that the CO_2 conversion coefficient of electricity is greater than that of natural gas. The summary table of simulation data between the heating system in the current situation of the house and the proposed heating systems is given in table 7.

Table 7. *Calculated data for Mehmet Üsdün House, current situation and proposed heating systems*

		Current situation	*Heating system with natural gas*	*Heating system with electric*
Air Temperature		10,62 °C	13,47 °C	13,47 °C
Heat Loss	Glazing	16,78 w/m^2	3,55 w/m^2	3,55 w/m^2
	Walls	19,65 w/m^2	5,49 w/m^2	5,49 w/m^2
	Ceiling (int)	4,09 w/m^2	0,68 w/m^2	0,68 w/m^2
	Floors (ext)	1,39 w/m^2	0,27 w/m^2	0,27 w/m^2
	External Infiltration	11,09 w/m^2	2,80 w/m^2	2,80 w/m^2
Heat Gain	Floors (int)	1,03 w/m^2	0,68 w/m^2	0,68 w/m^2
	Ground Floors	3,20 w/m^2	0,03 w/m^2	0,03 w/m^2
Total Energy Consumed	Lighting	20,86 kWh/m^2	20,86 kWh/m^2	20,86 kWh/m^2
	HVAC	221,98 kWh/m^2	153,91 kWh/m^2	153,64 kWh/m^2
	Total	242,84 kWh/m^2	174,77 kWh/m^2	174,50 kWh/m^2
CO_2 emissions (annual)		10783,02 kg	6673,06 kg	17987,04 kg

3. CONCLUSION

Studies on increasing the thermal performances of cultural heritage are rare in the literature. Re-evaluation of the existing historical building stock in today's usage conditions is a sustainable approach. Making energy improvements of historical buildings is important both for reaching today's comfort conditions and for world energy policies. In this context, within the scope of the study, it has been observed that the thermal performances can be increased without harming the authenticity of the architectural cultural heritage. This study is very important in terms of reducing the need for new constructions with the use of existing building stock and minimizing the use of natural resources.

When the thermal performance of Mehmet Üsdün House was evaluated within the scope of the study, the following results were obtained:

- It has been determined that the current thermal performance of the building does not meet today's standards in general and the existing heating system is not suitable when compared to the values given in TS 825.
- As a result of the simulation studies, it was concluded that the thermal performance of the building should be increased in different scopes such as the heating system, construction technique, material type and layers of the building components.
- Considering the originality of the façade, an additional layer such as thermal insulation was not proposed for Mehmet Üsdün House, but a new heating system was proposed.
- The change in the heating system was simulated and, considering this change, two scenarios were studied, before and after the building.

Together with the proposed underfloor heating system;

- The annual heating energy need of the house has decreased to 153 kWh/m2 when both fuel types are used.
- The thermal performance has increased by 30-35%.

- The total amount of energy consumed annually has decreased.
- With the natural gas heating system, the CO_2 emission decreased from 1954.88 kg to 1097.61 kg, reducing by approximately 45%. Together with the electric heating system, it reached 3232.47 kg and increased by approximately 60%.

It has been observed that the change in the type of fuel used in the proposed underfloor heating system differs during the intervention process. Since there is no natural gas installation in the house, it can be said that an additional intervention is required for the natural gas heating system and the intervention will be more compared to the electric heating system.

After the proposed heating system, the simulation results could not fully meet the criteria given in TS 825. For this reason, it has been concluded that the revision of the heating system is not a sufficient solution on its own. With this recommendation, it has been observed that additional measures such as thermal insulation and the application of double glazing to the windows should be taken.

Although the types of fuels used in the proposed heating system increase thermal performance, they are fossil fuels and are not renewable. The fuel type to be used should be selected from systems that can produce renewable energy such as solar energy (solar panels, etc.). The development of these methods will be beneficial in the context of sustainability. But, while using these fuel types, care should be taken to preserve the authenticity of historical buildings. In addition to these measures, the post-intervention structure should be monitored and its behavior should be monitored over a long period of time.

In the monitoring process, the positive and negative aspects of the application should be followed and it should be an example for future studies.

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Architectural Heritage of the Republican Era: Karamürsel (Kocaeli) Old Municipality Building[1]

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Abstract

During the Tanzimat period, the concept of modern municipalism emerged in the Ottoman Empire, leading to innovations in the administrative organization of municipalities in the 19th century. The Istanbul Beyoğlu Sixth Department Building, built in a Neo-classical style and masonry technique, was the first municipality building in Turkey. Subsequently, with the implementation of the Tuna Vilayeti Nizamnamesi (provincial regulations), this exemplary municipal building design spread to other provinces in the Ottoman Empire. During the Republican era, the municipal organization continued to develop. The first quarter of the 20th century was marked by the construction of public buildings in the style of the I. National Architecture Movement, including municipal buildings. This movement had a profound influence on the Turkish architectural movement during the first years of the Republican period. The national style, which appeared in parallel with the Turkism understanding of the period, was emphasised with a strong nationalism in public buildings during the first decade of the Republic. Elements characteristic of Seljuk and Ottoman architecture, such as wide eaves, domes, pointed arches and muqarnas capitals, were employed in the public buildings of the Early Republican period with a revivalist approach. In the Republican period, public buildings were constructed, city plans were drawn up and squares were organised to develop the city. Many municipality buildings dated to this period can be seen in various regions of Anatolia, constructed using different building materials. The national style reached its modern form in the 1930s. In modernising Turkish architecture, the architectural character with a simple facade understanding and wide window openings will be preferred. The municipality building in the Karamürsel district of Kocaeli, built between 1926 and 1929, reflects the aforementioned architectural style. The historical significance of Karamürsel as an ancient naval city and its maritime trade with the capital elevated municipal services to an important position. The building exemplifies the architectural style of the period in both its plan and facade design. Additionally, it is situated in the centre of a residential area and blends well with its surroundings, much like other public buildings. The symmetrical arrangement of its side wings and the elevated central axis of the two-story structure highlight the typical facade design of public buildings. This study aimed to explain the history, architecture, and facade design of the Karamürsel Old Municipality Building, emphasizing the changes that occurred over time and comparing it with other public buildings of the period. The goal was to determine the place of the building in the modern municipality's understanding of the young Republic of Turkey. Given the absence of a comprehensive study on the subject, it is particularly important to introduce and document this structure in Turkish literature.

1. INTRODUCTION

The 'hisbe institution', which is known as a sharia institution in the Islamic world, formed the basis of the municipal order [1]. In this institution, officers were appointed with the obligation to protect public order. Services were provided within the framework of general and individual rights. It is documented that Hazrat Umar, Uthman and Ali conducted city and market inspections in person. [2]. As the Islamic world expanded geographically, the duties of the muhtesip also expanded in lands such as Damascus, Baghdad

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and Iran. In Seljuk and Ottoman cities, it is known that there existed a group of representatives, comprising the heads of artisan guilds and ayan officials [1]. During the Ottoman period, an official known as *"şehremini"* (mayor) was responsible for repairs and construction after the conquest of Istanbul [3]. In the first half of the 19th century, this position was abolished and replaced by the Ebniye-i Hassa Müdüriyeti (Directorate of Ebniye-i Hassa). Municipal duties were then undertaken by kadis [4], muhtesibs, architect aghas, and state officials [3]. Under the office of kadis, muhtesibs and officials of the janissary quarry provided security, cleaning, and reconstruction in the city administration [1].
The Tanzimat period brought a new understanding, resulting in social and political transformations. Municipal institutions emerged in a modern style and spread to all provinces of the Ottoman Empire, starting from Istanbul, the capital city, and port cities [5]. The Şehremaneti (municipal institution) [6], established in 1854-55, was reported to be inadequate in terms of municipalization [7]. Ortaylı argues that Şehremaneti is not a good example of modern municipalism [1].

The Sixth Municipality of Beyoğlu was established in 1857 by Architect Barboni as the first municipality building to provide municipal services for foreigners concentrated in Galata and Beyoğlu [8]. The 1857 *"Regulations of the Sixth Municipality"* and 1858 "*Regulations of the Beyoğlu and Galata Department"* regulated the duties and financial structure of the municipality [7]. Its design was inspired by the modern sixth district of France, to resemble the European capital [9]. The municipal building was constructed using the masonry technique and is three storeys high. The Bursa Municipal Building, built during the same period, also exhibits a similar Westernisation in its construction technique and facade design [10]. The architectural and ornamental features of Bursa Municipality are empirical, as observed. In the year of its construction, the first regulation was announced in the *Takvim-i Vekayi Newspaper* [11].

During the Turkish Republic period, the municipal organization remained significant despite the economic and administrative challenges faced in the early years of the Republic. Municipal organizations were deprived of many facilities as a result of these difficulties. Only 4 out of 389 municipal organisations during this period had electricity installations. Additionally, 20 had regular drinking water, 17 had slaughterhouses, 7 had sports fields, 29 had parks and gardens, and 90 had regular marketplaces. During these early years, municipalities were responsible for urban planning and water management in cities devastated after the War of Independence. [12].

The architecture of the Early Republic was guided by the nation-state identity. Public buildings, such as municipal buildings, post offices, government houses, public houses, police stations, and hospitals, were constructed under the target of urbanisation. These buildings were constructed in a flamboyant manner, especially in the provinces [13].

The First National Architectural Movement developed in line with the national ideology of the Republic. It was particularly evident in official buildings until the 1930s and had a significant impact on early architectural activities [11]. The movement's influence was visible in the architectural elements and ornamental details, particularly on the facades of the buildings [14]. Although examples of this movement were found extensively in the capital city, buildings such as municipal palaces, government buildings, schools, and post offices were also constructed in other cities during the 1920s [15].

2. AIM AND METHODOLOGY

The Old Municipality Building in Karamürsel reflects the early period of the Republic's National Architecture in Anatolia. This study evaluated the building's history, facade, and architectural design. It was significant as an example of the First National Architecture style for municipality buildings in the provinces. The field and archive work revealed that the ground level of the building differed from its original state. It was discovered that the entrance level was lower in the original state and was subsequently filled in over time. Restitution studies involved partial plaster scraping and wall removal, revealing the original plan scheme of the ground floor. It is understood that the staircase on the southwest facade of the building does not exist today. The building currently serves as the district governorship building. The study involved an on-site visit, collection of necessary literature, and obtaining drawings, photographs, and other archive information about the building from Karamürsel Municipality and Bozdağ Architecture Company.

Initially, Its monographic importance and location within the region were underlined. After, the history of the building was discussed followed by an introduction to its architectural and facade features, taking into account the changes that have occurred over time. Finally, the building was compared with other public buildings, highlighting both similarities and differences.

3. GEOGRAPHICAL LOCATION OF KARAMÜRSEL

The structure is situated in the Camiatik neighbourhood, which provides access to the sea. To the north of it, there are beaches and parks, while Atatürk Street is located to the South. The building is situated in the heart of the residential area, adjacent to the historical government mansion as seen in Figure 1. These two public buildings form the nucleus of the regional centre. Unfortunately, the historical post office building and customs agency, located nearby and estimated to have been built in the late Ottoman period, no longer exist. However, it can be argued that the central settlement in Karamürsel maintained its influence during the early Republican period. The old municipality building is situated within the aforementioned square arrangement. The Kara Bâli Bey Complex (16th century), one of the earliest immovable assets of Karamürsel, is located in an area close to the sea, which was preferred as it became privileged as a naval city [16]. Thus, it can be suggested that the coastal area of the district gained significance due to the construction of religious, commercial, and public buildings. This trend also continued into the Republican period (Figure 1).

Figure 1. *View of the building from the south-west in the 1930s and the Government House next to it [Oral, 2009, 162] [17]*

4. MUNICIPAL ACTIVITIES IN KARAMÜRSEL AND THE HISTORY OF THE OLD MUNICIPALITY BUILDING

Karamürsel is a district situated on the southern coast of Kocaeli province. It holds a significant historical position as the first naval city of the Ottoman period. In the first half of the 14th century, Mürsel Alp (Karamürsel Bey), the first Kaptan-ı Derya (chief admiral) of the Ottoman Empire, captured Karamürsel (Prainetos) and established his navy by developing thin and fast ships known by his name in the town he settled [18]. The city maintained its significance in the following years and experienced a surge in demand for sea crossings during the 16th century [19]. It is believed that foreign-flagged ships [20], which gained superiority in Ottoman waters, also docked at Karamürsel pier in the first quarter of the 20th century. As a result, the city gained an important position for municipal services in the early years of the Republic.

The first municipal organization was established in Karamürsel in 1902. In 1922, as a sign of the modern urbanism understanding brought by the period, Karamürsel Municipality implemented the first zoning plan. The city's new boundaries were determined by the council decision on 8 June 1926 [21] (Figure 2).

Figure 2. *The 1922 zoning plan of Karamürsel Municipality [Özdemir, 2017, 228][18]*

As is well-known, municipalities did not have a specific building when they were established. Municipal organizations in both the capital and provinces continued to function in rented or other public buildings [4]. Karamürsel Municipality was first established in a rented shop in the bazaar, and Hafız Selahattin Bey, the head of the Mudafa-i Hukuk Society, was appointed as the mayor [18]. There is no definitive information or documentation on the date of the municipality's establishment. However, according to sources, the building was constructed between 1926 and 1929 under the initiative of the mayor. The construction work was carried out by Nuri Akalın as the technician and Süleyman Kalfa as the construction master [22]. Additionally, it has been reported that the municipality was founded in 1927 [23]. On the front facade, there is a panel with the sentence *"It is the place where M. Kemal Atatürk first set foot when he visited Karamürsel on 27.7.1933"* written in Latin letters. Archive photographs show that Mustafa Kemal Atatürk was welcomed and seen off on the pier of the building on this date (Figure 3) [24].

Figure 3. *Mustafa Kemal Atatürk's Visit to Karamürsel Municipality (1933), [Oral, 2009,163][17]*

The building served as the ticket and passenger hall of the pier until 1960. The lower floor was later converted into a restaurant and the upper floor into a hotel for two years. In 1968, it was used as a wedding hall. The building was damaged during the 17 August 1999 earthquake and municipal services on the second floor were evacuated. It was renovated twice, first in 2013 by Karamürsel Municipality in cooperation with the Board of Monuments, and then again in 2015 to restore it to its original state [22]. It temporarily serves as the district governorate building today.

3.1. Plan and Facade Features

The building is registered under 2 Pafta 145 Block 1 Parcel, with the decision of Bursa K.T.V.K.K. dated 18/01/2001 and numbered 8733. The building was constructed as a rectangular prism with a plan oriented in the northeast-southwest direction. It has one storey above the ground floor. A rectangular hall running in the northwest-southeast direction divides the main mass into two parts. To determine the wall material, partial plaster scraping was carried out on the ground floor walls during the restitution studies. The ground floor's original plan scheme was uncovered after the walls were removed. Symmetrical spaces are present on both sides of the ground floor. In the northeast of the entrance hall, there is a wooden staircase adjacent to the southeast wall that connects to the upper floor. A unit was formed in the northeast-southeast direction and used as a latrine (Figure 4).

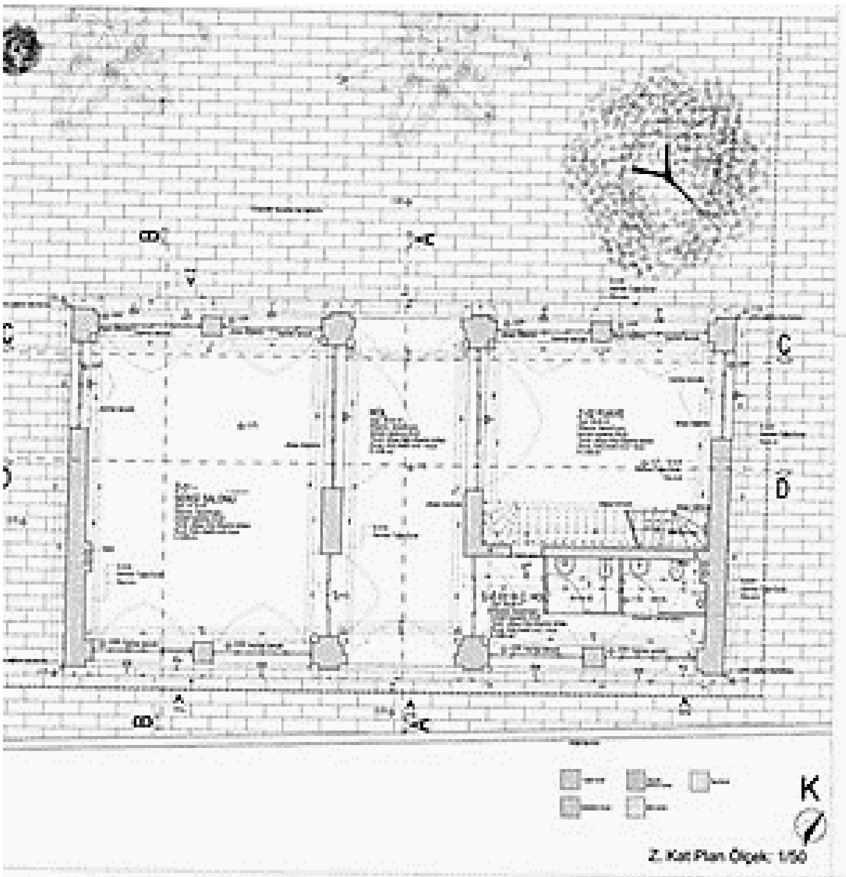


Figure 4. *Ground Floor Plan (Restoration Project), [Bozdağ Architecture Company) [25]*

The first-floor plan of the building has survived to the present day with only minor changes. A restroom was discovered during the restitution works in the northeast. The first floor is divided into two sections by a hall, with a small perpendicular corridor. The units at the corners of the corridors and the hall were used as service spaces. These spaces are bounded by thin walls. The north corner serves as the presidency room, while the east corner is designated as a meeting room (Figure 5-10).

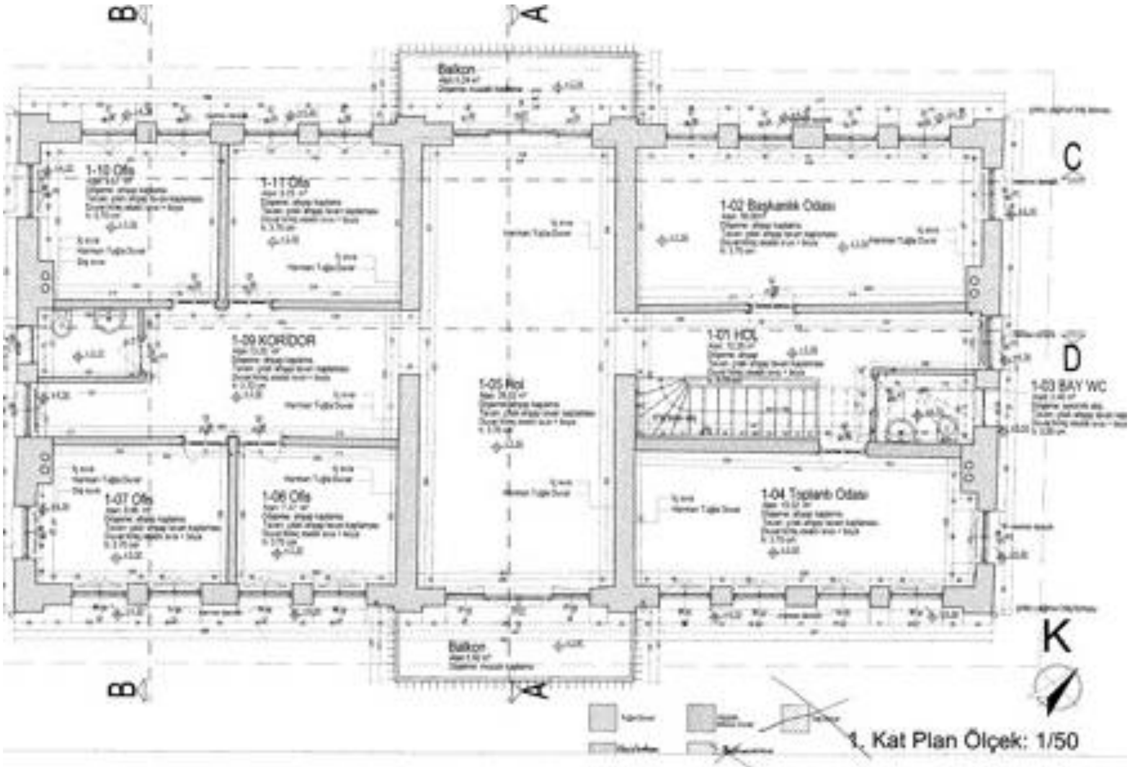


Figure 5. *First-Floor Plan, [Bozdağ Architecture Company] [25]*

Figure 6. *General View of the Ground-Floor Hall*

Figure 7. *General View of the First-Floor Hall*

Figure 8. *A wooden staircase for the passage between floors, leading from the room in the northeast*

Figure 9. *Presidential Room, North Corner, First-floor*

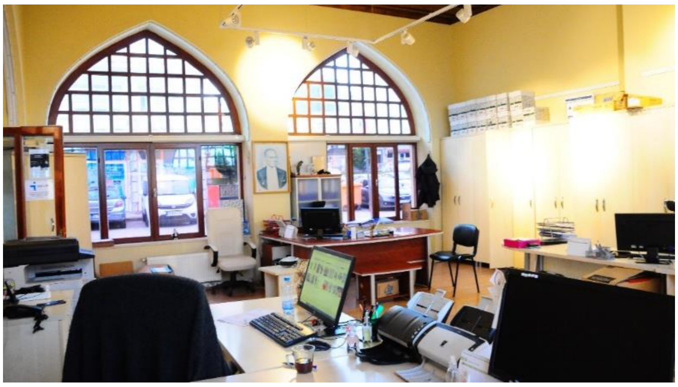


Figure 10. *The Southwest Room on the ground floor was previously used as the "Municipality Casino".*

According to an old visual source of the building, the coastal edge line differed from its current position, and the municipality building was situated right on the edge of the sea. A connection was established from the centre axis of the building towards the pier. It is apparent that the ground level of the building also differed from today, indicating that the surrounding area was filled over time (Figure 11-12).

Figure 11. *1930s [Oral, 2009,162] [17]*

Figure 12*. An Old View of Karamürsel Municipality Building [Karamürsel Municipality Archive] [26]*

The building's primary facade overlooks the sea. The entrance is highlighted by a rectangular mass raised on a hipped roof and partially recessed. The main door features a segmented arched opening, with a balcony supported by consoles above it. On either side of the door at the lower floor level, there are two arches. The upper floor level has four longitudinal rectangular window openings. The mass arrangement of the building is very symmetrical. A thin partially projecting moulding separates the two levels (Figure 13). The south-eastern facade shares the same features as the north-western facade. The side facades appear more massive than the other facades. Near the entrance facade, there is an opening with pointed arches on the lower side of the facades. At the upper level, there are four windows, one of which is smaller in size. The facades exhibit complete symmetry (Figure 14-16).

Figure 13*. Entrance Facade - Northwest Façade*

Figure 14*. Rear Facade - Southeast Facade*

Figure 15*. Southwest Facade*

Figure 16. *North-East Facade*

The building was originally constructed with masonry mortar bricks, although it is currently painted over plaster. The interior features a flat wooden interlocking ceiling, with thin slats nailed to the joints. The floor coverings were renewed during the last works and are also made of wood. The tile mosaic covering the centre of the ground floor of the building is observed (Figure 17-18).

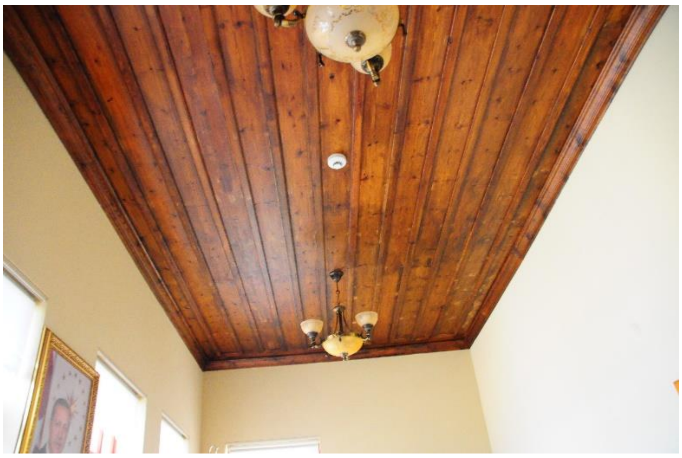


Figure 17*. Interior Ceiling Coating*

Figure 18*. Ground Floor Tile Coating*

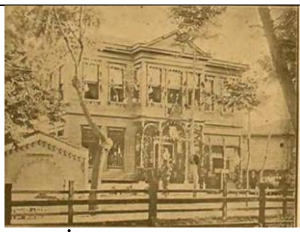
4. ASSESSMENT AND COMPARISON

The Karamürsel Old Municipality Building, constructed during the early Republican period, is the sole historical public building that has survived in the district. Therefore, it is significant in terms of reflecting the architectural features of the era. The plan features, mass, and facade composition of the building exhibit typical characteristics of the I. National Architecture period. It reflects the common plan scheme used in public buildings, which includes a central hall and rectangular rooms around it. This design was applied to both the first and ground floors of the Amasya Municipality Building (1913-1923) [27]. Although this plan resembles residential architecture, there are differences in the units [28].

During the late and early Republican period, several municipal buildings were constructed in the national style. These include Fatih (Istanbul, 1913), Kadıköy (Istanbul, 1913), Afyonkarahisar (Karahisar-ı Sahip-1919-1922), Amasya (1913-1923), Tokat (1916-1922) and Kastamonu (1921-1925) [13] municipality buildings which feature wiping belts that separate the floors, raised facade emphasis, wide eaves, and flattened or pointed arched windows.

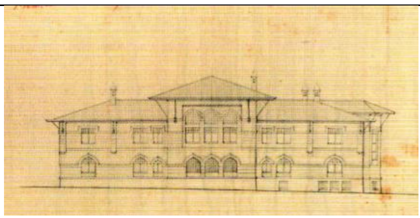
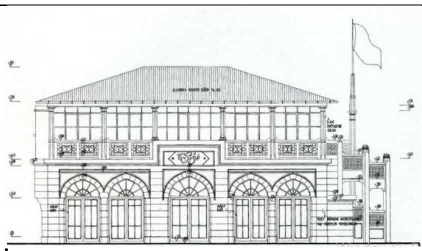
The main facade of the building is highlighted by its height in comparison to the side facades. This design feature is also present in other municipal buildings such as İzmit Municipality Building (1933), Amasya Municipality Building, Afyonkarahisar Municipality Building, Fatih Municipality Building, and Kadıköy Municipality Building. The Balıkesir Havran Municipality Building (1924-1928), which dates back to the Early Republican period, also exhibits similar characteristics in terms of facade and mass design [29].
In addition to the municipal buildings, other public buildings such as Bostancı İbrahim Paşa School, Istanbul Hamid-i Evvel Madrasah [30], Balıkesir Governor's Mansion [31], and İzmir Turkish Quarry [11] also showcase this characteristic on their main facades (Table 1).

Table 1.

 *a-Karamürsel Old Municipality Building (1926-1929)*	 *b. İzmit Municipality Building (1933), [32]*	 *c-Havran Municipality Building (1924-28), [29]*
 *d-Afyon Karahisar Municipality Building (1919-1922), [13]*	 *e- İzmir Turkish Quarry (1927), [33]*	 *f-Balıkesir Governor's Mansion (1928-1930), [31].*

Similarities exist between Hamid-i Evvel Madrasah [30] and Moda Pier [34], as both feature a double-centred pointed arch on the ground floor and modern windows on the upper floor. Additionally, Hamid-i Evvel Madrasah has geometric moulding on the upper floor windows, similar to the municipality building (Table 2).

Table 2.

 *a-İstanbul, Hamid-i Evvel Madrasah (1911), [30]*	 b-*İstanbul, Moda Pier (1916-1917), [34]*

5. CONCLUSION

The Old Municipality Building in Karamürsel holds great importance as the only remaining public building in the district. Prior to the construction of the municipal building, municipal activities were conducted in a rented shop. However, as the municipality's needs increased and the existing shop could not meet these needs, the municipality building was constructed under challenging circumstances with a limited budget. Concurrently, the city's zoning plans were drawn up under the leadership of the mayor's office, and significant efforts were made in terms of modern municipalism. It is known that other public buildings in the city were demolished over time. The municipality building, situated near the sea, serves to exemplify the nucleus of the city, in conjunction with the government mansion, post office building and customs building. This illustrates that the administration of the early period of the Republic was not concentrated outside the city, but rather on the main axis where the heart of trade was located. The municipal building shares architectural and functional similarities with other public buildings of the period, including the government mansion located next to it. This highlights the impact of municipal buildings on the city's overall appearance. Furthermore, it can be posited that the centre opening on the ground floor of the municipal building was also utilised as a pier in the past, with the aid of visual sources. From this perspective, it can be posited that the hall in the centre was utilised as a waiting area for passengers for a period. Over time, the edifice was utilised for a variety of purposes, including as a restaurant, hotel, wedding venue and other spaces with social functions. This resulted in a series of alterations to the ground floor plan, which was then restored to its original configuration following the completion of the restoration works. The municipality building has since been relocated from its original position along the shoreline. It can be understood that the area has been filled in and the building has been relocated from the shoreline.

It reflects the characteristic features of the First National Architecture Movement in terms of facade and plan. The hall's principal characteristics include its rectangular shape, the windows with pointed arches, the moulding belt dividing the façade into two, the balconies overhanging the entrance door, and the height of the central axis. These features are indicative of the national architectural movement. It is known that similar public buildings existed in the capital and provinces of the period. The building was constructed between 1926 and 1929 and serves as an example of the movement outside Ankara. Our primary objective is to maintain the original function of the structure.

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Muallim School and Education Institute Restitution Period Analysis[1]

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Abstract

In the first years of the Republic, innovative solutions were tried to be brought to the problems of education in the education programs and in the efforts to adapt education to the national culture and contemporary civilization at the same time. The fact that "National Education" and "National Culture" issues were addressed in the studies in the field of education and that education was the complementary and most important element in the activities aimed at nation building showed that education was the complementary and most important element. The Inspection Board of the Ministry of National Education, which convened in Konya in 1925, stated that there was a need to open a boarding "Middle Teacher (Muallim) School".
Gazi Middle School of Education was one of the schools established for this purpose.
The importance of the First National Architecture period and the last building designed by Architect Kemaleddin Bey in the history of Turkish education is indisputable. In the times when the Republic of Turkey was struggling with poverty, the repairs, renovations and restorations that the building, which is the symbol of modern education built using the latest technology of the period, has undergone from yesterday to today, presented chronologically within the scope of this paper.
The aim of this study is to contribute to the preservation of the Architect Kemaleddin Bey building, which is one of the monumental buildings and continues to be used as Gazi University Rectorate Building, and to transfer it to future generations correctly.

1.INTRODUCTION

Ankara, which has been home to many civilizations and has a deep-rooted history and cultural heritage, was officially declared the capital city with the law enacted on October 13, 1923, and the first steps of its development as a city were taken with the zoning works that started afterwards.

Between 1923 and 1927, the Ulus area, which constitutes the business center of the city, was the center of intense zoning activities, Gazi and Latife schools, public buildings were located on the Atatürk Boulevard axis, and they took their place among the representatives of the 1st National architectural style.

Gazi Middle School of Education was one of the schools established for this purpose. In the early years of the Republic, the most important institutions training teachers were the Higher School of Education in Istanbul and the Middle School of Education, or Gazi Institute of Education, in Ankara.

In the first years of the Republic, Mustafa Necati Bey, the Minister of Education, aimed to open a school in Ankara, the center of the Republic, equipped to meet the need for teachers throughout the country. Accordingly, the Middle Teacher Training School in Konya was transferred to Ankara on October 25, 1927, and the first attempt was made for the school planned to be opened here.

However, this school did not have a service building to provide education. For this reason, it is understood from the date on the original project that the design of the building, the work of Architect

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Kemalettin Bey, one of the important architects of the First National Architecture Period, was completed in 1927. Attempts to expropriate the land where the building is located are understood from the Council of Ministers Decree dated July 21, 1926.

Opened in 1930, the Middle School of Education played a pioneering role in changing social and cultural life in Turkey. Architect Kemaleddin Bey completed the design of the school in 1927 and the foundation stone was laid in the same year. In November 1929, its construction was completed and it was one of the important buildings belonging to the I. National Architecture period as "Gazi Middle School of Teaching and Education Institute". Since 1984, the building has been used by Gazi University, and today it is used by Gazi University Rectorate and offices, Gazi Education Faculty Dean's Office and administrative units.
From 1930 to the present day; old documents, photographs, traces from the building and comparative study data and period analyzes within the building constitute the main subject of the paper. As a result of the source evaluations, four main periods were identified throughout the building, and it was seen that the main mass of the building did not change within these periods. Depending on the changing function of the building over the years, changes in the scale of materials and architectural elements were identified.
The period from 1930 until 1984, when it was used only as an educational building, constitutes the first period of the building. The period until the early 1990s, when the High Board of Immovable Cultural and Natural Assets of the Ministry of Culture and Tourism decided that the necessary repairs should be made in order to be used as Gazi University Rectorate Building, is considered as the second period.

The period from 1993 to the present day is considered as the third period and during this period, the original stone coatings of the building were replaced with stone imitation plaster starting from the ground floor, the Painting and Sculpture Museum in the basement became operational in 2007, and this change of function caused changes in the scale of architectural elements in the building. The Mimar Kemaleddin Hall has survived with the additions made during this period.

In 2018, the survey, completion, restitution and restoration projects of Gazi University Rectorate Building were completed in 2021 and prioritized work items were carried out for the protection of the building within the scope of simple repair between 2021-2023. In this period, which is considered as the fourth period, the simple repair of the building was completed in accordance with today's technology and requirements.

2.METHOD

This study was conducted through literature and archive research, field surveys, and documentation. In the initial phase of the study, written sources and archive documents were examined. The original drawings of Architect Kemaleddin and the restitution projects from different periods were obtained during archive scanning.

Within the scope of the Period Analysis studies, old documents, photographs, traces from the building and in-building comparative study data were utilized. As a result of these source evaluations, three main periods were identified throughout the building. It was observed that the building did not undergo a change in mass dimension within these periods. In addition, it has been determined that the building has shown some changes in the scale of materials and architectural elements depending on its changing function over the years.

In the period analysis studies, the original project of the building and the survey plan, section and elevation were examined. Partition walls added later to the building, which were not in the original plan scheme, stone imitation plaster repairs made on the facade, the change of window joinery, which did not change the form from the old photographs but the opening direction was determined to have changed, and door changes that were incompatible with the original doors within the building were determined.

Regarding the contemporary restoration projects[2] addressed in the study, the author of this study has worked as a supervising architect.

This method aims to contribute to the preservation of cultural heritage and to social and architectural sustainability.

3.THE POSITION OF GAZI MIDDLE SCHOOL OF EDUCATION CAMPUS IN URBAN PLANNING

3.1.Location of the Building

It was built on the land between Konya road and Silahtar street in Gazi neighborhood of Ankara province Yenimahalle district (7358 Block 10 Parcel), which is used as Gazi University central campus today. (Fig.1)
Year of Construction: 1927 -1930
Architect Kemaleddin Bey
Old usage: Gazi Education Institute
Current use: Gazi University Rectorate Building

Figure 1. *Satellite image of the building*

Building tag: The building has a total area of 15.700 m2 with 5223 m2 of built-up area.The building height is 31.12 meters for the observatory dome.(+886.09) There are 2 inner courtyards of 245 m2 symmetrical to the central axis of the building.

The area of land allocated for the construction of Gazi Middle School of Education has shrunk over time. In the 1930s, the land on which Gazi Middle School of Education and the Institute of Education was located was 360,000 square meters, while the campus area was 282,192 square meters according to the records of the Rectorate Building Works Department in 2023. Today, faculties including Gazi Faculty of Education, Gazi University Rectorate and units affiliated to the Rectorate serve in the campus area.

3.2 History

The foundations of the building, which is used today as Gazi University Rectorate Building, were laid in 1926 at the request of Gazi Mustafa Kemal Atatürk in order to meet the country's need for teachers. The building, built on land taken from Atatürk Forest Farm, was opened for education in 1929-1930 as one of the first examples of Republican architecture and the last work of Architect Kemaleddin.

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[2] The project drawings, prepared within the scope of the "Survey, completion, restitution, restoration, and landscaping project of the Gazi University Rectorate Building" by Strata Restoration Project Construction Limited Company.[2]

The projects prepared by Architect Kemaleddin Bey were criticized by Ernst Egli, the chief architect of the Ministry of Education, who was in Turkey at the time for the realization of modern educational buildings, on the grounds that they emphasized Islamic architectural style and were luxurious, but Mustafa Necati Bey, the Minister of National Education of the period, stood by Architect Kemalettin, who thought that the building would lose much of its beauty and nobility as a result of the changes Egli wanted, and had the building completed. (Fig 2., Fig.3, Fig.4., Fig.5.)
Under the leadership of the Minister of Education Mustafa Necati Bey, the project preparations were completed and the foundation of the school was laid on August 8, 1927. The construction of the middle school building took 25 months and was completed in November 1929.

The name of the school was changed to Gazi Education Institute in the 1940s. Architect Kemaleddin's Ankara Gazi Middle School of Education building later became the Rectorate building of Gazi University with the decision of the High Board of Immovable Cultural and Natural Assets of the Ministry of Culture and Tourism dated 25.09.1984 and numbered 408 "It is appropriate to make the necessary repairs in order to be used as Gazi University Rectorate building".

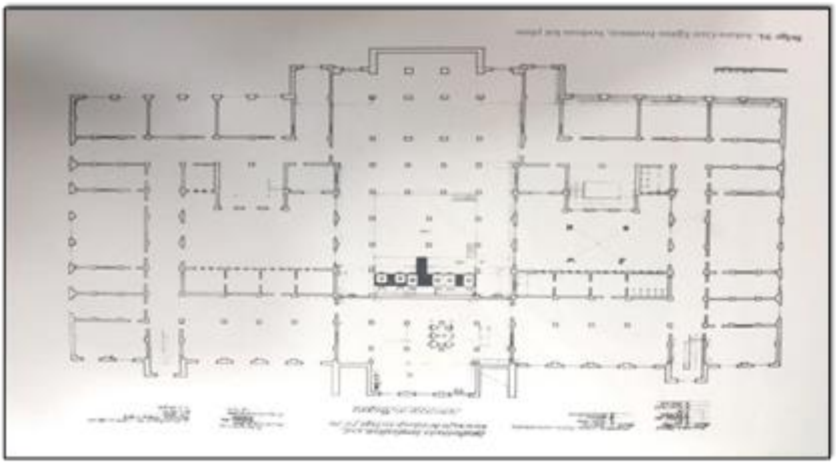

Figure 2. *Gazi Education Institute, Basement Floor Plan, (Yavuz, Y, Empire to Republic Architect Kemalettin 1870-1927, Source: GEEA)*

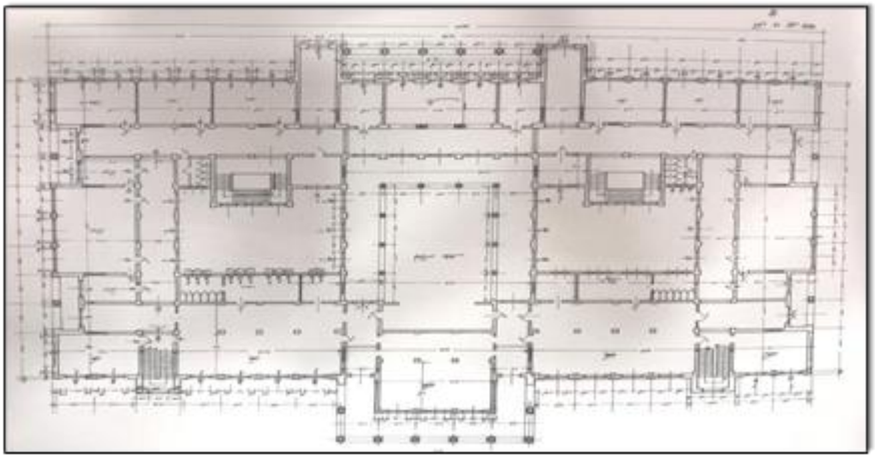

Figure 3. *Gazi Education Institute, Ground Floor Plan, (Yavuz, Y, Empire to Republic Architect Kemalettin 1870-1927, Source: GEEA)*

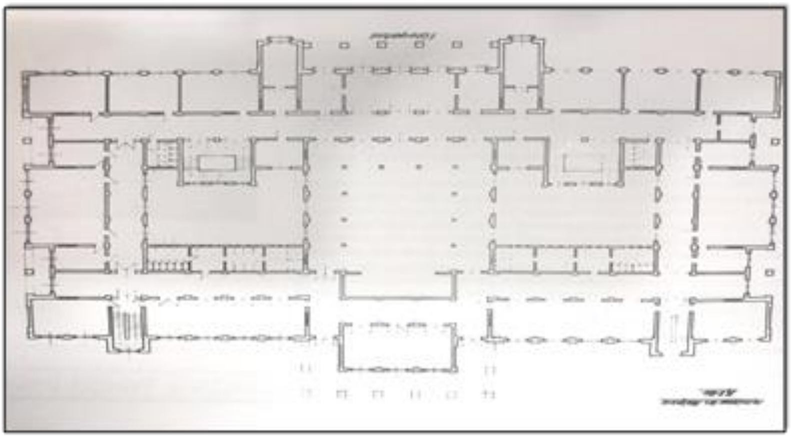

Figure 4. *Gazi Education Institute, First Floor Plan, (Yavuz, Y, Empire to Republic Architect Kemalettin 1870-1927, Source: GEEA)*

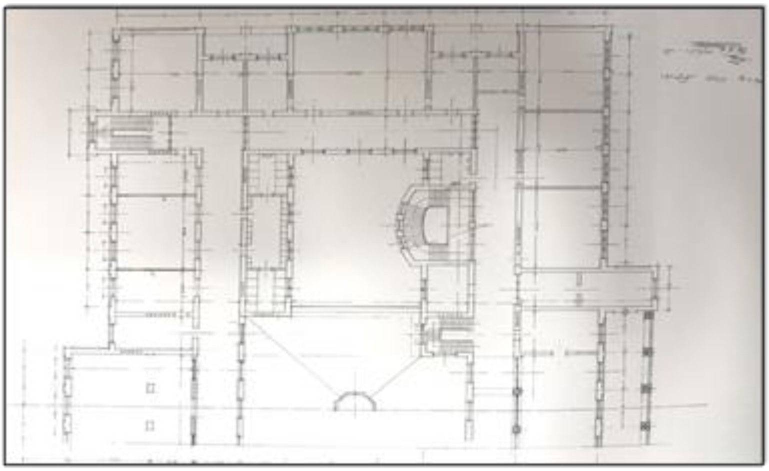

Figure 5. *Gazi Education Institute, Second Floor Plan, (Yavuz, Y, Empire to Republic Architect Kemalettin 1870-1927, Source: GEEA)*

3.3. Typological Research

The period between 1910-1930 is the period that was influential in Turkish architecture and called the First National Architecture Movement after the 1970s. It can also be said to be the reflection of the nationalism that emerged with the declaration of the Constitutional Monarchy in 1908. The pioneers of the movement are Architect Kemalettin and Architect Vedat in this period, which is against the eclectic period in which western neoclassical elements, which were especially effective in the 19th century, were frequently applied in architecture, but in essence, the styles of Turkish architecture were handled on a new platform instead of western elements with an eclectic understanding. They continued this style from the declaration of the Second Constitutional Monarchy until the first periods of the Republic. Their aim was to create a national movement away from foreign influences in the process of creating Turkish architecture. Although these architects completed their education abroad, they built monumental buildings with an eclectic understanding that reflected some elements of Classical Ottoman architecture (such as muqarnas, tiles, wide eaves, dome, pointed arch).

The building is the last work of Architect Kemaleddin Bey. "Gazi Orta Muallim Mektebi" was one of the last works of the 1st National Architecture Period, which started to lose its influence in 1927 and ended in 1930 with the influence of foreign architects called to work in the intensive construction works of the new capital Ankara.

The architects of the First National Architecture Period did not reflect the developed understanding of space seen in the monumental buildings of Ottoman Architecture to new building types, but were influenced by the western style in the plan schemes of these buildings. It is seen that the architectural design features taught at the French Academy of Fine Arts (Beaux Arts) were applied in the buildings. In the buildings of this period, care was taken to organize the plans symmetrically according to the entrance axis. Since the architects of this period were trained in façade design in educational institutions, they paid particular attention to the arrangement of façades in their applications.

The main and most basic feature of the buildings of the First National Architecture Period is the symmetrical arrangement of the facades and plans according to the entrance axis. On the facades, flat, pointed or flat arches in various forms used in the Ottoman and Seljuk periods are used in a new order. The facades animated by these arches have no reflection on the interior. Stone rosettes, column capitals with diamonds or muqarnas, and moldings between floors are used as ornamental elements. Such elements can only be used on the entrance facade depending on the importance of the building. The design of the façade is shaped according to its relationship with the street or alley where it is located. Other facades exhibit a simpler design compared to the entrance facade.

The First National Architecture Period educational buildings have reinforced concrete skeleton as their structural system. The facades of the buildings are usually covered with edelputz plaster (It is called decorative plasters prepared by using homogeneously colored and sieved special gravel (Edelputz Gravel) and white lime (marble) paste and colored cement (the same color as Edelputz gravel) that has been rested for at least one month after it has been extinguished.). Ankara stone was generally used on the facades of the basement floors. Stone is generally used on the floors of the entrances. In the interiors, marble and/or cast mosaic were used on the floor coverings of the entrance halls. Wooden paneling was used on the floor and wall coverings of the conference halls and lecture halls of the period.

3.4.Architectural Specifications of the Building

3.4.1.Plan Organization of the Structure

Gazi Orta Muallim Mektebi is located in Beşevler neighborhood where there was no construction at the time it was built. The area where the building is located has been transformed into a campus by continuing the construction process over time. The plan organization of the building is symmetrical in accordance with the formalist understanding of the First National Architecture Period and all functions are solved within a single mass. The ground floor plans are repeated on the upper floors. On the façade, protruding arrangements emphasizing symmetry were made. Corridors follow the rectangular plan scheme and are located on the same parallel axis. The stairs providing vertical circulation between the floors are symmetrically placed on the two side symmetries of the central axis of the building and on the two corner axes on the rear façade. All functions in the building are placed on the wings of the rectangular mass with a symmetrical approach.

Designed as a basement, ground floor and 2 normal floors, the fifth floor of the building, the attic floor, is partially used in line with the slope of the roof, and the area designed as an observatory consisting of two floors with an octagonal plan scheme on the entrance axis, which is the center point of the building, constitutes the highest elevation of the building with its domed top cover. Since the observatory could not be furnished with the necessary tools (telescopes, etc.), it has never been used in accordance with its function. (Fig 6., Fig.7, Fig.8., Fig.9., Fig 10., Fig.11, Fig.12.)

The facade of the building, which was built according to the reinforced concrete skeleton building system, is covered with andesite stone at the basement level, the main mass is covered with cut stone and stone imitation plaster and covered with a hipped wooden roof covered with tiles. There are skylights on the roof surface.

Information from the late 1970s and early 1980s, when the building was used as the Gazi Education Institute, reveals that the symmetrically planned building originally had large classrooms on the ground floor, side by side on the main entrance façade, dining halls in three large halls in the rear section, and large laboratories on the right and left axes. Opposite the main entrance, there is a large meeting hall, now known as Mimar Kemaleddin Hall, which is two stories high and has a balcony and a stage.

In the original design of the building, there are service spaces such as toilets, showers, etc. around the courtyards on both sides of the meeting hall. The horizontal circulation of the floors is provided by four staircases symmetrically placed according to the entrance, two on the rear façade and two illuminated from the courtyards in the center. In the basement, where various service spaces are located, the heat center is located under the meeting hall, while the kitchen and laundry facilities are located under the dining halls. On the first floor, in addition to other classrooms and laboratories, there is a library, painting and music workshops in the back section, and teacher and administrator rooms above the entrance in the front section, while the other two floors are reserved for dormitories.

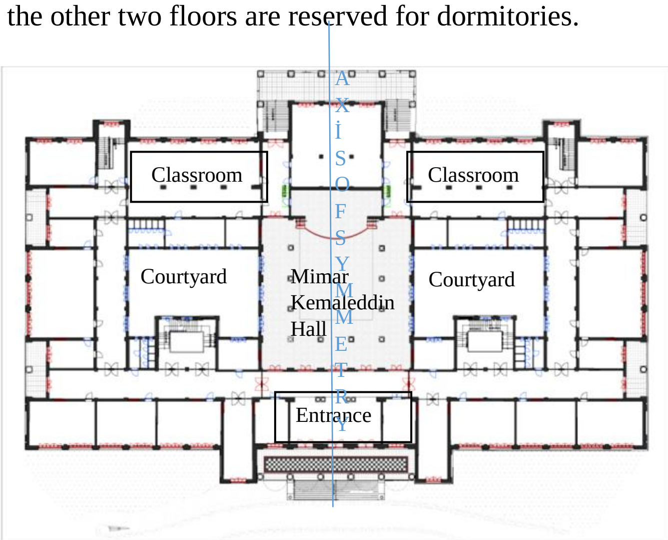

Figure 6. *Ground Floor Plan*

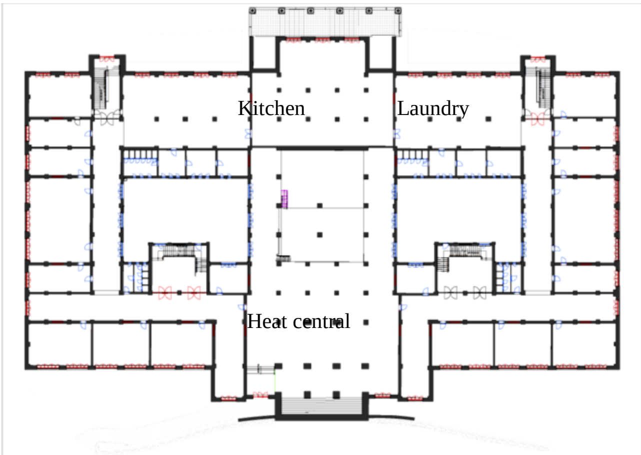

Figure 7.*Basement Floor Plan*

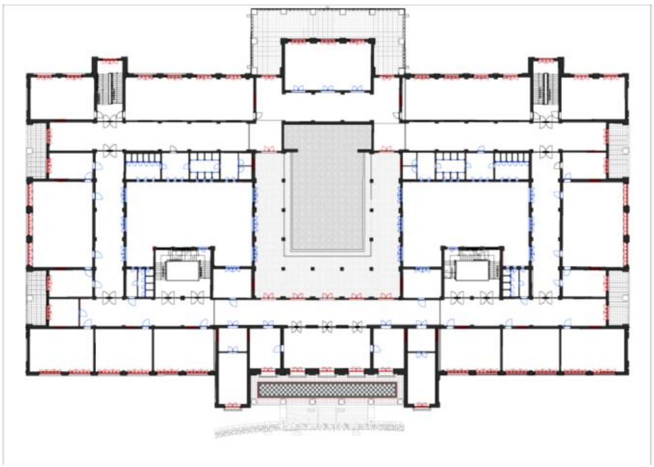

Figure 8.*First Floor Plan*

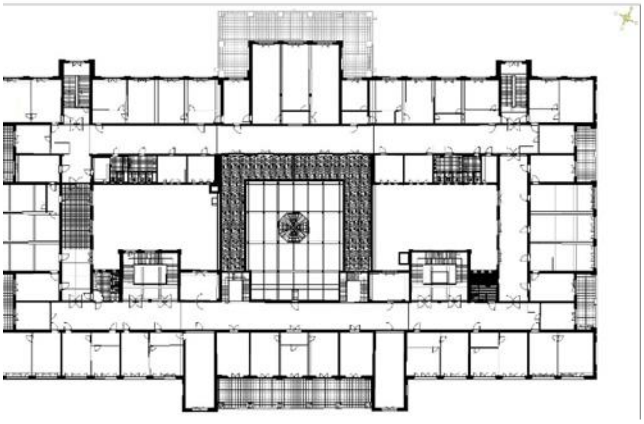

Figure 9.*Second Floor Plan*

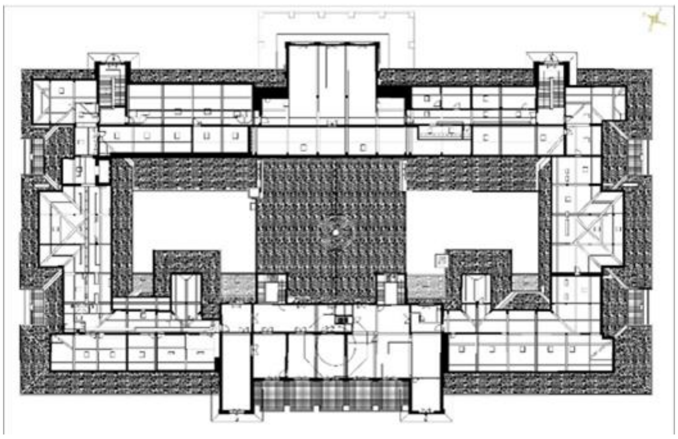

Figure 10. *Attic Floor Plan*

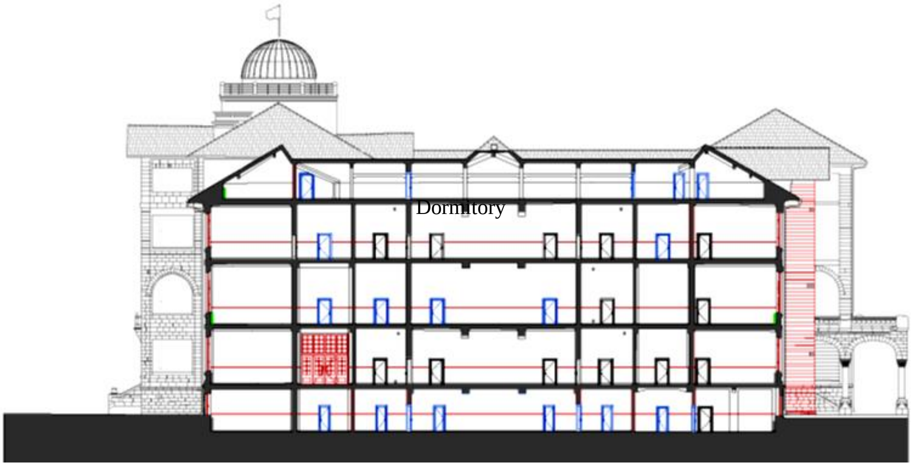

Figure 11. *Cross Section*

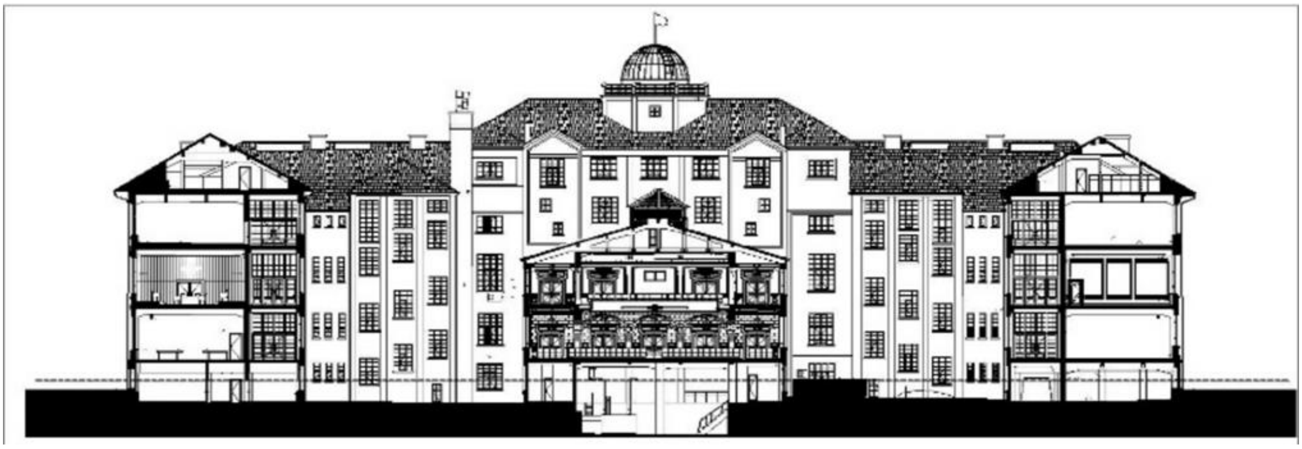

Figure 12. *Lenght Section*

Observatory; (Fig 13., Fig.14, Fig.15.) the dome has copper roofing, dome height 350 cm, dome width approximately 550 cm. in diameter, 60 cm opening designed on the dome for telescope use, and the space has an observatory area of 24 square meters. From the 68 square meter observatory room, 20 steps of steel structure stairs lead to the observatory space. The 55 square meter intervention terrace, which is accessed from the observatory area, is located around the octagonal main body wall with a side length of 400 cm. On top of the 215 cm main body wall height, there is a 330 cm high hemispherical form made of iron box profiles covered with wooden rafters and wooden cladding board and copper roofing on the outermost surface.

Although it is referred to in the sources as the first observatory of the Republican Period as the Istanbul University Observatory of 1934-1936, the observatory located in the building designed by the I. National period architect Architect Kemalettin Bey as Gazi Primary and Secondary Education School, whose foundation was laid in 1927 in Ankara, the capital city of Anatolia, and whose construction was completed in 1929, has adopted the functionalist, rationalist approach of the "national architecture" approach of the Early Republican period.

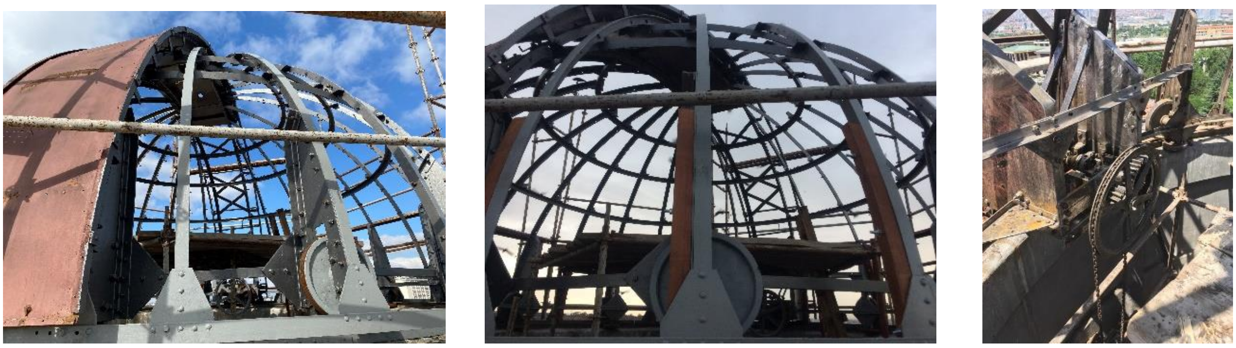

Figure 13. *Observatory(2023 Restoration)*

Figure 14. *Observatory(2023 Restoration)*

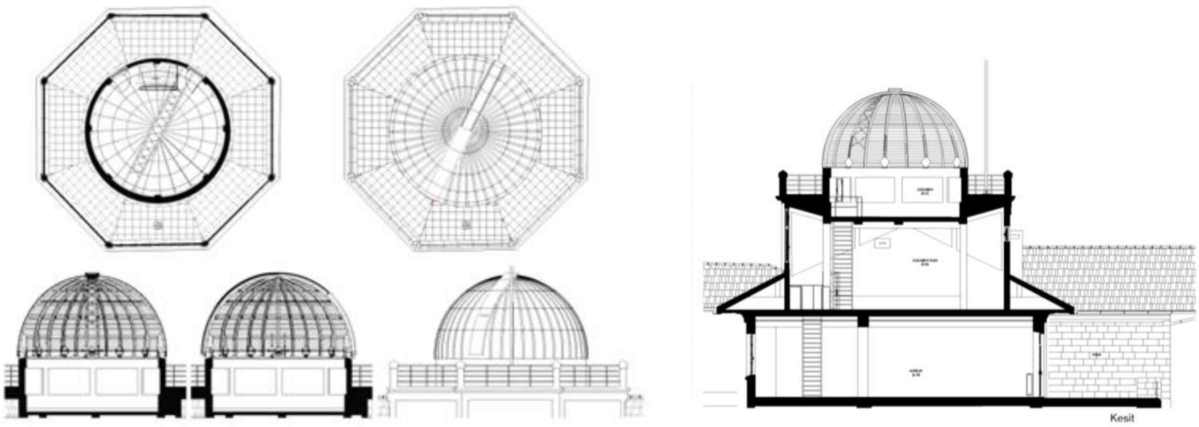

Figure 15. *Observatory Plan-Section (2023 Restoration)*

3.4.2 Facade Organization of the Building

When the central axis of the building mass is taken as a basis, the building surfaces are symmetrically arranged according to this axis; the first floor windows are crossed with pointed arches; the windows on the other floors are shaped as large rectangular or square openings. The central axis and the entrance are emphasized by extending the central axis of the building outwards from the general building surface on the front and rear facades; the emphasis is increased by enlarging the rooms on either side of the entrance on the front facade; the staircases at the corners on the rear facade outwards from the general eaves surface; and the appearance of towers reinforcing the symmetry by being covered with gable roofs forms the facade organization of the building. On the main entrance facade; there is a high entrance portico defined by five pointed arched openings carried by white marble columns two floors high and a closed balcony above it, defined by square openings. Above this covered balcony is an open terrace accessed from the top floor. On the rear facade, there is an open-terraced entrance portico with openings with basket arches, which surrounds the projection of the dining hall in the original plan scheme in the central axis and provides access to the entrances on either side of it. The symmetry on the side faces is emphasized by the recesses on either side of the laboratories, which are defined by a pair of open terraced openings with pointed arches, two stories high. The basement floor of the building is separated from the other floors by a continuous stone belt passing through the ground floor slab level; all windows are opened into vertical panels recessed from the surface and the surface arrangement is finished with wide eaves. (Fig 16., Fig.17.)

Figure 16. *Entrance Facade (2023 Restoration)*

On the building surfaces symmetrically arranged to the central axis, the first floor windows are crossed with pointed arches; the other windows are shaped as large rectangular or square openings. The central axis of the building is emphasized by projecting outwards from the general building surface on the front and rear facades; the rooms on either side of the entrance on the entrance facade and the stair buckets on the corners of the rear facade are projected outwards from the general eaves surface and covered with gable roofs, giving them the appearance of towers reinforcing the symmetry.

At the main entrance, there is a high entrance portico defined by five pointed arched openings carried by white marble columns two stories high and a covered balcony above it, defined by square openings. Above this covered balcony is an open terrace accessed from the top floor.

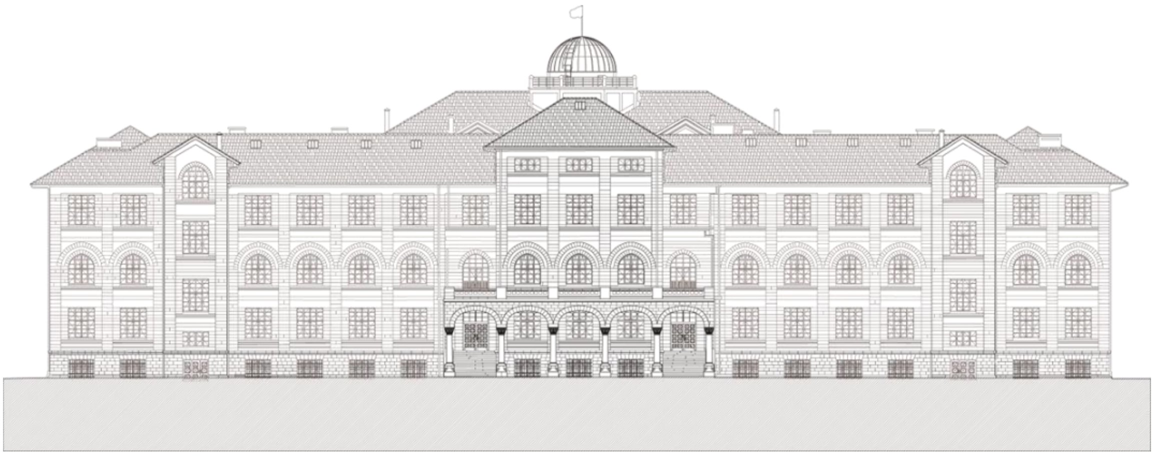

Figure 17.*Back Facede (2023 Restoration)*

The symmetry on the side facades is emphasized by the recesses on either side of the laboratories, which are defined by a pair of open terraced, double-height pointed arched openings.

The basement floor of the building is separated from the other floors by a continuous stone belt passing through the ground floor slab level; all windows are opened into vertical panels recessed from the surface and the surface arrangement is finished with wide eaves.

In the porticoed sections of the main entrances, marble columns are complemented with stalactite capitals, while the balcony above the entrance portico has four red marble columns. The tower-shaped projections to the right and left of this axis have rumi decorated capitals with medallions in the center on the windows of the fourth floor. Architect Kemaleddin Bey used these columns in the design to visually soften the sharp line form on the façade in accordance with the principles of national architecture rather than their load-bearing properties.

The continuation of the symmetry order of the facade program with the projection movement, the evaluation of the marble columns with pedestals and stalactite capitals, the ornamental elements on the projections, and the monumental form of the building are features that fully reflect the characteristics of the First National Architecture period.

3.4.3. Construction Technique and Material Properties of the Building

The structural system of the building is reinforced concrete frame. The building is covered with stone at the basement level. It is observed that stone imitation plaster and stone cladding are used together on the upper floors. The front and rear entrance porticoes of Gazi Middle School of Education, built with a reinforced concrete frame system, and the carriers of the balcony in the meeting hall are solved with reinforced concrete columns made with cast mosaic technique, emphasizing their visual and aesthetic qualities as well as their carrier qualities. Marble coating was also used on the floors of the entrance stairs and ground floor entrance halls. Apart from this, the floors are generally poured mosaic. In Architect Kemaleddin Hall, it is understood from old photographs that the flooring is wooden. The original doors and windows of the building have wooden joinery and the railings of the building are finished in wood on metal grids.

4. RESTITUTION PERIOD ANALYSIS

Completed in 1929, the building was used as Gazi Muallim Mektebi Building. In 1940, the building was renamed Gazi Education Institute and continued to serve only as an educational building until 1984. This period from 1930 to 1984 constitutes the first period of the building. Along with the main mass of the building, the architectural elements whose existence is proven in orginal drawings (Fig 2., Fig.3, Fig.4., Fig.5.) and photographs are grouped as the first period. As a written source, the plans of Architect Kemalettin from 1927, which Yıldırım Yavuz found in Gazi University Archive and included in his book "Empire to Republic Architect Kemalettin 1870-1927", were used.

It became the Rectorate building of Gazi University with the decision of the High Board of Immovable Cultural and Natural Assets of the Ministry of Culture and Tourism dated 25.09.1984 and numbered 408 "It is appropriate to make the necessary repairs in order to be used as Gazi University Rectorate Building." The period starting from 1984 until the early 2000s is considered as the second period. During this period, the walls and ceilings of the Rectorate and Dean's Offices, Senate and Meeting Room were covered with wooden paneling and the floors were covered with carpet. It is thought that the mezzanine floor made of steel construction on the ground floor and the wooden coverings in this section were also built during this period.

The period from 1993 to the present day is accepted as the third period of the building. During this period, the deterioration of the original stone coatings of the building was completed with stone imitation plaster starting from the ground floor. The Museum of Painting and Sculpture was opened in the basement in 2007. In 2011, one of the halls of the museum was transformed into the Mimar Kemalettin Museum. In 2013, the Mimar Kemalettin Museum was reorganized and added to the Intangible Cultural Heritage Museum. Suspended ceilings and lighting elements were added to the basement floor due to the changing function, and changes were made to the floor slabs. (Table 1)

Again in this period, new space arrangements were made with panel walls for functional requirements within the building. In the Rectorate and Dean's offices, in the second period, arrangements were made on a material scale as required by the function. In 2014, arrangements were made in Mimar Kemalettin Hall, ground floor offices. Although the exact date is not known, it is thought that all window joinery in the building was also changed in this period.

Table 1. *Restitution Timeline of the Building*

I.PERIOD	• Completed in 1930, the building was first used as the Gazi Teacher Training School building. • In 1940, it was renamed Gazi Education Institute and continued to be used as an education building in its original function until 1984. • The period between 1930-1984 is accepted as the 1st restitution period.
II.PERIOD	• It became the Rectorate building of Gazi University with the decision of the High Board of Immovable Cultural and Natural Assets of the Ministry of Culture and Tourism dated 25.09.1984 and numbered 408. • The period starting from 1984 until the early 2000s is considered as the second period.
III.PERIOD	• The period from 1993 to the present day is accepted as the third period of the building.

Figure 18. *In the inner courtyard, two arches and galleries (2023 Restoration)*

During the drainage works in the inner courtyard, two arches and galleries were found under the natural ground level. It was determined that the arches and galleries were blinded due to the disappearance of the necessity of use over the years. The space behind the arch and galleries is the boiler room, and since natural gas boilers are used today, chimney connection has been made according to this system. Since the system was revised according to the natural gas heating system, the excavation was not continued since it is thought that the arches and galleries were used in coal boiler systems. (Fig 18., Fig.19.)

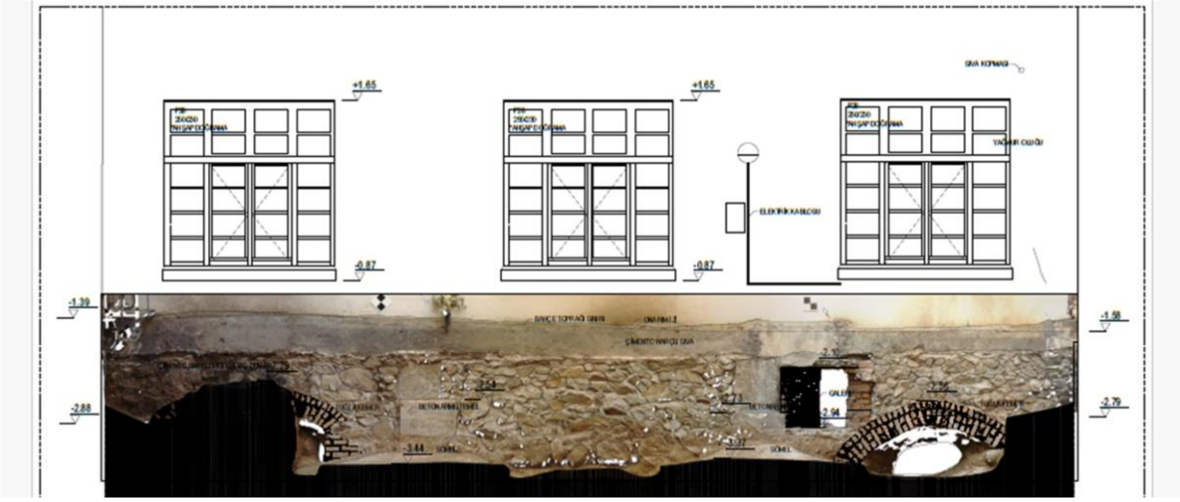

Figure 19. *In the inner courtyard, two arches and galleries (2023 Restoration)*

5.CONCLUSION

As a result of the source research on the building, three main periods of use were identified throughout the building. The first of these is the period when it was first opened and used as an educational institute until 1984; the second period is the period when it started to be used as the rectorate and deanery building affiliated to Gazi University, and the third period is the period from the 2000s to the present day. It has been observed that the building has not undergone a change in mass dimension during these periods. In addition, it has been determined that the building has shown some changes in the scale of materials and architectural elements depending on its changing function over the years. These changes are compulsory additions made as the requirements of today's technological needs and regulations. In 2019, the architectural scheme of the building was not intervened within the scope of the restoration project, and compulsory repairs and modifications were made in the production items of waterproofing, drainage, roof and joinery replacement in order to prevent irreversible permanent damages to the building.

Due to the significant reliance of restoration efforts on restitution projects, a thoroughly researched, scientifically-oriented restitution study has been presented, avoiding speculative and hypothetical approaches. In this context, it is envisaged that the study will contribute to the field of cultural heritage preservation at both national and international levels. Considering the monumental nature of the structure and the importance of its transmission to future generations, the main motivation of this study is to remain faithful to the original in terms of the main mass and functional context and to preserve it.

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Reflections of the Turkish National Architecture on the Educational Buildings: The Sample of İsmet Paşa Primary School[1]

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Abstract

Turkish National Architecture is the name of an architectural style which emerged in 1908 in the Ottoman Empire and lasted until the 1930s, the first years of the new republic. Named “National Architecture” and “National Architecture Renaissance” during its reign, this period was rather called “First National Architecture” after the 1970s. In recent eras, the wider preferred name for the period is “The Architecture of Late Ottoman and Early Republican Period”. This style was reinforced by the nationalism and Turkism concepts of names like Ziya Gökalp and Yusuf Akçura. The ideas of Turkish identity and nationalism, which emerged in the late Ottoman period, were effective in the educational politics of the new republic era. Between 1921 and 1938, education politics were based on the Atatürk’s reforms and a secular, modern and democratic path was accepted. One of the very first goals was to increase the literacy percentage of the population. For this purpose, the number of primary schools has risen. Construction of these new school buildings was rapid, practical, and cost-effective. They were also designed to represent the architectural ideology of the era. In 1923, the “Construction Bureau of the Ministry of Education (Maarif Vekaleti İnşaat Bürosu)” was established. Article 24 of 1926 mentions “The official school, library, and museum buildings of Turkey are designed in the construction bureau of the Ministry of Education.”. Therefore, the primary school buildings were erected in identical projects with minor modifications. The subject of this study, the İsmet Paşa Primary School building in Konya, Turkey is one of the representatives of the mentioned structures. Konya is one of the pioneering cities in Turkey with samples of the educational buildings from the early republican era, such as Gazi Mustafa Kemal Primary School and Hakimiyet-i Milliye Primary School. Therefore, the place of İsmet Paşa Primary School in the era and its plan type, façade and decoration features are going to be evaluated in this study.

1. INTRODUCTION

Long-established states are expected to hold an identity concept. Educational improvements are important for the generations who recognize their own national identity. Therefore, many of the very first reforms of the new Turkish republican era were linked with education. Education was perceived as important as independence, during the republican era. The gathering of the Education Congress (Maarif Kongresi) in Ankara on 16 July 1921, during the Battle of the Sakarya, was a clear manifestation of this attitude.

The educational reform movements rooted in the Tanzimat era of the Ottoman Empire. The first Tanzimat reforms were about the military. The rise of the nation-state concept in Europe, civil rebellions, and the loss of territories in ongoing wars, all forced the Ottoman Empire to pay attention to military education, to maintain their central authority. The 19th-century reforms led the civil administration to rule the state and an urgent need for qualified civil servants emerged. In 1938, an organisation called “Meclis-i Umur-u Nafia” was established to rule the educational processes [1]. Therefore, the first samples of the periodically monitored schools appeared. The educational reforms, which began in the Ottoman period,

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were accelerated in the republican era. School buildings were constructed in Anatolia. Since it was the post-war period and there was a scarcity of educated architects, identical plan types were followed. The structures needed to be functional, easily constructed and were expected to reflect the national values.

2. METHOD

There are numerous primary school buildings in Turkey, with distinct features. However, it is spotted that not many of them reflecting the "national architecture" were mentioned in the literature. There are samples of those primary school buildings in Anatolia still in use without any major modification. Konya city was chosen for a narrow perspective. Konya comes front with its dense building stock since the Anatolian Seljukid era, having a greater land area and a large number of government buildings and residences.

First, the relevant resources about "national architecture" and "nationalism" concepts were investigated for this study. The study continues with a focus on the educational politics of the republican era and the construction of primary school buildings. With the aid of those studies and the plan drawings gained from the KUDEB (Koruma Uygulama ve Denetim Bürosu, "Conservation-Implementation and Inspection Bureau") of Konya, the İsmet Paşa Primary School building was studied. The building was visited and photographed. The other educational structures, which were built in the same era in Konya, were also visited to spot the similarities and differences.

The study focuses on the similarities between the İsmet Paşa Primary School building and those mentioned educational buildings, based on the facts learnt from the literature and archive files. It is obvious that the İsmet Paşa Primary School building is an example of late Ottoman – early republic era architecture, however it was also affected by the different styles of the period as well.

3. THE EMERGENCE OF THE TURKISH NATIONAL ARCHITECTURE STYLE

The nation-state concept, which emerged during the French Revolution, was also the case for the Ottoman Empire in the late 19th century. The nationalism process affected both Europe and the Ottomans. Figures like Ziya Gökalp and Yusuf Akçura have a clear role in the spread of that idea.

Akçura formed the "Türk Derneği (Turkish Association)" with friends like Veled Çelebi and Necip Asım in 1908. The association aimed to pursue studies on Turkish history, literature, language, and social structure, and share the results with the population. They published a magazine with the same name of the association for seven issues [2]. According to Güler, an idealist positivism called "social idealism" was behind the nationalist ideology of Ziya Gökalp. Gökalp summarized this ideology as "We are the Turkish nation, İslam ummah, and Western civilisation." [3].

One of the most distinctive studies of Ziya Gökalp about nationalism was his stress on the absence of ethnographic museums. He claimed that those museums would be inactive even though they were built. According to him, they would be beneficial only if the Turkish Hearths (Türk Ocakları) established them [4].

These ideal movements were active in the Ottoman Empire during the late 19th century and affected the political, cultural, and social reforms in the Tanzimat and Constitutionalism ("Meşrutiyet") eras. However, the ethnocultural differences accelerated the collapse of the Ottoman Empire and the emergence of the nation-states at the beginning of the 20th century. The simultaneous emergence of the ideological consciousness also rapidly affected the architectural style. Celal Esat Arseven was the first scholar who mentioned that this was a unique Turkish art [5].

With the effect of the Industrial Revolution, new materials and techniques have emerged in architecture, such as glass and concrete which replaced the traditional masonry construction. The pioneering architects of the era, Mimar Kemalettin ("Kemalettin the architect"), Mimar Vedat, Arif Hikmet Koyunoğlu, Mimar Muzaffer, Giulio Mongeri, all created a new architectural attitude by merging the traditional decoration and construction features of Ottoman and Seljukid architecture with modern materials. This period was called "Turkish National Architecture" and spanned between 1908 and 1930s [6].

The spread of the national architectural style into Anatolia with government structures like the city council, municipality palace, school, and post office, clearly proves that it was a state ideology. General features of this style were wider eaves, different window types on the ground and upper floor, a definitive entrance, segmental arches on doors and windows, sometimes eave decorations, mostly symmetrical plans, and cut stone claddings. Konya was a city featuring the national architectural style of Anatolia, especially with the educational, governmental, and monumental structures designed by Mimar Muzaffer, another one of the pioneering architects of the era (Figure 1).

Figure 1. *Konya Central Post Office Building, Architect Muzaffer and Architect Fatih Ülkü (Wikimedia Archive, 2023)*

4. EDUCATION REFORMS IN REPUBLICAN ERA

After the proclamation of the Republic, Atatürk's reforms gained momentum, with significant changes occurring particularly in the field of education. Up to that time, education had been governed by the "Tedrisat-ı İptidaiye Kanun-ı Muvakkati", which had been in effect since 1913. The 15th article of this law regulated various expenses related to the establishment of primary schools, from procuring land for school construction to paying the salaries of teachers, school principals, and assistants, which were expected to be covered by the residents of villages or neighborhoods. Additionally, it stipulated that the responsibility for collecting these expenses would be assumed by the district or provincial council administrations to which the village or neighborhood was affiliated [7].

After the foundation of the republic, the first reform was to disconnect the school and madrasah relationship and to adopt a secular education approach. For this purpose, the Education Union Law ("Tevhid-i Tedrisat") and the Alphabet Reform were applied. The Education Law stresses that all schools are ruled by the Ministry of National Education [8]. These approaches unified the education issue and increased the level of modernism and literacy.

While the reforms in the Ottoman era were for the permanence of the empire (military reforms to maintain central authority), reforms in the republican era were about to foundation of a new state and a new education model [3]. During the War of Independence, Atatürk demonstrated a keen commitment to education, culminating in the establishment of the Ministry of National Education ("Maarif Vekaleti") on May 6, 1920. Preceding the foundation of the Republic of Turkey, the Ministry of National Education initially emerged as the Ministry of National Education and Culture on March 3, 1920. However, the subsequent series of reforms and amendments led to its transformation into its present form, aligning with the date of May 2, 1920. This date is recognized as the official inception of the Ministry of National Education, celebrated annually as "National Education Day." Its fundamental objective revolves around the modernization and organization of schools based on contemporary and scientific principles. The articles of one of the first Education Congress were as follows:

- Gaining the statistical information about the numbers of present schools, students, and teachers
- Current status of the schools, continuation of paused constructions
- The status of agricultural and industrial schools
- Abolishment of foreign and private schools.
- Modification of the primary school model, the establishment of a region and requirement-based system
- 5-year education period for primary schools
- The check of educated experts for a local and national production model

The Assembly were gathered on 14 August 1923 for subjects such as the education of children, the education of the people, increasing the numbers of high schools for girls, industrial secondary schools for girls, teacher schools for girls, and converting the primary school attendance to compulsory [8].

Parallel to the educational reforms, the "national culture" was also coined as an important subject and "building a nation" was targeted. The "national" concept was centralised. When asked "You rescued the country. What is next?", Atatürk replied "Raising the national wisdom is my main goal."[9].

In the early republican era, schools can be considered as designed according to the republican ideology. The main concept of the era, nationalism, can also be observed in the school buildings.

5. THE CONSTRUCTION OF PRIMARY SCHOOL BUILDINGS

After the connection of all schools to the Ministry of Education with the Education Union Law, a 1926 law banned any school construction unless the plans were sent by the ministry [10]. Certain plan types, prepared by the ministry, were sent to the local Directory of Education ("Maarif Müdürlüğü") units and built by Special Provincial Administration ("İl Özel İdaresi") units according to the local population and needs [10]. The expenditures were covered by the local taxes. In the villages, local people also contributed their workforce during the construction. This obligation was set on the 1924 Village Law Article 12 as "constructing a school building according to the sample delivered by the Directory of Education [10]. Construction Bureau of the Ministry of Education ("Maarif Vekaleti İnşaat Bürosu") ruled the issues such as gaining the building site for primary school buildings, the construction, salaries of teachers, provision of teaching materials [11].

In 1927, the German architect Ernst Egli was appointed as the head of the bureau, where Robert Vorhoelzer and Bruno Taut were the successors [12]. Egli prepared technical trips around Anatolia. Stone, wood, and adobe were selected as building materials and the plans were designed over those present materials in a cost-effective approach. Two plan types were provided as one-classroom and three-classroom village schools. Also, a toilet and teacher housing facilities were designed. For towns and cities, five-classroom plan types were chosen [13].

Educational structures were built according to type projects which were modified due to the student population and local building site features. The economic problems of the post-war era and the scarcity of architects forced people to use type projects. These projects mostly had a central circulation axis with an entrance corridor and a well-defined entrance on the façade. Samples have minor differences and sizes vary according to the local population (Figure 2).

Göztepe Primary School
Architect: Kemalettin Bey, Year of Construction: 1924,
Location: İstanbul,
Source: https://kulturenvanteri.com/tr/tema/mimar-kemalettin-yapilari/

Hakimiyet-i Milliye Primary School
Architect: Mukbil Kemal Taş, Year of Construction: 1926,
Location: İstanbul,
Source: Parlak, Ö., & Yaldız, E. (2017). Konya'da Erken Cumhuriyet Dönemi Ilkokul Yapıları.

Mimar Kemal Primary School
Architect: Kemalettin Bey, Year of Construction: 1927,
Location: Ankara,
Source: https://kulturenvanteri.com/tr/tema/mimar-kemalettin-yapilari/

Figure 2. *Primary school building samples from Turkey*

Plan types for the primary schools varied like "I" type and "U" type [14] (Figure 3). They were named after the circulation schemes. "I" plan types obtain daylight from the façade. Gazi and Latife School in Ankara, and İsmet Paşa (table no:1), Hakimiyet-i Milliye (table no:2) and Gazi Mustafa Kemal (table no:3) primary schools in Konya are the samples. In "U" plan type, the circulation scheme is on the ends of "U" and symmetrical. Kara Mustafa Paşa Primary School in Merzifon (figure 3) is an example [14].

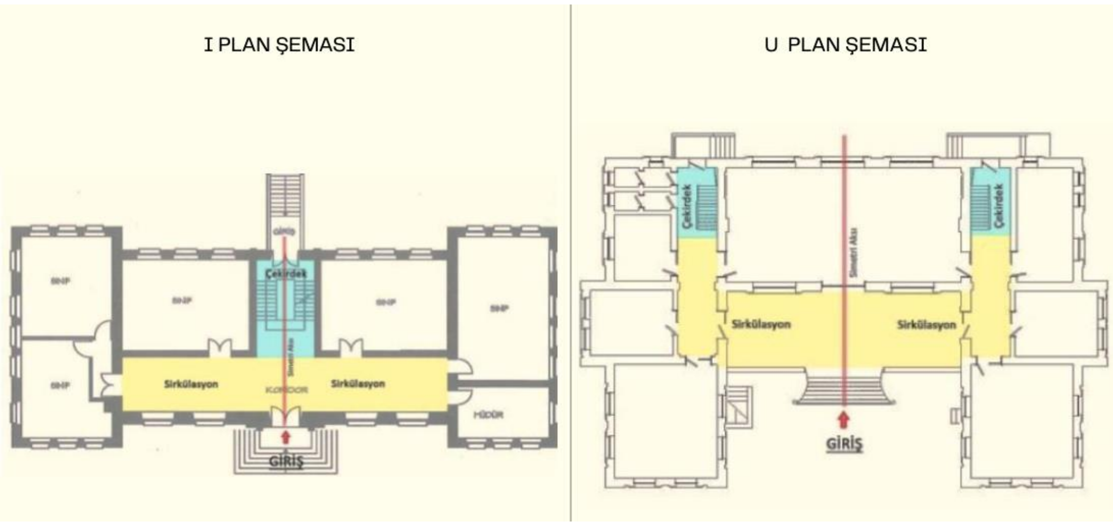
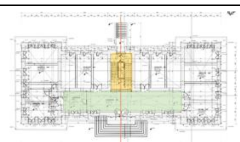
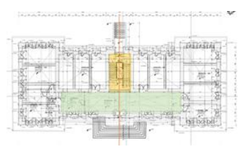
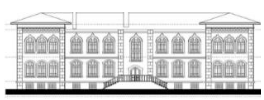
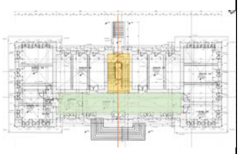
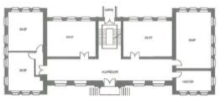
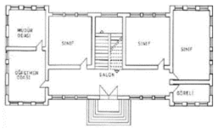
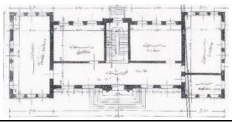
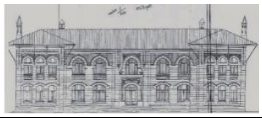
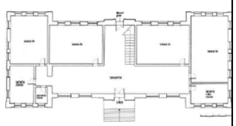


Figure 3. *Plan types of primary school buildings [14]*

The table below shows the primary school buildings around Anatolia. They are all in the "I" plan type (figure 3 and table 1). The "I" plan type is more cost-effective and time-effective, compared with the "U". These features may be the reasons for wider preference. The "U" plan type was rather selected for secondary schools and high schools for their larger student population.

Table 1. *The comparison of the primary school buildings of the National Architecture Style*

no	Building Name	Building Year	City	Architect	Plan type	Plan	Façade View
1	İsmet Paşa Primary School [18]	1926-1927	Konya, Karatay District	Unknown	"I" Plan Type		
2	Hakimiyet-i Milliye Primary School [18]	1926-1927	Konya, Karatay District	Unknown	"I" Plan Type		

3	Gazi Mustafa Kemal Primary School [18]	1926-1927	Konya, Karatay District	Unknown	**“I”** Plan Type		
4	Gazi ve Latife Primary School [19]	1924	Ankara, Altındağ District	Mukbil Kemal Taş	**“I”** Plan Type		
5	Akşehir Cumhuriyet Primary School [20]	1927	Konya, Akşehir District	Unknown	**“I”** Plan Type		
6	Mehmet Akif Ersoy School [21]	1927	Sinop, Ayancık District	Mukbil Kemal Taş	**“I”** Plan Type		
7	Orhan Gazi Primary School [19]	1929	Düzce, Akçakoca District	Mukbil Kemal Taş	**“I”** Plan Type		
8	Kadınhanı Primary School [20]	1927	Konya, Kadınhanı District	Unknown	**“I”** Plan Type		

6. İSMET PAŞA PRIMARY SCHOOL

The building is on the İstanbul Boulevard, Karatay District, Konya Province, and is still in use as a primary school (table no:1). Konya Cultural Heritage Preservation Regional Board (“Konya Kültür Varlıklarını Koruma Bölge Kurulu”) registered the building on 13 November 1982. The Mayor İzzet asked to build İsmet Paşa Primary School along with Gazi Mustafa Kemal and Hakimiyet-i Milliye primary schools in 1926. The construction was carried out by the German Lenc (Leno) Company. Completed and started working in 1927 [15, 16].

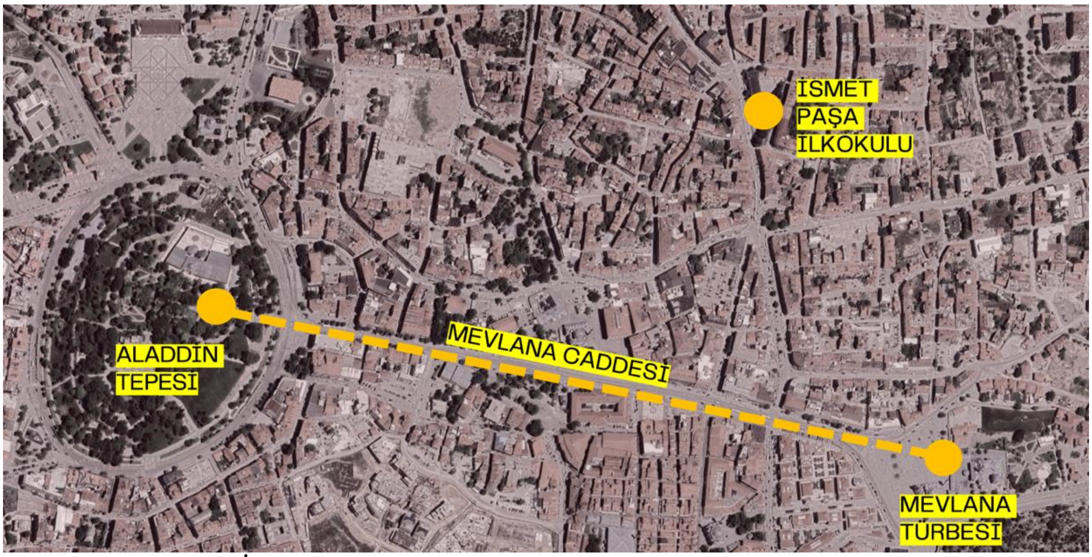


Figure 4. *The location of İsmet Paşa Primary School in Konya (Modified on Google Earth image, 2023)*

In 1936, with the order of the Technical Teaching Directorate for Girls', the İsmet Paşa Primary School began to serve also as the Industrial School for Girls, in the evenings. Skills like sewing, needlework, clothes washing, and cooking were taught to the primary school graduate ladies. The education period was two years [17].

Architectural features;

The building has a rectangular and symmetrical plan and was located on the north-south axis. It has two floors over the basement. The entrance is on the east-west axis over the symmetry axis. It has an "I" plan type corridor with a natural lighting feature. The first floor is identical to the ground floor. The basement, which also has natural lighting support, has a library, storage, and archive functions.

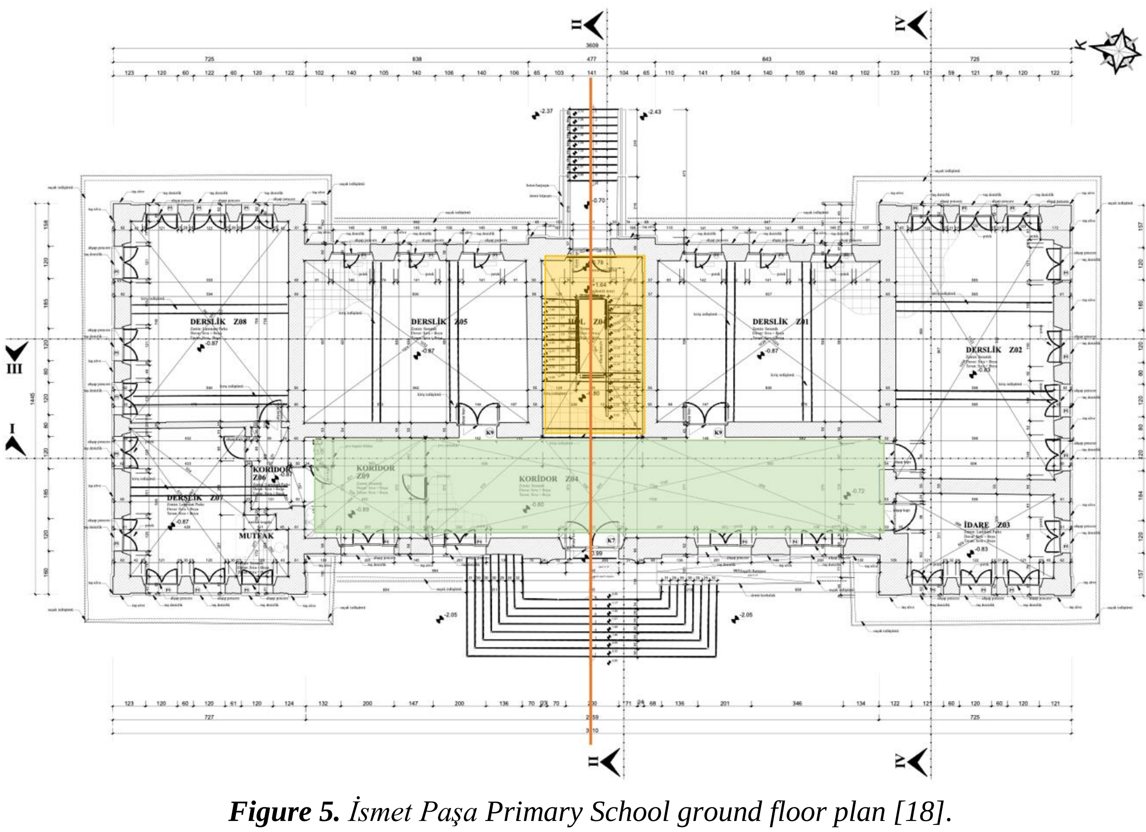


Figure 5. *İsmet Paşa Primary School ground floor plan [18].*

The first repair of the building was in 1978. The National Education Directorate has repaired the plumbing services and the roof.

Figure 6. *İsmet Paşa Primary School west façade, (Authors' archive, taken on 20.11.23 by Işıl Esen)*

On the façade, the effect of the National Architecture Style is obvious. The lower-floor windows have short arches whereas the ones on the upper floor have pointed arches (table no:1,2,3). The eaves are wider and decorated. There also are some rectangular decorations between the roof and the upper floor.

Figure 7. *İsmet Paşa Primary School east façade, (Authors' archive, taken on 20.11.23 by Işıl Esen)*

Yet another interesting feature of the building is its different design for front and back façades. In recent times, the west façade has been used for entrance. The big yard in front of this façade is used for morning ceremonies and sports classes. Since the east façade is adjacent to a crowded street, there cannot be a gathering space here. Therefore, the west façade is used for this purpose. On the east façade, there is a large stone-frame entrance door whereas the west façade has segmented arched entrance door under a narrow and high pointed arched window.

(a) (b)

Figure 8. *(a) İsmet Paşa Primary School garden wall ornamentation (Authors' archive, taken on 20.11.23 by Işıl Esen), (b) Art Nouveau residence façade in Brussels on right (Authors' archive, taken on 20.05.13 by Nur Urfalıoğlu)*

The "rumi" an "palmet" ornamentations on garden walls are the unique features of the building (Figure 8). Those remind European Art Nouveau style façade ornamentations but also has Ottoman and Seljukid inspirations. The emblem with a longer middle part and shorter side parts are similar with the righter image of an Art Nouveau façade (Figure 8). Kemaleddin the architect, who were active in the era, also used Art Nouveau ornamentations on his Natural Architecture Style works. "Rumi" and "palmet" ornamentations are considered not simultaneous with the construction date. However, the research could not achieved the exact building date of the garden wall.

Figure 9. *İsmet Pasha Primary School interior photographs were taken by Jule Eriç Horosanlı on March 24, 2024, The old photographs were obtained from the administration of Ismet Pasha Primary School*

7. DISCUSSION AND CONCLUSION

This study covers the educational reforms in Turkey and their architectural reflections. The educational reforms focused on the military sector in the Ottoman era with the Tanzimat whereas in the republican era, education was considered as important as independence.

The National Architectural Style concept was created by the influence of the nation-state and nationalist movements. Philosophers like Ziya Gökalp and Yusuf Akçura aimed to reinforce the Turkish identity and the national culture. These concepts affected the architecture in the republican era and the National Architectural Style emerged, combining traditional Turkish patterns with modern construction materials. Buildings of the era were generally in symmetrical plan type, having wide eaves, symmetrical façades, and two storeys. Façades have well-defined entrances and dynamic façades with cymatia and windows with pointed or segmental arches. The most frequently used plan type of the era was the "I" type which was designed by architect Mukbil Kemal Taş. This plan type was first applied in Gazi and Latife Schools in Ankara. The plan type has the general architectural features of the era.

As seen in Table 1, the primary school buildings around Anatolia have major similarities. They are generally on the "I" plan type whereas the "U" plan type was preferred for secondary school and high schools in more crowded districts (Figure 3). Gazi and Latife Schools in the Altındağ district of Ankara, Mehmet Akif Ersoy School in the Ayancık district of Sinop, and Orhan Gazi Primary School in the Akçakoca district of Düzce were all in the "I" plan type and designed by Mukbil Kemal Taş. Besides having differences, they all had symmetrical façades and entrances on the axes of symmetry. Also the Akşehir Cumhuriyet Primary School, the Kadınhanı Primary School, and the İsmet Paşa Primary School in Konya province are all based on the "I" plan type, too. Therefore, these structures with unknown architects may be designed by Mukbil Kemal Taş, too.
The façade designs of İsmet Paşa Primary School, Hakimiyet-i Milliye Primary School, and Gazi Mustafa Kemal Primary School are identical, as well as their plan type. These three schools were constructed in a short period by the same company (Leno). The materials, façade features, and plan similarity remind the works of Mukbil Kemal Taş. Among these projects, the İsmet Paşa Primary School has a unique garden wall ornamentation. The "rumi" and "palmet" patterns have both Turkish ornamentation art (Figure 8) and European Art Nouveau influence. The reservation of the İsmet Paşa Primary School, which is a sample of early republican era architectural style, with the unique function is very important for the architectural memory of Konya.

Finally, it can be put forward that the relationship between education and architecture in Turkey has always been subject to change in history. The republican era reforms and the concept of the National Architecture Style heavily affected the architecture of educational structures, which became a part of the reinforcement attempts of Turkish national identity.

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An Evaluation on Plan and Facade Compositions in Architect Kemaleddin's Educational Buildings[1]

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Abstract

Architect Kemaleddin, one of the pioneers of the idea of creating a National Architecture, took part in the design of many buildings with different typological features. During his most productive years, he designed many school buildings. The design approach adopted in the production of plans and facades has been defined as the "Kemaleddin School".

In the study, better understanding the plan and facade style of Kemaleddin's educational buildings was determined as the research subject. Within the scope of the study, the Reşadiye School, Sultan Abdülhamid-i Evvel Madrasa, Medreset-ül Kuzat, Bostancı İbrahim Paşa Primary school, Göztepe Primary school and Gazi Education Institute buildings designed by Architect Kemaleddin were evaluated. It is aimed to evaluate the typological similarities and differences of the plans and facades of Kemaleddin's educational buildings by creating tables.

As a result of the study, the frequent occurrence of rectangular, L and U-shaped plan layouts and the presence of protrusions that emphasize the entrance were determined to be common features of the buildings. It gives the impression that the facade design is designed in vertical and horizontal parts and that there is a rhythmic order. Especially the use of rectangular and pendant arched molded windows with different shapes between the floors and the wide eaves roof form were observed as characteristic features of educational buildings.

1. INTRODUCTION

Advances in architecture have been in direct relationship with the economies, technical know-how, policies and cultures of nations throughout history [1]. When viewed from the perspective of historical events, it is possible to say that the 16th century Ottoman architecture was at the most advanced level in terms of technique and aesthetics [2]. The concept of modernization came to the fore with the dramatic increase in the knowledge gap between western states and the Ottoman state in the 18th century [3;4]. The first steps of the modernization movement were seen primarily in transportation, trade and military fields, and traces of modernization were also seen in the field of education, bureaucracy and architecture [4;5].

The first developments in the field of education during the modernization process were at the higher education level and were made with the aim of increasing the quality in the military field. Subsequently, educational reforms continued at primary and secondary education levels [6]. The modernization movement in education was implemented mostly in Istanbul during the Tanzimat period, and became widespread in Anatolia during the Abdulhamid period. In these years, the numbers of elementary schools, middle schools, high schools, and girls' schools have increased [7]. II. After the Constitutional Monarchy, unlike the education reforms implemented in previous years, madrasahs were also included in the education reform. Gökalp's understanding of the education model, which emphasizes society, is one of the important developments in the field of education [7;8;9].

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Investments in educational buildings were a matter of great importance in the last periods of the Empire and the Early Republic period [10]. The Education Congress held during the war years proves this situation [8]. Starting from the Republic period, madrasahs were abolished with the Tevhid-i Tedrisat law, and contradictions in the education system were eliminated and education was made secular and national [8;9]. The problem of designing new buildings that will adapt to changes in the field of education has emerged [5;11].

While in the pre-modern period, Ottoman educational structures developed around teachers and students who did not have a defined place, the areas where education was provided were defined with the modern education system. In this context, educational structures consisting of a certain curriculum and appropriate spaces have emerged. This structuring in educational structures dates back to the 19th century. century and XX. It has been generally adopted by states in the century. In this direction, the national identities of the states have begun to be effective in the design of buildings. With the increase in nationalism in the Ottoman Empire, there were also changes in architecture. During these periods, called the First National Architecture Period, a style emerged in which architectural elements reflecting the characteristics of Classical Ottoman Architecture were used fondly, as opposed to European architectural art and style. Although symmetrical fiction was effective in the plans and facades of the buildings designed in this style, the facades of the buildings were given more importance. In addition, the symmetrical understanding in the plan layouts of the buildings of this period was also reflected on the facade[12;13]. The layout and plan layouts of the buildings remained in the background. When we look at the characteristics of the buildings of this period, it seems that architectural elements such as pointed and low arches, domes, wide eaves, reliefs, muqarnas, and tile decorations in Seljuk and Classical Ottoman Architecture were frequently used in facade constructions[14;15].

There are studies in the literature that comprehensively investigate the changes in the field of education. Educational buildings in Istanbul were discussed and evaluated in terms of their architectural features, decorative elements and construction techniques [16;17;18]. In studies examining educational buildings in Ankara [19;20], Izmir [21], İstanbul[15;22] and Anatolia [23;24;25], a typological framework was created in terms of plans and facades. Based on these studies, it is possible to say that the educational buildings built from the early 1900s to 1930 were designed with the concern of creating a national identity. Research shows that the plans in educational buildings are mostly symmetrical and contain side-functional spaces in line with new needs. It is noteworthy that on the facades, classical elements were selected, simplified and applied by considering the technology of the period.

Drawing attention with his efforts to create a National Architecture in his designs, Kemaleddin's influence on educational buildings distinguishes him from his contemporaries [26]. Architect Kemaleddin designed many educational buildings between 1909 and 1927, sought solutions to new design problems, and is one of the first modern Turkish architects. It appears as an important name in this respect [27].

The aim of this study is to try to understand the plans and facades of the educational buildings designed by Kemaleddin. Within the scope of the study, the architectural understanding of the period covering the transition from the Empire to the Republic was touched upon, and Kemaleddin's architectural story and the historical development of educational buildings were conveyed. The architect's educational buildings were examined under three main headings: schools, madrasahs and higher education institutions. Within the scope of the study, the plan and facade features of six buildings, namely Reşadiye Primary School, Sultan Abdülhamid-i Evvel Madrasa, Medreset-ül Kuzat, Bostancı İbrahim Paşa Primary School, Göztepe Primary School and Gazi Education Institute, were compared by creating tables. As a result of the comparisons made, the effect of the architectural style of the period on the buildings was emphasized.

2. METHOD

Within the scope of the study, a literature research was conducted specifically on educational buildings, and comparative analyzes were made by creating tables and the features of the plans and facades (doors, windows, decorations and roofs) of historical buildings. The typological and morphological similarities and differences of the plans and facade designs of Kemaleddin Bey's educational buildings, Reşadiye

Primary School, Sultan Abdülhamid-i Evvel Madrasa, Medreset-ül Kuzat, Bostancı İbrahim Paşa Primary school, Göztepe Primary school and Gazi Education Institute buildings were evaluated by creating tables. In this context, the aim of the study is to examine the reflections of the design approach of the model difference in the educational buildings designed by Architect Kemaleddi. An attempt has been made to reveal the relationship between this design approach and the national architectural movement of the period in the plan and facade solutions of the buildings.

3. EDUCATIONAL BUILDINGS OF ARCHITECT KEMALEDDIN

Throughout history, people and societies have designed structures as a result of the physical and socio-cultural norms of the region in which they are located. These spaces and the structures created by these spaces have evolved and transformed over time and have survived until today. In the process, changes in the structures that make up the built environment have become inevitable due to reasons such as important technological developments and transformations and architectural movements [28]. With the concept of nationalism affecting the world, the understanding of nourishing from tradition and learning from the past has become widespread in civilizations [28;29]. While this understanding showed its influence in the West with the emergence of orders resembling Greek and Roman architecture, the influence of nationalism in Ottoman architecture; Turkish art is seen within the framework of understanding and preserving the design approach in Classical Ottoman and Seljuk works [29].

The First National Architecture Period, was when Turkish nationalism gained importance, changes were experienced in many areas in the Empire, and there was a need to build modern public buildings suitable for the changing conditions[5;30]. It is possible to say that there was an emphasis on rational and functional plans in the plan schemes of the architectural products of the First National Architecture period [32]. A symmetrical layout with entrance from the middle axis is frequently seen in buildings [33]. Designing the facade in three parts and giving importance to the front facades bear traces of the Renaissance tradition [31;34]. The facades are mostly designed symmetrically with respect to the entrance axis, just like the plan layout. There are examples where the entrance is emphasized similar to the crown gate. It is frequently encountered that the dome cover system and the hipped roof are used together [21;34]. The ornamental elements under the eaves, marble main stair railings, relief and ornamental elements reflect the Seljuk and Ottoman tradition [34]. Depending on the cultural changes in society, there are also differences in terms of interior layout. Ventilation, bathroom and heating installations were considered at the planning stage [35].

The idea of national architecture; It would not be wrong to say that it contains traces of the concepts of creating a national identity, maintaining Turkish art, learning from the past and nationalism. Arif Hikmet Koyunoğlu, Ali Talat Bey, Architect Muzaffer and Giulio Mongeri also have buildings showing these features[31].During the process, Turkish intellectuals such as Kemaleddin Bey and Vedat Tek carried out valuable works aiming to create a national architecture as a reaction to the understanding of westernization.

Architect Kemaleddin Bey, witnessed many important events that took place in the last years of the empire during his childhood and youth. In 1876, he started his secondary education at İbrahim Ağa Mekteb-i İbtidaisi in Suda, Crete, due to his father's duty in the Ottoman navy [37]. After returning to Istanbul two years later, he continued his education at Şems-ül Maarif [37;38;39]. In 1887, when he started Hendese-i Mülkiye, Prof. He received higher education from experts such as Jasmund [40]. In 1891, he studied at Hendese-i Mülkiye Mektebi as Prof. He was appointed as Jachmund's assistant and opened his private office [41]. He was sent to Berlin by the state in 1895, and after completing his two-year architecture education at Charlottenburg Technische Hochschule, he worked in Germany for two and a half years [39;41]. After returning home in the following years, he gave lectures at Hendese-i Mülkiye and Sanayi-i Nefîse Mektebi[42]. After a short time, he was appointed to the Ministry of Military Affairs with an additional duty [42;43].

Figure1. *A Photograph of Architect Kemaleddin Bey[44]*

He became a very active name in building production after being appointed to the Construction and Repair Committee of the Ministry of Foundations between 1909 and 1919 [42]. During these years, he worked for the Architect and Engineer Professional Society and its magazines in order to ensure professional organization [45]. In 1914, in addition to this position, he was appointed to the Istanbul City Council of Science Consultancy. During these years, he designed buildings such as contemporary school buildings, hospital buildings, commercial buildings, residences and station buildings in line with the needs of the period. He carried out various construction and repair works of large commercial buildings, mosques, schools, and became an influential name in the design of educational buildings and religious buildings [39;42]. Kemaleddin Bey, who had important works on the restoration of historical monuments, went to Jerusalem in 1922 for the repair of Masjid al-Aqsa. He returned to Ankara in 1925 to work as the chief architect of the General Directorate of Foundations for the reconstruction of the country [41]. The formation of an architectural environment in Ankara where indecision and criticism began affected Kemaleddin Bey deeply, and he died as a result of a brain hemorrhage in 1927 [42]. Kemaleddin Bey's "public architect" identity, which was integrated with state appointments throughout his career, enabled him to have a say in architectural production with his technical team of young architects in the Ministry of Foundations and to work mostly on public buildings [46]. It is understood from Kemaleddin Bey's writings that the design philosophy of the period concentrated on the idea of fully accepting technical developments and applying these developments on a national line [47].

The design process of modern educational buildings has many aspects that differ from the classical Ottoman educational institutions, primary schools and madrasahs. During the design phase, the issue of how to spatially position circulation elements, wet volumes and building entrances in educational buildings has become one of the important design problems that need to be resolved [42]. With the change in the methods used in education, classrooms lined up in rows with an instructor and many students appear as the main place where education is given [6;42]. Side-functional spaces such as painting workshops, dormitories and dining halls were needed [48]. In terms of facade structures, it is possible to say that Kemaleddin's educational buildings have the characteristics of the First National Architecture period and were designed in a simpler structure than other building typologies. The design approach adopted by the architect in the facades and plans of educational buildings is defined as "Kemaleddin School", proving that it has an important place among the designs of educational buildings [48].

Architect Kemaleddin has educational building designs in Istanbul, Ankara, Edirne and Medina. In addition, projects similar to school projects have been implemented in Anatolia. There are sources stating that the architect designed nearly forty school buildings during the years of the Ministry of Foundations [49]. In this study, the architect's known educational buildings were examined under three main headings: schools, madrasahs and higher education institutions. When these structures are evaluated chronologically, it is difficult to follow a linear process in terms of design decisions, but it is understood from the material and construction technique preferences that the technological developments between 1909 and 1927 were followed. It is possible to see that school designs during the Republican period evolved towards a simpler understanding that represented the new regime [50]. In the study, the plan organizations and facade structures of Reşadiye Primary School, Sultan Abdülhamid-i Evvel Madrasa, Medreset-ül Kuzat, Bostancı İbrahim Paşa Primary School, Göztepe Primary School and Gazi Education Institute were evaluated.

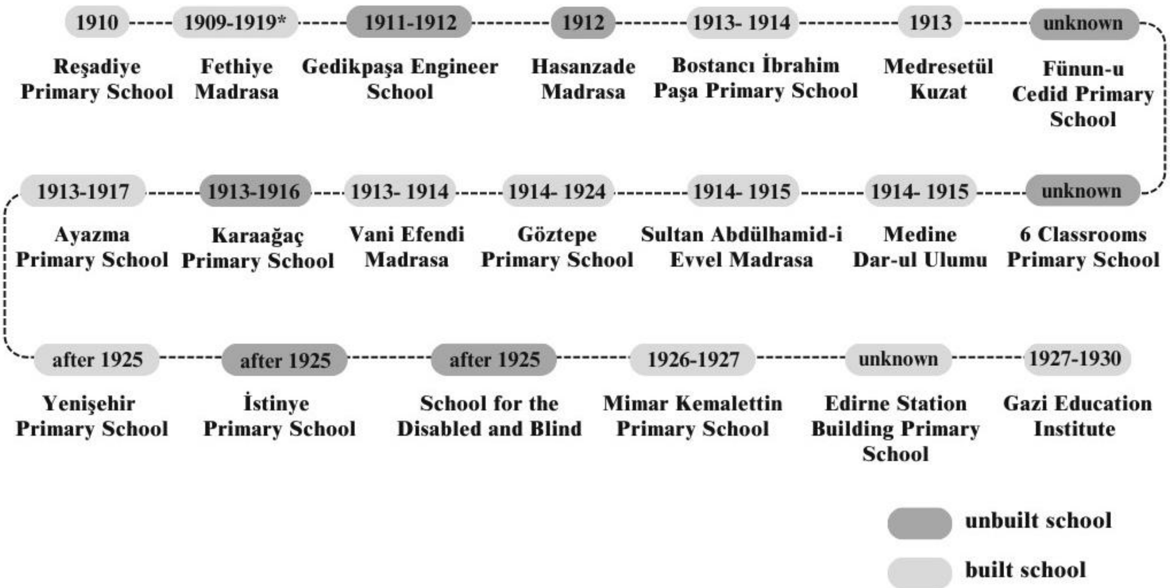


Figure 2. *Educational Buildings of Architect Kemaleddin in the Historical Process[42]*

3.1. Primary School Buildings

Primary Schools was seen as the first educational level of modern education after the changes in the field of education. Kemaleddin's known school designs; Karaağaç Primary School, School for the Disabled and Blind, School Project in Istiye, Sultan III. Mustafa Primary School, Fünun-u Cedid Primary School, Mimar Kemal Primary School, Edirne Station Building Primary School, School with six classrooms [51]. The single-storey simple planned design for the Karaağaç Primary School was not implemented on site, but there are many examples similar to this project in Anatolia [42;52]. It can be said that the architect had a complex plan because it included spaces with various functions such as dining halls and meeting rooms in Istanbul such as Bostancı, Reşadiye, Ayazma, Göztepe [42].

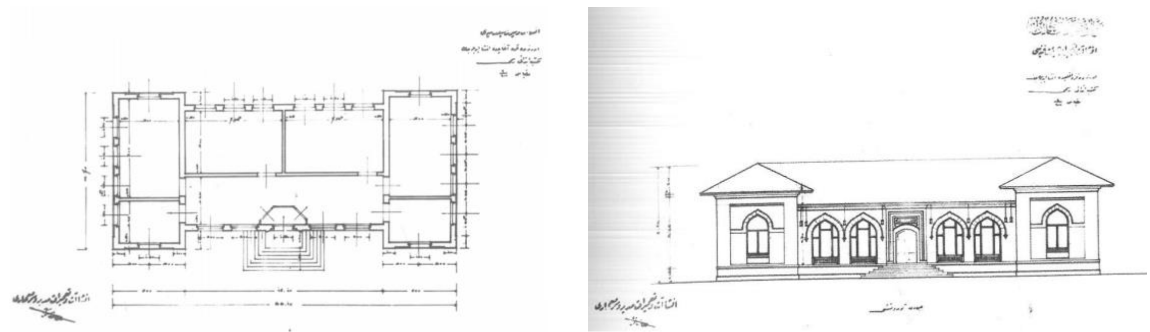


Figure 3. *a) Karaağaç Primary School Ground Floor Plan, b) Karaağaç Primary School Front Facade [42]*

3.1.1 Reşadiye Numune School

The building, located in the Eyüp district of Istanbul, was built upon the request of Reşat the Fifth and is located on the same land as the Tomb of Mehmet Reşat V, designed by Architect Kemaleddin [23;42]. The building in L plan layout consists of a basement, ground floor and first floor [53]. Today, changes have been made in the plan setup.

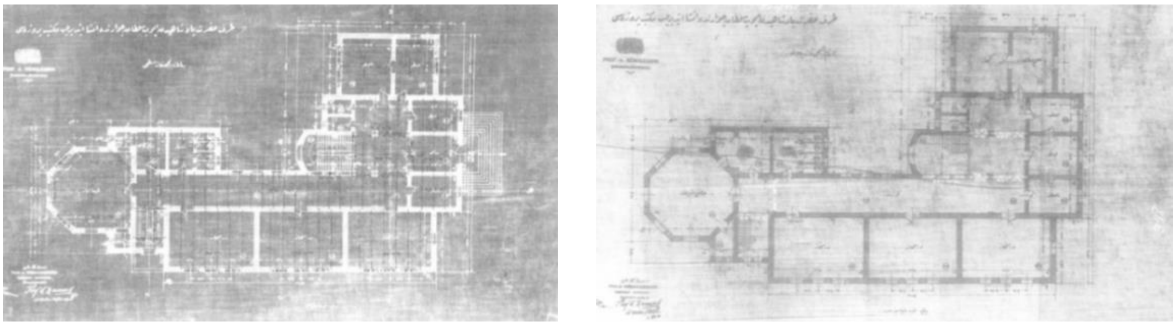


Figure 4. *a)Reşadiye School Ground Floor Plan, b) Reşadiye School First Floor Plan [42]*

The diagonal-shaped room on the ground floor was designed as a dining hall in the original project [38]. This octagonal-shaped space, completed with a double-walled dome cover, was designed as a masjid in the original project on the first floor. This proves the place of religion in the education program in the early 1900s[42;53]. Access to the building is provided through a low arched entrance door. The star and crescent motif on the door attracts attention. A symmetrical setup was adopted on the front facade compared to the entrance, and the prominent mass was emphasized by moving it up over the eaves level. There are square-framed geometric reliefs on the wall surface just below the eaves on the front facade.
Plaster-shaped rectangular panels are seen in the upper floor facade [42]. Penci arched and rectangular shaped windows have penci and flat frame moldings on their upper parts that follow the window form. It was built using brick material with the masonry construction system and has steel beams in its floors [42;53;54]. The top of the hipped wooden roof is covered with tiles and the masjid section is covered with lead material.

Figure 5*. a)Reşadiye School Facade Photo [23], b)Reşadiye School Facade Photo [55]*

3.1.2. İbrahim Paşa Primary School

Bostancı Primary school, located in the Bostancı district of Istanbul, was built together with the Bostancı Mosque located adjacent to it. The building, planned in an L shape, consists of a basement, ground floor and first floors [17;56]. As a result of the repairs made in the following years, the original plan and facade structure changed.

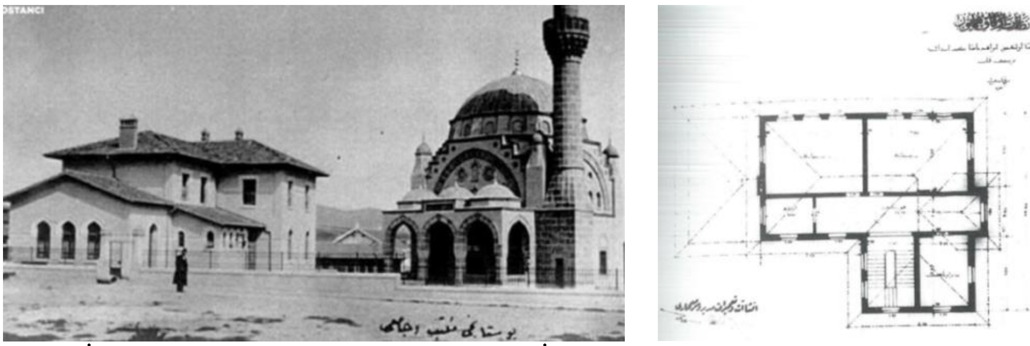


Figure 6. *a) İbrahim Paşa Primary school [57], b) İbrahim Paşa Primary school First Floor Plan [42]*

There is a massive overhang in the middle axis of the building, which is accessed through a staircase entrance, emphasizing the entrance. While penci-arched windows are seen on the ground floor, the upper floor windows are rectangular in shape. In Bostancı School, the use of molding on windows and floor molding between floors are also seen [17;42]. It can be seen that the window groups on the upper floor are surrounded by panels. The wooden hipped roof has wide eaves and is covered with tile covering. The building was built using brick material using the masonry construction system [42;56].

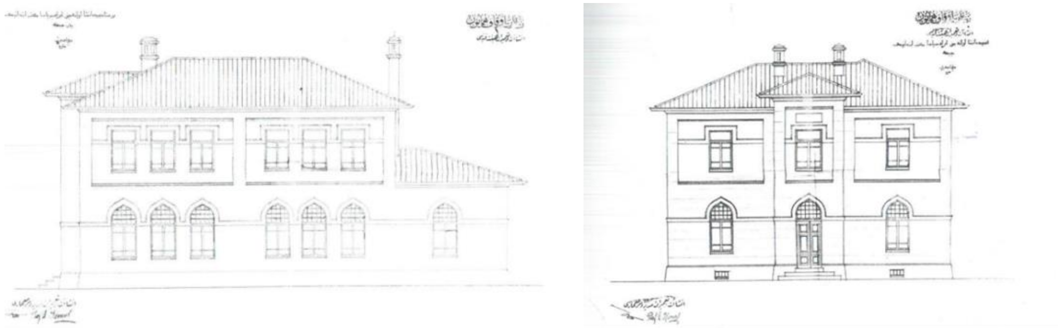


Figure 7. *a) İbrahim Paşa Primary school Side Facade, b)İbrahim Paşa Primary school Front Facade [42]*

3.1.3. Göztepe Primary School

The building located in Göztepe, Istanbul has a rectangular plan scheme [58]. There are spaces such as coal sheds and warehouses in the basement [17;42]. In the original project, it is distinguished from other educational buildings by the open terrace section on the first floor. This part was closed structurally during the repairs in the building in the following years [59].

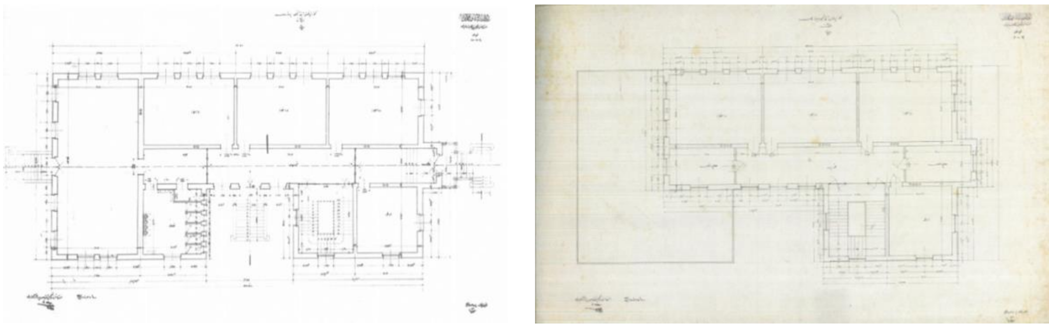


Figure 8. *a)Göztepe Primary School Ground Floor Plan [42], b)Göztepe Primary School Second Floor Plan [51]*

Göztepe Primary School differs from other educational buildings of the architect in terms of its religious space function. When compared to Bostancı, Ayazma and schools with similar features, it is seen that these buildings are located near masjids or mosques [42]. In Reşadiye school, the masjid was dissolved into the structure. However, it is estimated that there is no place with a religious function in Göztepe Primary School.

There are two more entrances in the building besides the main entrance. According to Yavuz, it is thought that the entrance on the left side of the building is for the dining hall. This entry was removed in later years. It is provided with a staircase entrance [60]. Although horizontal jointed plaster application is seen in the project, it is thought that it was not applied during construction or was removed after the repair. In the original project, buttresses supporting the eaves are seen. It shows similar features to the Bostancı School Primary School with its cantilevered and symmetrical facade layout [42;59]. The wooden hipped roof has wide eaves and is covered with tile covering. It was built using brick material using the masonry construction system[60].

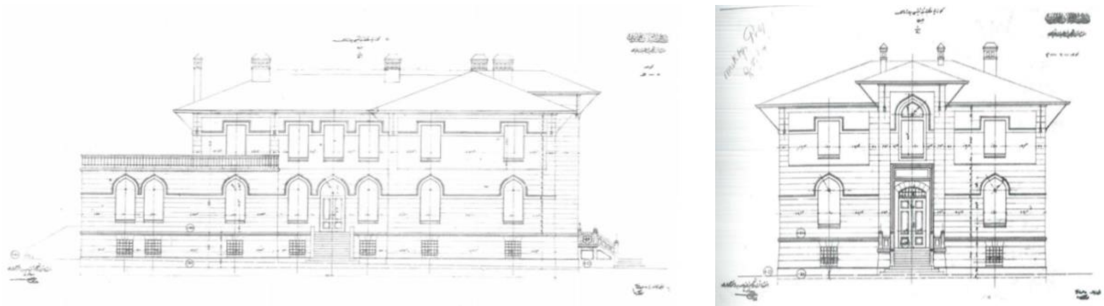


Figure 9. *a)Göztepe Primary School Side Facade, b)Göztepe Primary School Front Facade [42]*

3.2. Madrasah Buildings

Known madrasah buildings of the architect; Fethiye Madrasah, Hasanzade Madrasah, Medrese-tül Kuzat, Sultan Abdülhamid-i Evvel Madrasah, Madrasah in Medina, Vani Efendi Madrasah [43;51]. While traces of the old-style madrasah plan can be seen in the Fethiye Madrasa, one of Kemaleddin's madrasah designs, dated to 1909, other madrasah structures were designed in accordance with the new system [42;59]. Madrasa-tül Kuzat and Sultan Abdülhamid-i Evvel Madrasa structures also appear as introverted structures, unlike the Classical Ottoman madrasah typology [61].

With a T-shaped plan scheme for Hasanzade Madrasa, it can be seen that Kemaleddin is outside the understanding of symmetrical plan fiction. A T-type plan may have been considered because it was built on the foundations of the Old Madrasa, which was previously located here and was destroyed [42]. It is noteworthy that the facade structure has similar features to other educational buildings.

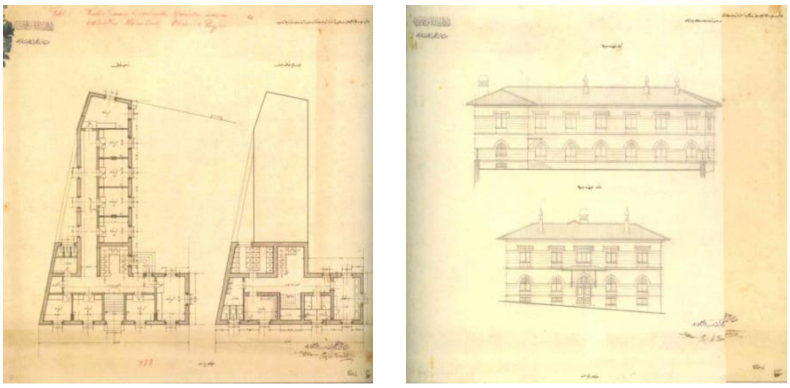


Figure 10. *a)Hasanzade Madrasa Basement and Ground Floor Plan, b) Hasanzade Madrasa Facades[51]*

3.2.1. Sultan Abdülhamid-i Evvel Madrasa

It is possible to say that the building built in Istanbul in 1915 represents a different and innovative approach from the Classical madrasah typology [43;51]. The building was designed and built as an L-shaped structure. After a repair in the 1950s, an addition was made to the building and a short mass was added to the side arm, and it had a U-shaped plan. Circulation is provided by two staircases rising in the form of an octagonal projecting corner tower [18]. Service spaces such as toilets and laundry rooms were designed in the basement floor plan of the building, which provides a staircase entrance from the central axis [42;43].

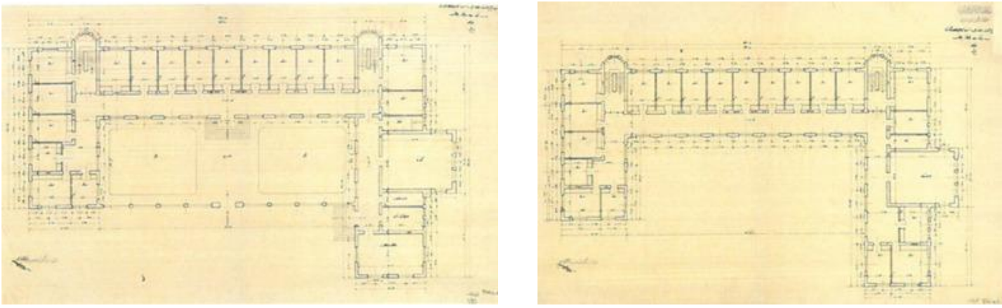


***Figure 11.** a) Ground Floor Plan of Hamid-i Evvel Madrasa in Sultan Selim, b) First Floor Plan of Hamid-i Evvel Madrasa in Sultan Selim[51]*

The long side wing seen on the right side of the Ground Floor was designed as a library. The section protruding from the center of the facade was designed as a library on the ground floor and a prayer room on the upper floor [42;51]. The masjid section was extended over the eaves and pendant arched light windows were placed. While triple windows were used on this side facade, equally spaced window spaces were created on the other facades of the building [18;42].

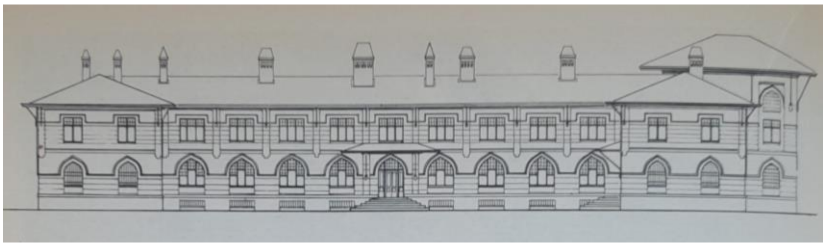


***Figure 12.** a)Front Facade of Hamid-i Evvel Madrasa in Sultan Selim[31]*

In the facade layout, the ground floor window arrangement is pendant arched, and on the upper floor there are windows close to square in form with flat scarf arches. There are continuous moldings on the windows. Plasters located between the upper floor windows and continuing to sag in the floor molding were used. There are carved rosettes at the ends hanging from the end of the floor molding to the lower floor [18;42]. There are colorful Rumi motif decorations surrounded by rectangular panels on the eaves above the entrance door. It is covered with a tiled wooden hipped roof. Wide eaves are supported by iron buttresses. It was built using brick material using the masonry construction system [17;18;42].

3.2.2. Medreset-ül Kuzat

The building, completed in 1913, was designed for kadis to receive education as a result of developments in the religious and educational fields [62]. Medreset-ül Kuzat symbolizes the change in education in madrasahs and modern education [61]. The basement of the building, where the U-shaped scheme is applied, is reserved for the warehouse and heat center. On the ground floor, there is a dining hall in a mass that is shorter than the other. There are also classrooms and administrator rooms on the first floor [18;42].

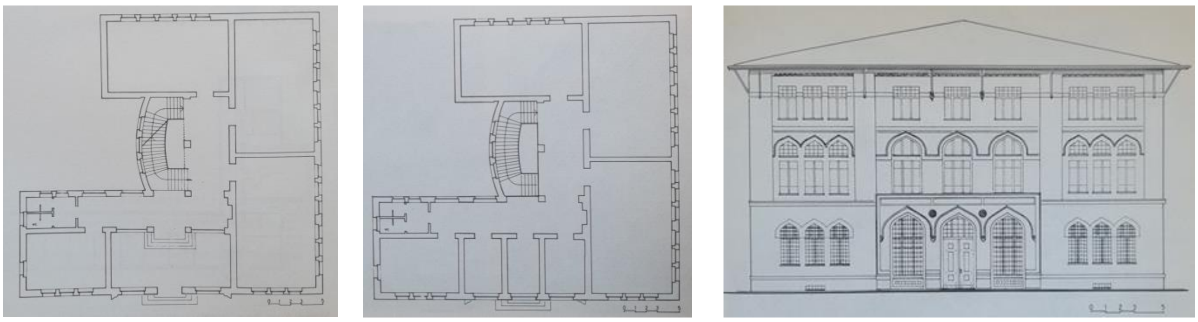


***Figure 13.** a)Medreset-ül Kuzat Ground Floor Plan, b)Medreset-ül Kuzat First Floor Plan c)Front Facade of Medreset-ül Kuzat [31]*

Penci arched triple windows were used on the ground floor. The front facade attracts attention compared to other facades. There are penci-arched windows on both sides of the double-winged penci-arched entrance door. Molding on doors and windows continues. There is a reverse tassel at the intersection of these moldings. There is a round badge and an inscription above the entrance. In the drawing, it can be seen that there is relief under the end of the eaves and in the part above the windows. The inscription above the entrance is projected upwards along the entrance door and the windows on both sides [18;42;63]. Starting from the upper part of the basement windows, the stone belt continues throughout the building. It was built with four floors using brick material. Cut stone-like plaster was applied on the exterior.

3.3. Higher Education Institution Buildings

There are two higher education institutions known to have been signed by Kemaleddin. One of them is Gazi Education Institute and the other is Gedikpaşa Engineer School. The plan scheme of Gedikpaşa Engineering School, which has not been implemented, differs with its entrance and Bursa arch-shaped windows on its facade. We can say that the architect designed this type of building with a different approach than the typological features seen in school designs [42;64].

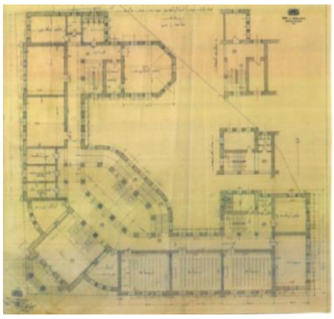
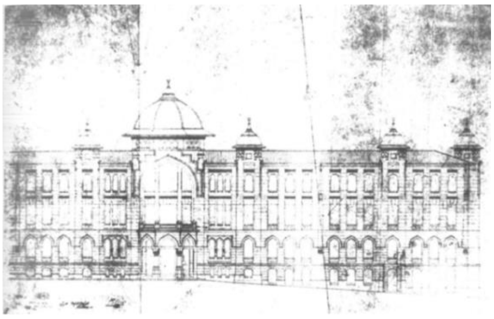



Figure 14. *a)Gedikpaşa Engineer School Ground Floor Plan [51], b)Gedikpaşa Engineer School Facade [42]*

3.3.1. Gazi Education Institute

With the proclamation of the Republic, it emerged as an important structure in modernizing the institutions in the country according to contemporary conditions. The building, designed as “Gazi İlk Muallim Mektebi”, was built to meet the need to train teachers [65].

There is a staircase entrance to the building, which has a symmetrical plan. While there are classrooms, meeting hall, dining hall and laboratories on the ground floor, administrative units, workshops, classrooms and laboratories are planned on the first floor. The second and third floors are reserved for dormitories. Another floor was added in the section above the entrance. Although this area, covered with a dome, was designed as an observatory, it could not be used for this purpose because it did not have the necessary equipment[42;65]. On the basement floor, there are service areas where the heating center and wet areas are located.

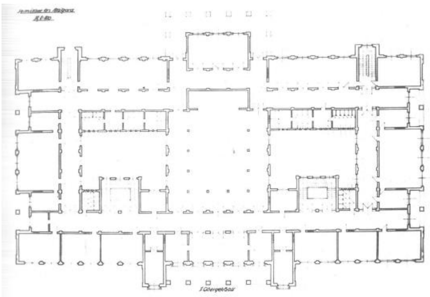
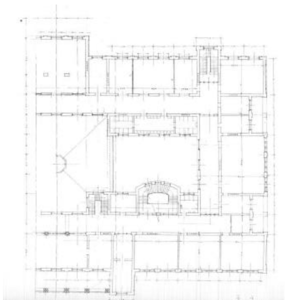



Figure 15. *a)Gazi Education Institute First Floor Plan, b)Gazi Education Institute Third Floor Plan (half of the floor plan) [42]*

In the facade setup, there is a semi-open area with a portico with marble columns rising on two floors in front of the entrance. The part corresponding to the portico at the entrance in the upper floor plan layout was used as a closed balcony on the second floor. The corresponding part of this balcony with red marble columns in the upper floor plan was used as an open terrace on the third floor. The building differs from other educational buildings in terms of the application of reinforced concrete construction technique [66].
Gazi Education Institute will contribute to seeing the differences in the design approach applied before and after the Republic period. This building is important as it is the last structure of Kemaleddin before his final death. The design process of the building, which was completed in 1927, was a very stressful process for Kemaleddin. German Architect Egli was brought to Ankara with the thought that it did not reflect the modern understanding of the period, and the architectural forms used caused criticism. The construction of the building was completed after the death of Architect Kemaleddin and started to be used in 1930 [65;66;67].

Figure 16. *a) Gazi Education Institute [68], b) Gazi Education Institute Side Facade (by author)*

4. EVALUATIONS ON ARCHITECT KEMALEDDIN'S EDUCATIONAL BUILDINGS

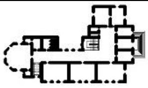
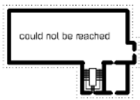
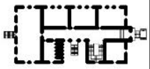
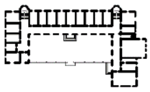
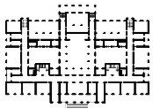
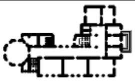
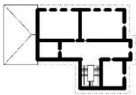
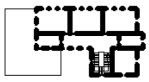
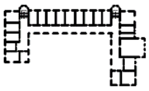
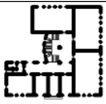
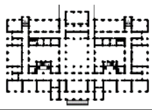
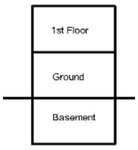
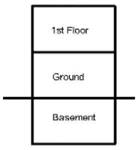
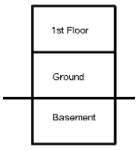
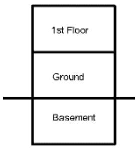
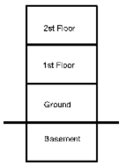
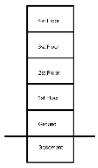
In plan fictions, it is seen that buildings differ according to user needs, location and education system. It is possible to say that it generally adopts symmetrical and functional plan solutions. L, U and Rectangular shaped plan types were frequently used.

Unlike the courtyard and portico plan typology seen in the classical plan typology of madrasahs, a plan structure is seen in which classrooms are arranged around corridors and wet areas are mostly solved in the interior. It is observed that the sizes of private teaching institutions in classical period madrasahs changed in parallel with the importance and size of the madrasah [61]. Similar to this understanding, the fact that the masjid section of the Sultan Abdülhamid-i Evvel Madrasa is higher than the other parts of the building suggests that this is due to the importance given to this place.

When looking at the space organization in educational buildings, service areas such as heating center, toilet, warehouse and laundry are generally located in the basement floor. It can be said that classrooms are located on the ground floor, and administrative units are generally located on the upper floors. They contain side-function spaces such as dining halls and meeting rooms.

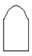
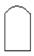
Frequent use of staircased entrances not only helps solve the lighting and ventilation problems of the basements of buildings, but also highlights the entrances and gives them a monumental appearance. Protrusions that refer to the Turkish house have become a frequently used design element and are mostly used to emphasize the entrance. In addition to protrusion, applications in which the mass retracts are also seen. At Gazi Education Institute, the mass was withdrawn and used as a covered terrace. In the original project of Göztepe Primary School, a similar structure is seen as an open terrace. In the original project of Bostancı Primary School, the mass on the upper floor was withdrawn.

Table 1. *Plan Features Table*

Plan Features							
Functions of Structures		**Primary Schools**			**Madrasa**		**Higher Education Institution**
Names of Structures		**Reşadiye Primary School**	**Bostancı Primary School**	**Göztepe Primary School**	**Sultan Abdulhamid-i Evvel Medresesi**	**Medresetül Kuzat**	**Gazi Education Institute**
Floor plans	**Zemin Kat**						
	1.Kat						
plan forms	**U formed**						
	L formed						
	Rectangle						
Number of Floors							

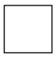
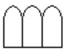
In terms of door shapes, rectangular, flat arched and penci arched door forms were used. Among the structures examined, the rectangular-shaped gatehouse is seen only in the Gazi Education Institute.

Table 2. *Door Specifications Table*

Door Features								
			Primary Schools			**Madrasa**		**Higher Education Institution**
No	**Draw.**	**Descript.**	**Reşadiye Primary School**	**Bostancı Primary School**	**Göztepe Primary School**	**Sultan Abdulhamid-i Evvel Medresesi**	**Medreset ül Kuzat**	**Gazi Education Institute**
1		**Rectangle form**						+
2		**Penci arched form**		+	+	+	+	
3		**Flat-arched form**	+		+	+		

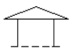
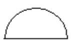
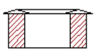
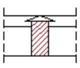
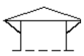
In window setup, the use of different types of windows on the ground floor and first floor is a common feature of educational buildings. The use of twin and triple windows is seen. The frequent use of rectangular and pentacle arched windows is one of the most characteristic features of educational buildings. Square shaped windows are found in Gazi Education Institute and Sultan Abdulhamid-i Evvel Madrasa. The use of twin and triple windows is also seen.

Table 3. *Window Features Table*

Window Features								
			Primary Schools			Madrasa		Higher Education Institution
No	Draw.	Descript.	Reşadiye Primary School	Bostancı Primary School	Göztepe Primary School	Sultan Abdulhamid-i Evvel Medresesi	Medreset ül Kuzat	Gazi Education Institute
1		Rectangle form	+	+	+	+	+	+
2		Pointed arch form						+
3		Penci arched form	+	+	+	+	+	
4		Square form				+		+
5		Basement window			+	+	+	+
6		Twin window	+		+			
7		Triplet window	+		+	+	+	

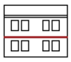
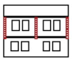
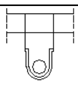
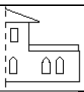
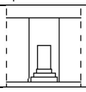
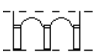
Roof features, it is seen that the roofs of the educational buildings evaluated have wide eaves resembling a Turkish house. The wooden hipped roof is covered with tile cover. In addition, there are examples where the dome is used. Unlike the dome of the Gazi Education Institute, which was designed as an observatory, an onion-shaped dome was used in Reşadiye School. It is seen that the cantilevers that emphasize the entrance in Bostancı, Göztepe and Reşadiye Schools also extend upwards on the facade. At the Gazi Education Institute, there is also a massive overflow on the entrance and rear facades. Iron buttresses supporting wide eaves were used in the original projects of Göztepe, Sultan Abdulhamid-i Evvel Madrasa and Medresetül Kuzat buildings.

Table 4. *Roof Specifications Table*

Roof Features								
			Primary Schools			Madrasa		Higher Education Institution
No	Draw.	Descript.	Reşadiye Primary School	Bostancı Primary School	Göztepe Primary School	Sultan Abdulhamid-i Evvel Medresesi	Medreset ül Kuzat	Gazi Education Institute
1		Wide eaves	+	+	+	+	+	+
2		Dome	+					+
3		Corner Tower				+		
4		Upper	+	+	+	+		+
5		Buttress			+	+	+	

From its ornamental features, it is noteworthy that there is a concern for form on the facades. It shows the characteristics of the First National Architecture period with its window and door types with continuous moldings, porticoes, rosettes, Rumi decorations and reliefs. It is noteworthy that the panels that divide the facade vertically are frequently used in the first floor facade setup. The floor molding element that divides the facade horizontally is frequently used. In buildings other than the Gazi Education Institute, the moldings on the windows were characteristic features that emphasized the facade structure. In addition, the star and crescent motif on the upper part of the low arched door in Bostancı İbrahim Paşa Primary School has an imaginary meaning [69].

Table 5. *Decoration and Facade Features Table*

Decoration and Facade Features								
			Primary Schools			Madrasa		Higher Education Institution
No	**Draw.**	**Descript.**	**Reşadiye Primary School**	**Bostancı Primary School**	**Göztepe Primary School**	**Sultan Abdulhamid-i Evvel Medresesi**	**Medreset ül Kuzat**	**Gazi Education Institute**
1		**Belt Course**	+	+	+	+	+	
2		**Panel**	+	+	+	+	+	+
3		**Window Sill**	+	+	+	+	+	
4		**Rosette**				+	+	
5		**Inverted drop**				+	+	
6		**Floral ornamentation**				+		+
7		**Terrace**			+			+
8		**Staircase entrance**	+	+	+	+	+	+
9		**Arcade**						+

As a result of the evaluations, it is seen that in the educational buildings built by Architect Kemaleddi, the plan structures also changed as the model of the education system changed. However, Architect Kemaleddi used architectural forms and elements belonging to the National School of Architecture on the facades of his buildings with two educational models.

5. CONCLUSION

II in the Ottoman Empire. Many buildings were designed in the National Architecture style, which started during the Constitutional Monarchy period and to ensure national unity in Turkish Architecture. In this period, Architect Kemaleddin has an important place as the pioneers of this style. Architect Kemaleddin Bey created educational buildings that constitute a large part of his work, especially during the years he worked at the Ministry of Foundations. Architect Kemaleddin worked as an architect in an environment where Neo-Classical examples were seen in Europe under the influence of Nationalism, where there were many new design questions and there was concern about establishing a new style. He contributed to the design of many educational buildings in these years when the architect education program changed and modernized. It has been observed that the plans in educational buildings are mostly designed as introverted structures. The possibility that changes in the madrasah education program may be effective in the occurrence of this situation in madrasah structures should be taken into consideration. A rational setup has been adopted, including side-functional spaces such as meeting rooms.

Symmetrical fiction, which is frequently seen in plan layout, is also considered important for the facade layout. The entrance to educational buildings is generally provided from the middle symmetrical axis, but there are also examples of projects with side entrance, as in Göztepe Primary School, or from the corner, as in Gedikpaşa. It is seen that the facade design is designed in vertical and horizontal parts and a rhythmic order is often included. Particularly the use of molded penci-arch windows, floor moldings continuing throughout the building, wide eaves roof form and overhangs that generally emphasize the entrance are the characteristic features of the facade structures. Generally, the front facade of the buildings is more decorated than the other facades and emphasizes the cantilevered building entrance created in the middle section. Pointed and flat arched windows were frequently used on the facades of educational buildings. Window forms differ between the ground floor and upper floors. Roofs generally have wide eaves and are covered with tiles, as in Turkish houses. The staircase and central entrances, marble columns, and symmetrical layouts in the facade layout can be seen as traces of the architect's western-based academic background. Arched window and door forms, the use of domes and wide eaves covering systems, and the inclusion of ornamental elements are elements that reflect the intricacies of Turkish art.

When the structures examined are evaluated within the historical process, the Reşadiye School, İbrahim Paşa Primary School, Göztepe Primary School, Sultan Abdülhamid-i Evvel Madrasa were built in the last periods of the Ottoman Empire. These structures were built using masonry construction system using brick material. In the following years, Gazi Education Institute, built in 1927, was built of reinforced concrete. In addition, Gazi Education Institute, unlike the other buildings evaluated, has stone cladding on its exterior. It is seen that different construction technologies were used throughout the historical process.
As a result, in line with the evaluations made, it is seen that there are differences in the plans of educational buildings such as School, Institute and Madrasa designed by Architect Kemaleddin in line with the needs of the period. However, it is seen that these buildings were designed with similar facade layouts, with traces and influences of the 1st National School of Architecture. In this context, it can be deduced that the influence of the 1st national architectural movement was more effective in the facade constructions of Mimar Kemaleddin's buildings, and that he designed the spaces with a modern approach in the plan constructions. It can be thought that when Architect Kemaleddin needed to design a building with a very different function, the plan layout would change according to the need, but the facade layout would be designed with a similar facade setup from the National architectural school.

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PART B: ART, HUMANITIES, DESIGN AND PLANNING

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Investigating The Effects of Using Artificial Intelligence in The Conceptual Design Phase of the Industrial Design Process

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Abstract

This article offers a perspective on the use of artificial intelligence software as an auxiliary tool in the design process and the positive and negative effects of its application. For this purpose, the potential of the MidJourney tool based on artificial intelligence to support creativity and motivation in the product design process was tested with design students. In the workshop with design students, it was determined that artificial intelligence can support the creative thinking process in terms of form and aesthetics by creating the outlines of design concepts and supporting the creative thinking process in terms of form and aesthetics and can also contribute positively to the student's time management. As a result of the analysis and interpretation of the workshop, positive results were obtained, like other studies that refute the existing negative prejudice against artificial intelligence. However, it is understood that there is a need to explain to the students how such platforms should be used and that the current concerns should be eliminated by raising students' awareness about the future of artificial intelligence. On the one hand, it will negatively affect unconscious student profiles or people who are accustomed to the ready-made design process and their creativity.

1. INTRODUCTION

Product design has been labelled with different definitions throughout its history, new definitions are emerging today [28, 64]. After the Industrial Revolution, many different design approaches have been developed, and the product design process has moved to a new dimension with the more effective use of productive design [60]. In this process, it has been observed that by creating design alternatives, designers increase their creativity and save time. Generative design facilitated by algorithms, enables the generation of multiple product designs. This capability has been the subject of extensive discussion in numerous articles (Figure 1). Generative design can be used very effectively in the design process [3, 55]. However, in addition to creativity, the designer's knowledge and instincts are also very important in the design process [3, 60].

Studies aiming to reflect the brand identity in different product ranges have been carried out. For example, McCormack, Çağan, and Vogel [42] conducted studies on Buick vehicles; Pugliese and Çağan [48] on Harley motorcycles; and McKay, Ang, Chau, and Pennington [43] on Coca-Cola bottles. In addition, Alcaide Marzal et al. [3] conducted studies using generative design on different products such as office chairs, rings, and coffee machine wheels. As illustrated in Figure 1, the application of algorithmic rules has led to the development of initial product designs or the creation of diverse designs through the amalgamation of features from various products [3].

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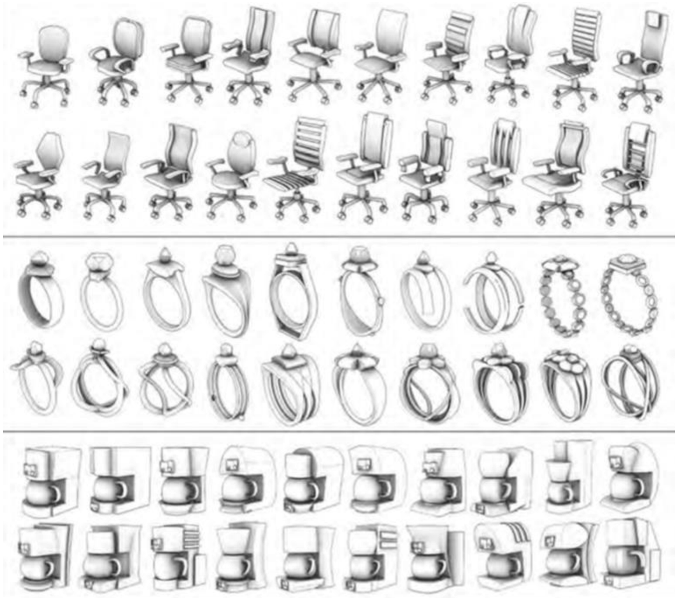

Figure 1: *Productive design solutions for office chairs, rings, and coffee machines [3].*

Research on machine learning has increased over time and a new method has been created in the design process [8]. Machine learning is defined by Şapçı and Bektaş [58] as "Machine learning, which is one of the sub-headings of artificial intelligence developed to perceive, learn and imitate human intelligence, is defined as the process used to program artificial intelligence algorithms in the form of continuous learning and to enable these algorithms to make informed decisions according to what they learn from these data by separating the data." [58]. Among the programs implemented with machine learning are systems capable of editing photographs, and software trained on diverse visuals and models to generate a model specific to a particular word (Figure 2) [14, 61].

Figure 2: *3D modelling of a chair inspired by four different 3D options (cyan) from a photograph. New models (yellow) are created as geometric variations of the candidates to match the target product in the photo while maintaining the 3D structure of the options [61].*

Machine learning-based artificial intelligence studies are not limited to product design. They can be applied in graphic design, fashion, interior architecture, architecture, art, and many other fields. Especially since 2021, many platforms with text-to-image features have emerged. Applications such as Dall-E 2, MidJourney and Stable Diffusion, which can be accessed via internet browsers, are among these applications. These online systems, using data trained by machine learning, allow users to edit images generated by the system with the words or sentences they type. These features are used by designers in many fields such as design, graphics, fashion, and architecture. In a study conducted in the field of graphics, users of the preferred artificial intelligence-based application showed that they were twice as creative compared to non-users [40]. Recently, the clothing brand Koton launched its clothing collection designed with MidJourney [66].

The process of product design, from the students' perspective, has a certain modus operandi. After the project topics are determined, the initial step involves consulting Pinterest and similar channels. By analysing various images on these channels, existing and conceptual products are researched, and boards are created. Afterwards, students put their findings into words and sketches. However, the choice of words may not be compatible with the sketches. In this case, problems such as the inability to express ideas correctly and the inability to manage time correctly on the way to inspiration and synthesis may be encountered [59]. This article examines the experiences of artificial intelligence in students' design education processes.

Within the scope of this study, a long-term workshop was conducted with third-year Industrial Design students. A mixed-method approach was utilized to examine the effects of artificial intelligence usage on the design process [16, 27, 39]. Data were analysed using thematic analysis and the Analytical Hierarchy Process (AHP). Thematic analysis involved coding the qualitative data obtained from semi-structured interviews and associating it with conceptual themes [11, 12]. The AHP analysis facilitated the acquisition of quantitative data through the decision-making and prioritization processes in complex systems. Consequently, it enabled the calculation of the weights for criteria such as motivation, creativity, and time management in the Likert-scale questionnaires administered to the students [29, 45, 52].

1.1. Creativity, Association, Analogy, and Fixation in the Design Process

Design activity is a problem-solving process that aims to transform existing conditions into desired conditions. The process aims to produce new knowledge by utilising existing knowledge [5, 54]. The design process progresses with studies that are not within a rigid framework [26]. The process starts with the analysis of the problem arising from a need and continues with conceptual, concrete, and detailed design stages [28, 37, 46, 63]. In this process, auxiliary tools such as hand drawing, sketch models, and computer-aided modelling can be used [64].

The creative process includes cognitive and sensory activities such as perception, thinking, learning, motivation, and communication [23]. Amabile [4] argues that individual creativity has three main components: expertise, creative thinking skills, and motivation (Figure 3).

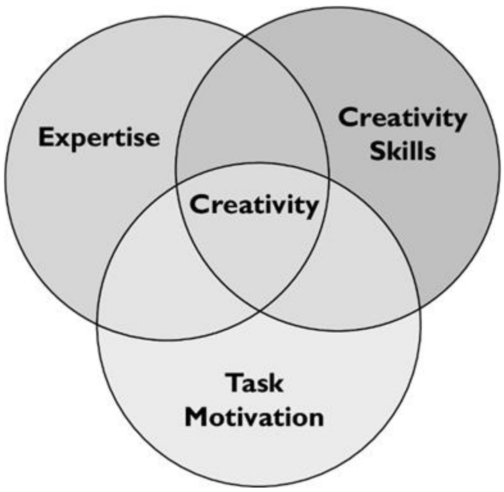

Figure 3: *Components of Creativity [4].*

The creative design process requires a high level of creativity and involves the use of various methods to encourage creativity [9]. Methods such as combination, mutation, analogy, and basic principles can be used to achieve creative design. According to this model, the designer can develop creative design by using combination, mutation, analogy, or basic principles methods to create appropriate forms by combining the features of existing designs in a synthesis (Figure 4) [17].

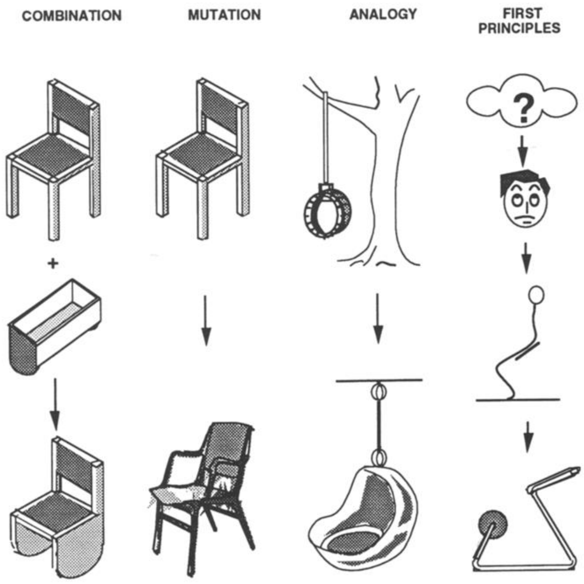

Figure 4: *Illustration of combination, mutation, analogy, and basic principles [51].*

Associations connect emotional and conceptual representations from experience [59]. According to the research conducted by Bar et al. for example, the sound of a train can activate the related image and help develop thoughts [7]. The association process proposed by Bar consists of three main items: associations, analogies, and predictions. Firstly, 'associations' are formed by storing repetitive models in the individual's memory. Secondly, with 'analogy', similarities between the information in memory and the new information are sought and questioned with the question, 'What does the new information look like in memory?

It can be difficult to think beyond the current use of objects [49], and this can lead to fixation [20]. Fixation refers to the fact that individuals get stuck on the same information during the idea generation phase, and this leads to the emergence of unoriginal ideas. This can also lead to biased judgements by design evaluators [10]. Design educators and professionals often have difficulty with early commitment to design solutions and deviation from similar designs [49]. Research has shown that providing a wide range of examples can lead to more original solutions than limited and unoriginal solutions due to fixation [2].

1.2. Examples of the Uses of Artificial Intelligence

With the development of technology, computer-aided studies have become a supportive tool in art, design, architecture, law, and other fields [53]. However, Sezer [53] argues that while technology serves as a tool, human creativity and diverse perspectives are paramount. In the literature, there are studies about the use of artificial intelligence in fields, such as architecture, interior architecture, graphic design, visual arts, fashion, and product design. For example, Chaillou thinks that artificial intelligence is an opportunity for architecture and achieves rich results by addressing the blind spots of the discipline [13]. Many similar artificial intelligence applications are used in the field of interior architecture. Platforms such as Interior AI, Room GPT, AI Room Planner, Visualize AI, and Spacely AI transform the space photos uploaded by users into their preferred styles (Scandinavian, Art Deco, modern, etc.).

In his study titled "Is MidJourney-AI the New Anti-Hero of Architectural Imagination and Creativity?" published in 2023, Radhakrishnan aims to reveal whether technologies such as artificial intelligence are beneficial or harmful. Radhakrishnan suggests that channels such as MidJourney are not inherently detrimental to the field of architecture but could potentially become so if they are misused or their influence is not properly managed. Citing Panicker [47] to support his argument, Radhakrishnan suggests that MidJourney can be useful for architecture students who struggle to visualise possibilities and need creative support. In conclusion, Radhakrishnan [50] tools outside of teaching still require personal interpretation and do not automate creativity now or in the future.

Artificial intelligence accelerates graphic design processes, increasing design efficiency and reducing costs–[21]. In addition, it is also used in different areas, such as logo-making, web design, news illustration, and photo editing [33]. For example, Opal is an algorithm for creating multiple images from texts for news illustrations. It analyses the given articles or texts and presents visuals. In the study, it was found that Opal users produced twice as many usable results as non-users [40].

Software in the fields of visual arts and fashion is used in many different fields, such as the production, analysis, and restoration of artefacts [62]. The artificial intelligence application called FashionQ provides creative designs by combining different styles and encouraging the creative processes of fashion designers. The application was tested by 10 fashion designers and was found to support their creative processes as it encourages different thinking [32].

1.2.1 Generative Design and Artificial Intelligence in Product Design

The origins of generative design date back to the 1970s. The initial aim of generative design was to focus on the solution of complex structures, and with the advances made, it has developed to create design alternatives, develop options, and facilitate design research [6, 55]. In this process, alternatives emerge that cannot be achieved through traditional design methods. These ~~are~~ alternatives include;

- Reduced weight
- Sustained or improved performance
- Reducing development time
- Increased creativity
- Increased efficiency
- Customised product development [44].

There are products designed and manufactured using a generative design approach. In 2019, a chair designed by Philippe Starck in collaboration with Autodesk is among these products. In this chair design, the relationship between design and artificial intelligence was analysed. Similarly, programs such as SolidWorks Simulation, xDesign, CATIA, Siemens NX, and Autodesk Fusion were used for other chair designs [60].

As stated by Stones and Cassidy [56], digital design helps designers complement their skills by offering solutions beyond their imaginable limits. Instead of replacing the designer, the computer helps the designer develop his or her ideas by offering a wider perspective on the design process. Alcaide et al. [3] argue that generative design should be viewed as a design object, not as a design tool. Generative design can be used as a system that can support designers in finding the most appropriate structure [3].

1.2.2. Examples of Artificial Intelligence Studies in Product Design

In the literature, there are artificial intelligence-based human-computer studies in which creativity-supporting tools are used in the design process [40]. Suh et al. [57] believe that content produced with the help of artificial intelligence can facilitate collaborative groups to meet on common ground. It is argued that creativity is invoked in the design and modelling process, and the user should be the source of inspiration [14]. While the source of inspiration comes from pure imagination, it can often be a variation and composition of one or more existing models [14, 22, 34, 38]. Chaudhuri and Koltun [14] carried out a study in which designers can get different suggestions or ask for uncontrolled suggestions to improve their initial rough models through the Inspire Me software. This study enables a prototype to be created by visually emulating and then refined with a high-level 3D modelling package (Figure 5) [14].

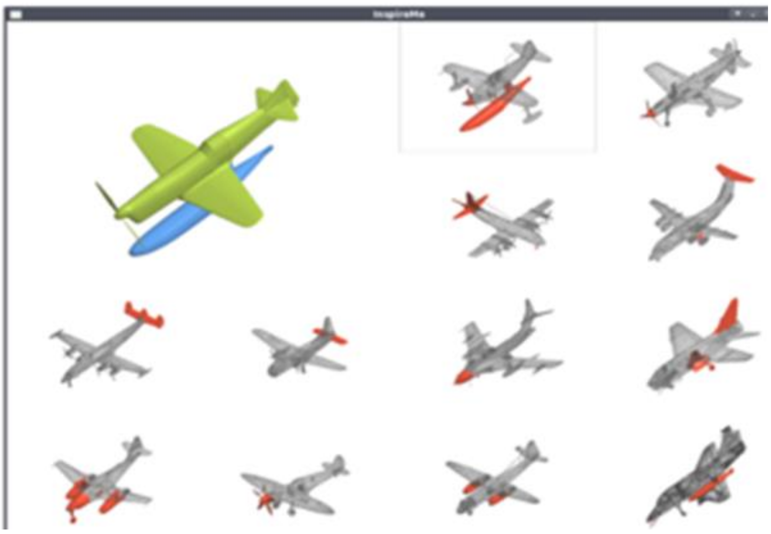

Figure 5: *The Inspire Me interface displays a query form (in green) and corresponding suggestions (in red). Once a suggestion is selected, it is added to the model (in blue) [14].*

Within the scope of the Inspire Me project, designers are asked to design futuristic military aircraft and creatures for science fiction films. As shown in Figure 6, after the concept of the project was explained in detail, the designers realised the designs using Maya, 3Ds Max, or ZBrush programmes.

Figure 6: *The models designed for the aircraft (top) and creature (bottom) tasks, created by the designers. The initial query shape (top row), the model created with Inspire Me (middle row), and the final textured model created from the model (bottom row) are shown for each model. All new components are derived from data-driven suggestions [14].*

The time required for the completion of the design depends on the decisions of the designers. At the end of the research, the designers expressed their satisfaction with the application and stated that they could use such a tool in the conceptual design phase (Figure 7) [14].

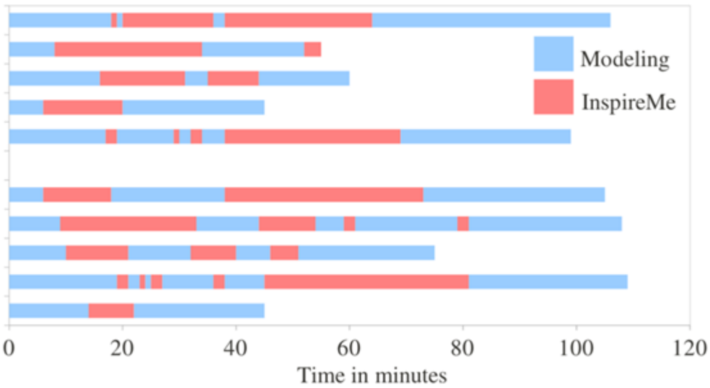

Figure 7: *A comparison of the duration of activities in Modeling Programs (blue) and Inspire Me (red) during the process of model creation [14].*

Xu et al. [61] present an algorithm that guides the creative process inspired by a user-selected photograph. This algorithm works with 3D candidate models to generate new 3D models (Figure 8).

Figure 8: *Matrix of creations inspired by photographs (rows: 3D model candidates; columns: photographic inspirations) [61].*

The input of the system comprises a photograph of the target object, which contains components of the 3D candidate models previously analysed within the program. This uploaded photo is then matched with the 3D models to generate several variations of them.

Hyun and Lee [30] tested alternative design methods with four automotive designers through an application created with the help of artificial intelligence to help make efficient design decisions. The results of the applied questionnaire revealed that the designers using the methodology proposed by Hyun and Lee showed a significant difference compared to the others. This methodology helped to generate new design alternatives and helped to create the proposed designs by allowing a large number of changes and saving time.

Autodesk researchers integrated 3DALL E software into Autodesk Fusion360 in 2022 to test it with designers. The results showed that presenting the text-to-image concept as a 3D model helps to explore the design process. The system has the advantages of facilitating collaboration, providing inspiration, and fully exploring the design process. Moreover, the user-friendly interface, similar to search tools such as Google Images, provided a faster and more efficient research process [41].

2. METHOD

A mixed-methods approach was used to examine the effects of using artificial intelligence in the design process. Mixed-methods research involves analysing and interpreting qualitative and quantitative data in a study [16, 27, 39]. This approach allows research questions to be analysed from different perspectives [16]. The workshop included non-participant observation, survey research, and semi-structured interviews. Since the study was a long-term workshop, third-year students currently studying in the department were selected. Care was taken to ensure the accuracy of the participants and to avoid time constraints, and six volunteer participants from the Yeditepe University Department of Industrial Design who were in their third year were selected.

Thematic Analysis and Analytic Hierarchy Process (AHP) were used to analyse the data. AHP helps to quantify design alternatives and criteria and is used in the literature as a decision-making and prioritisation tool for complex systems [29, 45, 52]. Thematic analysis is a qualitative method used to identify meaningful themes and relate them to conceptual issues [11]. Systematic coding of qualitative data provides support for qualitative research that can be associated with clusters and then broader conceptual themes by analysing the codes [12].

The reliability of thematic analysis can be measured using various methods. Hayes and Krippendorff [25] suggest Krippendorff's Alpha, called KALPHA. The KALPHA macro is a tool used in SPSS software that produces a reliability test that does not negatively affect reliability and can be applied with at least 2 raters [36]. Through this macro, the results of the coders are entered into the system, and the reliability test result is obtained. The KALPHA macro argues that results above .800 have high reliability and results between .667 and .800 have low reliability [35].

2.1 Workshop

The skill levels of the participants in the traditional and AI-assisted design processes were determined by a survey conducted at the beginning and end of the workshop. The questionnaire included seven criteria: proper time management, creativity, concept development, knowledge of form and aesthetics, transforming ideas into products, fixation, and motivation. The students scored the questionnaire between 0-5, considering the process they went through in their designs. The workshop was conducted in 2 separate groups: experimental and control groups, with four sessions of 45 minutes each. Participants were randomly assigned to these 2 groups, the experimental group utilised artificial intelligence in the design process, while the control group followed the traditional design process. In each session, the experimental and control groups were switched to ensure that the participants received an equal amount of AI assistance. In the sessions, participants were tasked with creating a conceptual coffee machine design for four different brands: De'Longhi, Apple, IKEA, and Bang&Olufsen respectively.

Semi-structured Interview Questions

1- Can you describe your design process through screen recordings and your works respectively?
2- At which stages of your design process did you use artificial intelligence?
3- What was different from your usual design process?
4- Did artificial intelligence contribute to your creative process? How would you evaluate this issue? Did it inspire you, or did it lead to a fixation on the results?
5- Did artificial intelligence help you generate ideas or your design approach? If so, in what way?
6- How do you think you would get results if you did not use artificial intelligence?
7- Can artificial intelligence be used in design processes?
8- How does it affect students?

2.2. Investigation of the MidJourney System as an Auxiliary Tool for the Conceptual Product Design Process

MidJourney, an artificial intelligence software, enables the creation of variations of visuals through text.

The impact of the MidJourney platform on art, fashion, and graphic design has been investigated. It has been observed that the platform can help fashion designers in the process of creating initial ideas and can significantly speed up the process. In the field of art, it has been argued that it motivates the designer more in his or her work and supports creativity. It was also mentioned that it encourages creativity in graphic design and develops more alternatives by utilising the power of artificial intelligence [18, 24, 65].

MidJourney, which incorporates many different features, can produce the user's drawing, rendering images, or 3D visuals with typed words. The application generates four different alternatives according to the typed text. The user can choose to recreate or save and enlarge the image of his or her choice among these alternatives (Figure 9).

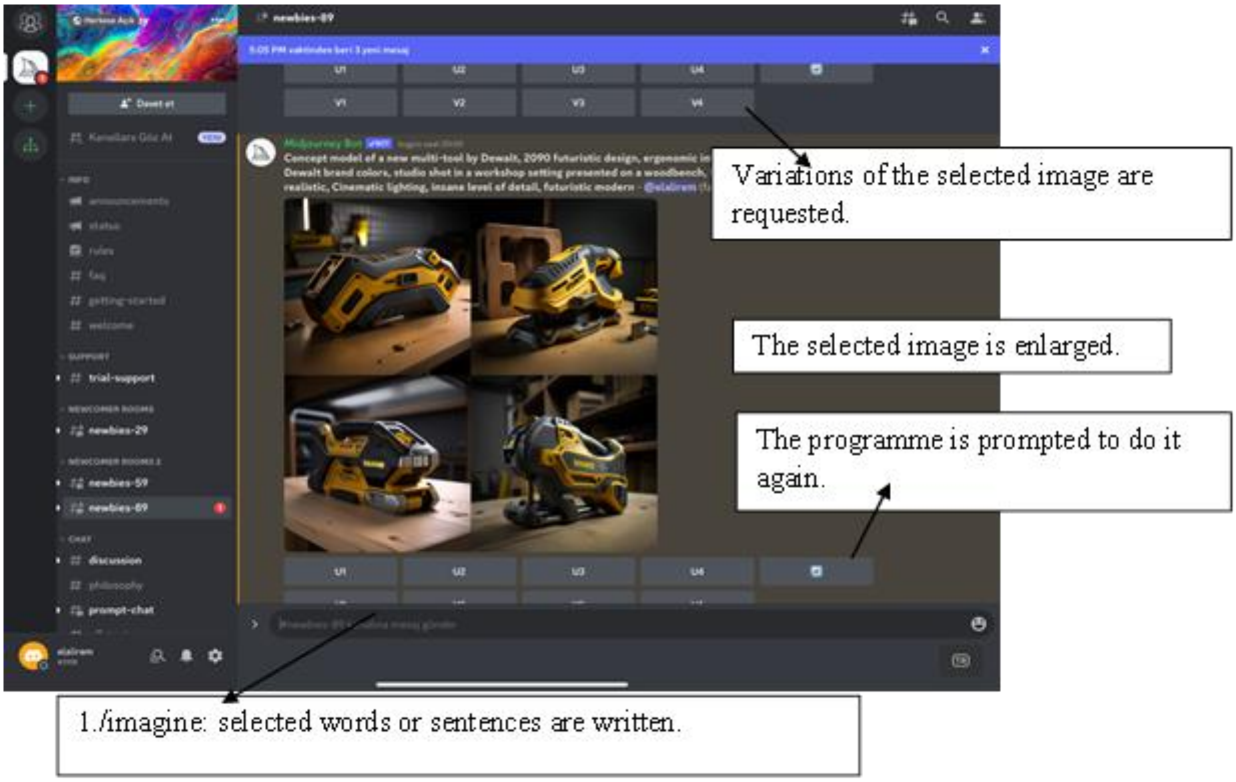

Figure 9: *Interface screenshot of the MidJourney platform (MidJourney).*

In addition to the feature of creating text-specific images, the platform has many features such as editing the uploaded photographs with the typed words (Figure 10), stylising the images, and adjusting the quality and size of the output. In the student studies, 'blend, describe and upload images' features were used.

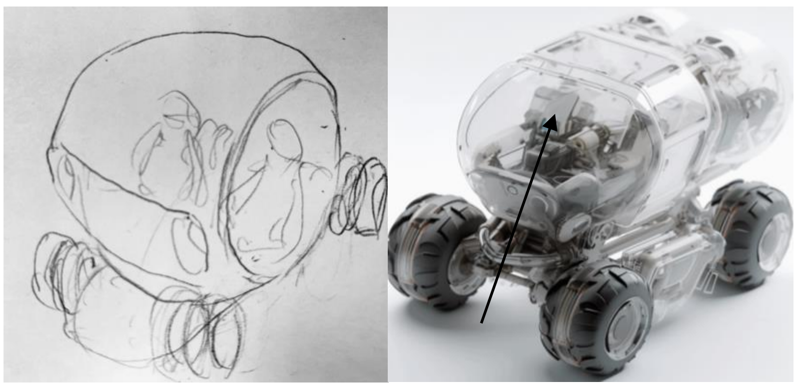

Figure 10: *Recreating the sketch image uploaded to the MidJourney application with typed words (MidJourney).*

As shown in Figure 11, 4 different variations can be created by blending 2 different images using the 'blend' feature.

Figure 11: *MidJourney, creating new coffee machines from Saeco and Nespresso coffee machines using the 'blend' feature (MidJourney).*

3. FINDINGS

3.1. Workshop Outputs

The analysis of the questionnaire data collected from both the control and experimental groups shows a significant improvement, especially in terms of motivation. While the motivation criterion was given scores between 1 and 3 in traditional design processes, the answers for the design phase with AI resulted in scores of 4 or 5. We will examine the outputs of 2 students, which were analysed by reviewing screen recordings to illustrate the paths followed by the participants during the workshop. The first example is the concept design of a coffee machine created by participant A for IKEA. To understand the design identity, the student first visited IKEA's website and analysed the company's products. This led to the creation of the first image in AI. Then, he asked ChatGPT to explain IKEA's design style and created the second output by using the resulting keywords in the MidJourney application (Figure 12).

Figure 12: *Design phases of participant A for IKEA concept coffee machine on the MidJourney platform.*

1- Prompt for image 1: Ikea espresso machine.
2- Prompt for image 2: Espresso machine simple, functional, minimalist, Scandinavian, influence, innovative, democratic design made Ikea.
3- The 3rd image is a variation of the one on the top right in the 2nd image.

ChatGPT was asked, "If Ikea produced a coffee machine, what would they pay attention to? What kind of design language would it use? Which colours would it use?" and created the prompt of the 4th visual in line with the answers received.

Prompt of the 4th image: Espresso machine simple, functional, minimalist, Scandinavian, influence, innovative, democratic design made Ikea, add natural material like wood and space efficiency

Finally, it reached its goal for the final design by creating variations of the upper left from the 4th output (Figure 13).

Figure 13: *Final design by participant A for the IKEA concept coffee machine*.

Our second example is the work of participant, C who designs for Bang & Olufsen. The participant initially visited the brand's website, analysed its products, and researched the design identity and the target audience. Then, using artificial intelligence, he added one of the sites where the user segment of the brand lives to his keywords (Figure 14).

Figure 14: *The first four design phases of participant C for the Bang&Olufsen concept coffee machine on the MidJourney platform.*

1. Prompt for the 1st image: bang olufsen, luxury, house in çubuklu vadi house, bang olufsen coffee machine
2. Prompt for image 2: Bang olufsen coffee machine, luxury, rich
3. The 3rd image is the result of the variation of the bottom left one in the 2nd image.
4. Image 4 is the result of the variation of the upper left in image 2.

Figure 15: *Visuals obtained by participant C by applying the 'blend' command to the 3rd and 4th outputs for the Bang&Olufsen concept coffee machine.*

5. The 5th image was obtained by applying the 'blend' command to the 3rd and 4th outputs.

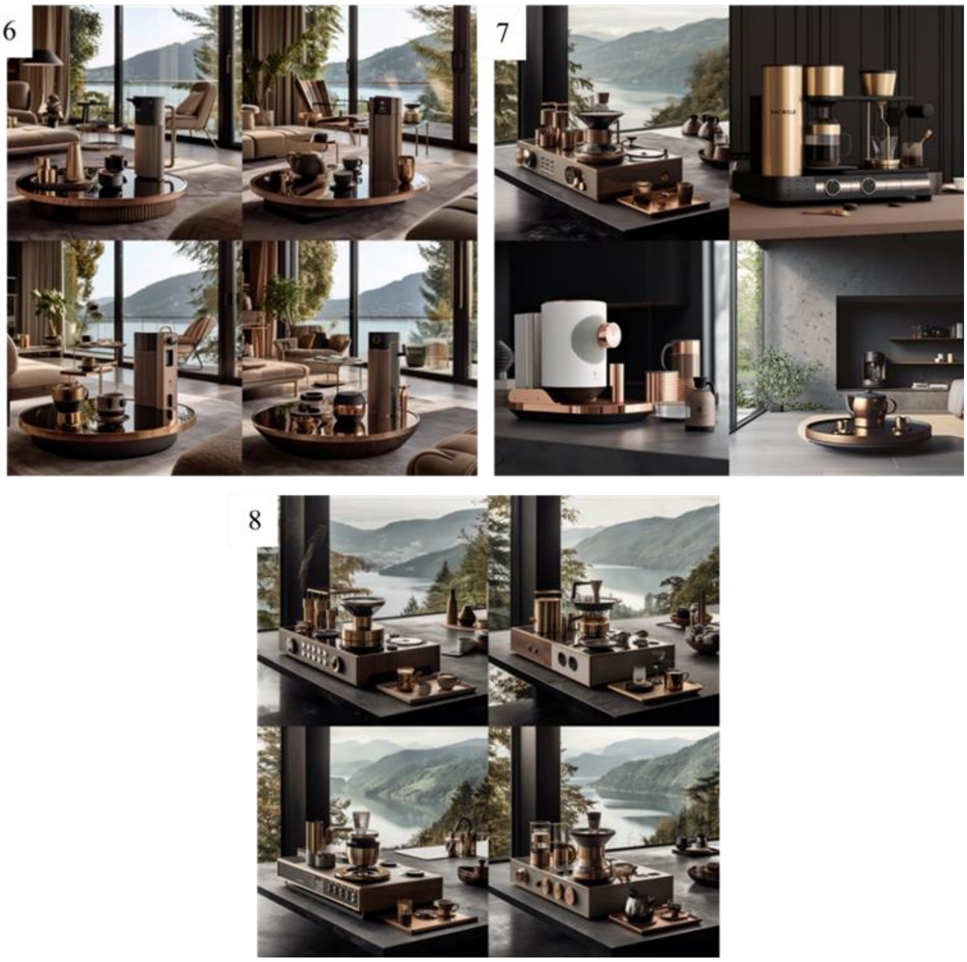

Figure 16: *Steps 6, 7 and 8 of the Bang&Olufsen concept coffee machine design phases of participant C.*

6. The 6th image is the result of the variation of the bottom left output of the 1st image.
7. Prompt for 7th image: bang olufsen, luxury, house in çubuklu vadi house, bang olufsen coffee machine
8. The 8th image is a variation of the upper left output of the 7th image.

3.2. Application of AHP and Thematic Analysis

Weight calculations were made for the criteria in the questionnaire applied to the students. AHP analysis was used as a decision-making and priority-setting tool, and Super Decisions programme was used. In the questionnaire, 6 different criteria were determined: correct time management, creativity, concept development, transforming ideas into products, knowledge of form and aesthetic, and motivation. The weighting criteria of the criteria were calculated as follows;

- Correct Time Management: 0,26116
- Creativity: 0,18417
- Concept Development: 0,06191
- Converting Ideas into Products: 0,09724
- Form and Aesthetic Knowledge: 0,03281
- Motivation: 0,36271

An AHP analysis was performed on the questionnaires completed by the experimental and control groups according to predetermined criteria. The results revealed that the average of the traditional design process scored 2 points and the average of the design process using artificial intelligence scored 4 points. Thus, it was determined that the use of artificial intelligence in the design process led to twice the effectiveness of the traditional method in terms of time management, creativity, concept development, idea implementation, knowledge of form and aesthetics, and motivation criteria. During the workshop, it was observed that artificial intelligence had a positive effect on students' design processes and contributed significantly to their motivation levels.

Thematic analysis was applied to the interviews, and as a result, 128 codes, 5 clusters, and 2 themes were obtained. After the reduction stage following the coding stage, five clusters were determined: Implementation Characteristics, Time Management, Creativity, Motivation, and Awareness. Finally, 2 themes named 'Impact' and 'Use' were identified.

The features of the MidJourney app were part of the "Use" theme, and the cluster of this theme, the "App Features" category, consisted of 38 codes. For example, Providing Various Alternatives, Having More Information About the Brand, Reaching Different Results by Blending...

The 2nd theme is the "Influence" theme. It includes the clusters of Creativity, Motivation, Time Management, and Awareness. Research shows that these clusters are interconnected and play an important role. Darini et al. [19] revealed that there is an important link between creativity and time management. Jackson [31] stated that the correct implementation of time management increases productivity and quality of life. Agnoli et al. [1] also emphasised in their study that motivation and creativity success are interactive.

According to Krippendorff [36], a reliability test requires at least 2 coders, and the output should be clearly presented to them. In this study, the coders were given an Excel file containing 128 codes corresponding to the themes. Both coders are Industrial Design graduates; one of them is an Expert Industrial Designer and the other one is studying for a master’s degree in industrial design abroad. The data were processed using the SPSS programme and a reliability test was obtained using the KALPHA macro with a result of 0.8070, which is considered highly reliable according to Krippendorff [35].

3.3. Interpretation of the Workshop

Users who were not used to using computers were able to adapt to the platform quickly. Users were positively influenced at every stage and were able to focus on the project for a longer period of time. This enabled them to manage their time and develop more efficient ideas. These interactions increased their motivation towards the project [1, 19, 31].

The time spent on Pinterest and similar channels for existing product or brand research, which is the first stage of the design process, was minimised. With the coffee machine images uploaded using the Describe feature, information about the brand's design identity and keywords were obtained. By accessing the image with keywords, time-savings were achieved. In addition, students who were freed during the design process improved their knowledge by getting support from ChatGPT, Google, and Pinterest.

"I didn't know the De'Longhi brand. It took me minutes to do the research that I would normally spend hours on. In the IKEA study, even though I knew it very well, it offered me the keyword that I could not think of." P1.

As a result of the capacity of artificial intelligence, and self-training helped designers gain a wider perspective and increase their creativity by presenting four different visuals. The visuals created with different variations allowed new ideas to be discovered in each new output and the problems in the students' stereotyped ideas to be eliminated. Artificial intelligence increased the motivation of the students, increased their working efficiency, and triggered their desire to produce better work. In addition, thanks to its speed and capacity, artificial intelligence gave students the advantage of conceptualising, making decisions, and reaching the starting point of the project earlier, allowing them to improve in time management and get the opportunity to test their thoughts concretely.

"My time has become very short; I spend most of my time on research because I usually think that I will find a way after researching. But since I was able to confirm what they found out with this; I stopped searching on the internet when I realised that there were really completely accurate results that I would have found if I really tried. It saved me a lot of time." P1

"I'm a very demoralised person; if I can't do something I'm thinking about or if I get stuck on an idea, I try to run away from the project. However, the fact that the visuals were of such high quality and reflected what was on my mind motivated me a lot. Maybe I realised that I could work more continuously when I got up from the table in half an hour." P6

The quality and realism of the visuals were used as an aesthetically effective tool. The students not only looked at the form and shape of the products but also interpreted their outputs, enabling them to gain ideas about their functions and properties. These gained ideas enabled them to make progress in their design process by using the 'blend' feature and manipulating the images they found appropriate to achieve different results. They also realised that they could use these features on images they obtained from other platforms or on their drawings. In this manner, they expressed that these features can assist them when they encounter difficulties in advancing their ideas, and they can also utilize them for presentation purposes.

The students likened the platform they used to the support of their lecturers, who provide counselling in their courses. In this way, they realised that they could advance their design processes more easily and accurately. They stated that the ideas offered by the platform were as stimulating as the ideas given by their lecturers and that they were almost like a design coach. In addition, thanks to the flexible use of the platform, students can reach the ideas they have created more quickly and get support.

"Students, especially me, I am a person who progresses with approval; I get approval from my teacher, and then I continue. When I saw the things I had in mind here, it gave me more morale and confidence, especially for the second one. I think it supported me." P1

"I would say he coaches like a teacher. He already presents the thoughts in my head to me before I draw them. We can see it as a second mentor next to the lecturers." P6

"It was so different from my usual design process that I am now trying very hard not to become a member. It opened a very beautiful window for me. Because in a project, lecturers guide you and open your horizons, and I experienced that in MidJourney." P3

"We can call it a coach rather than an auxiliary tool, so it would be unfair if we didn't because the things, they do change your thinking power incredibly." P3

They reported that their steps in the design process improved, and their creativity was further supported by leveraging various platforms and artificial intelligence channels.

"I started with more motivation in my work without artificial intelligence because I included the features in this programme in my process. I thought of myself as artificial intelligence while doing the other design." P1

All this positive feedback improved their stress and time management and enabled them to focus more on the project. It also provided support for the profiles of students who have little drawing skills and cannot reflect their ideas.

"Definitely, it would have been very nice if I had used it during the 14 weeks. Once I write down whatever comes to mind, I am currently making a barbecue that can make pizza pancakes, but I reached the idea of a drum oven in 2 or 3 weeks; if I had used it, I would have reached it earlier. Naturally, it would also help me manage stress. If I had something at hand, I would work better. Our biggest problem, especially for 3rd and 4th grade students, is that we don't have good hand drawing; if we don't have an expression,

we can't explain what is in our minds well, so we can't come up with good things, but if we had this, I would definitely produce very good things." P3

Participants believe that the use of artificial intelligence in the sector is necessary and that it will enable quick product design in emergencies. Regarding design education, students had different views on the use of AI. Some emphasised the importance of learning the design process before using AI output. On the other hand, some students stated that AI outputs do not sufficiently understand the human-product relationship and may cause problems in ergonomics. However, they said that the positive aspects of artificial intelligence will increase for conscious students who know the design process, and, in this way, students can come to the same level and create a competitive environment where intelligence and creativity power are more important.

"I think it can affect the students much better because there will be a competitive environment; this time it will be very different to use the power of intelligence, not by drawing but by hand. Students who do not know how to use those keywords will be eliminated if they cannot provide the right data at the right time. The idea was already important from the very beginning; people who have an idea but cannot draw, who draw but have no idea will be on a more equal level." P6

A negative effect mentioned by one of the participants is that high-quality visuals can sometimes lead to a "got to have it all" mentality. While time and stress management can increase creativity and inspiration, another participant had a lack of self-confidence with the thought that "I cannot do better than this" for the results they obtained with artificial intelligence, causing them to worry about the future of their profession and professional competence.

4. CONCLUSION

In this article, is aimed at investigating how the increase the number of artificial intelligence users and platforms that create visuals from text in a short time will affect the designs of industrial design students in the conceptual design phase and their criteria, such as creativity and motivation. In the workshop conducted with the students, it was seen that artificial intelligence increases inspiration and creativity [3, 14, 22, 30, 34, 38, 55, 56], which are related to each other [1, 20, 31] as in the studies on creativity in the design process, productive design, and various artificial intelligence platforms in the literature. In particular, it has prevented the problem of not being able to manage time [59] on the way to synthesis with fixation and inspiration that students experience in the traditional design process. Because, as Agogué et al. [2] mentioned, providing too many examples prevents fixation, and the MidJourney platform, with the infinite alternatives it offers, prevents fixation, and supports them to reach unique solutions. In the study, with the AHP analysis, it was concluded that the use of artificial intelligence is two times higher in time management, creativity, form and aesthetic knowledge, concept development, transforming ideas into products, and motivation criteria compared to the traditional design process. As in the literature, it has been observed that the efficiency of the results obtained with the use of artificial intelligence is related to the knowledge and instinct of the user and varies [3, 60]. Because in the first stage of the design process, which is the concept creation and development step, it has been determined that it provides more motivation and creativity to conscious students who have internalised the design process and know how to interpret and use the outputs instead of using them directly. Like generative design, it has enabled the designer to explore wider solutions by complementing the designer's skills without experiencing fixation [56]. Because, as in the literature [32] the combination of different inputs for the discovery of new ideas with artificial intelligence has supported the designer in the adventure of creating innovative and creative ideas. At the same time, Radhakrishnan's study supports the conclusion that artificial intelligence can help students who have difficulty in visualisation and need creativity support but can have negative effects with unconscious use [50]. To increase the accuracy of the results, the mixed method was used as an analysis. Qualitative and quantitative data were obtained, and thematic analysis was applied in addition to AHP. The thematic analysis of the semi-structured interviews and the monitoring of the screen recordings showed that the feature of the software to obtain fast and aesthetic results caused some students to accept the first result and not develop their ideas and that unconscious use of artificial intelligence or students who have not yet internalised the design process may have negative effects on students. At the same time, the quality of the of the visuals created anxiety in the students about their professional competence. Therefore, it is thought that a new era has started for students with artificial intelligence, and they should be prepared for it. Because in the long run, irrespective of the student profile, the quick and aesthetically pleasing results produced by the software might lead students to become accustomed to the ready-made solutions, potentially hindering their ability to engage in brainstorming and critical thinking as they progress toward becoming designers.

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An Industrial Heritage in Tarsus: Yuvam Brick Factory[1]

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Abstract

Industrial heritage; includes structures, areas, landscapes, ruins, and industrial processes that bear the technical, economic, and social characteristics of the period. All of these are unique elements in the formation of urban identity and local memory. The conservation of industrial heritage, which was discussed in the second half of the 20th century, is a concept whose importance is known, as can be seen from the increasing examples in Turkey. This study aims to evaluate and examine the Yuvam Brick Factory, which is produced in Tarsus, within the scope of industrial heritage. Within the scope of the study method, oral history and archive research and on-site documentation of the structure and area were carried out. The industrial heritage structures in Tarsus and, in this context, the Yuvam Brick Factory campus constitute the material of the study. Tarsus became a settlement that attracted the attention of foreign investors with its railway transportation and port trade in the late 19th century. Thus, the Mersin-Tarsus region became a settlement where factories were established. Industrial structures in the region are important for understanding the industrial and historical development of Tarsus.

Yuvam Brick factory was established in 1974 ended traditional brick manufacturing in 2016 and was demolished after the change of ownership in 2021. With this work done just before its demolition; brick kilns, lodgings, administration building, laboratory, security buildings, warehouse, workshop, machinery, and transformer rooms, award-winning balcony, a registered chimney, and official documents within the campus were identified. Evaluations were made to preserve the remaining units of the factory, other industrial structures in the region, archaeological findings, and traditional cultural heritage elements within the framework of a holistic plan. Thus, urban cultural memory will be maintained, and industrial heritage will be preserved and used by future generations.

1. INTRODUCTION

The Industrial Revolution, which began in the eighteenth century, brought about great changes in many areas of society. Many branches of industry have developed based on the needs arising in production and cities have been shaped with the impact of these developments. However, the factories established after a while could not adapt to the developing and changing technology and became idle in the city centers before the end of the 20th century. The concept of industrial heritage emerged during the discussions on the reuse of these structures [1].

Thanks to its fertile lands and location, the industry became important for Tarsus in the 19th century. Foreign capital owners realized the production potential of Tarsus and established ginning and yarn factories [2]. The development of the textile industry has also created and developed the food manufacturing, electricity generation, machine parts manufacturing, textile, and brick-ceramic production. Buildings or building parts belonging to the Tarsus industry, which develop and change over time, today appear as unused, still operational, or reusing industrial heritage elements in the Tarsus city

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center [3]. One of these industrial heritage areas is the Yuvam Brick Factory campus, which is the subject of this study.

According to the information obtained from the oral interviews, Yuvam Brick Factory, located in Tarsus, was established in 1974, and after the end of its production function in 2016, it became a place where ceramics were produced, flowers were grown and nostalgic tools were collected until 2021. Semi-open areas within the land, a building and warehouse built between 1986-88, two Hoffmann-type brick kilns, two double-decker lodgings built in the 1990s, and a single-story lodging in the orchard, a chimney, a 10-story lodging, there are two 15-year-old safety buildings, a machine room with a workshop and a warehouse, a transformer and a diesel tank room. Since its construction in 1974, there have been occasional collapses in the semi-open areas with eaves due to weather conditions. The balcony of the administrator building received the second and first prizes for the Most Beautiful Balcony in 2004 and 2005, and the Most Beautiful Small Business Garden Award in 2006. After losing their original function, many units on the land were not used and the remaining ones were used for purposes other than their original functions, resulting in damage to the structure. In short, the Yuvam Brick Factory, which is an industrial heritage and needs to be preserved, lost most of itself, especially due to misuse, and then almost completely disappeared (Mümtaz Eyüpoğlu, Eyüphan Eyüpoğlu, personal interview,2019).

It can be said that detailed documentation studies regarding the conservation of industrial buildings in Tarsus are at the very beginning. However, preserving the industrial heritage values of Tarsus is important for the sustainability of the city’s memory. This study will be original in terms of subject and area, as there is only one building in Tarsus (Gözlükule Excavation and Research Center) that is preserved with a new function, and there are very few examples of brick factories in our country that are preserved with a new function within the scope of industrial heritage.

Tarsus Yuvam Brick Factory, which is the subject of the study, shaped the traditional brick production in Tarsus and witnessed the history, culture, and development of Tarsus. Despite the demolition of its structures and the destruction of its machinery and equipment, it is an industrial heritage and the remaining lodging, administrative buildings, and registered chimney structures in the area need to be preserved.

2. METHOD

The material of the research consists of the Yuvam Brick Factory campus located in Yunusoğlu village of Tarsus district of Mersin province. To collect data within the scope of this article, literature research, on-site observation-based detection and oral history study methods were used in 2019. In the literature research, articles, journals, symposiums, papers and different internet sources were used. Local newspapers, books, magazines, and, reports of Tarsus Chamber of Commerce and industry were examined in this context. The city maps which used in the campus analysis was obtained from the Tarsus Municipality. Following the literature study, the current location of the Yuvam Brick Factory was determined through drawings and photographic documentation. Due to the lack of architectural plans, sketches were drawn during the fieldwork with the help of Mümtaz and Eyüphan Eyüboğlu, partners of the factory. Building slips were prepared to be used in field studies to determine the physical and spatial values of the buildings on the campus. Determinations based on on-site observation; Information about the material and structural problems of the building, previous interventions, additions, and their history are included. In the identification and documentation study, the importance and values of the buildings on the campus were investigated.

After understanding the values of the Yuvam Brick Factory in terms of architectural and industrial heritage, suggestions for its conservation are presented. A discussion environment has been created for the preservation of other industrial heritage structures in Tarsus, along with archaeological sites and monumental and civil architectural structures from various periods.

3. THE CONCEPT OF INDUSTRIAL HERITAGE AND THE DEVELOPMENT OF CONSERVATION STUDIES FOR INDUSTRIAL HERITAGE

Industrial heritage; consists of industrial buildings and ruins that carry historical, technological, socio-cultural, architectural, and scientific values. These structures are main buildings where conservation takes place, additional units (warehouse, hangar, etc.) and transportation structures. The abandonment of industrial buildings and areas as a result of production techniques becoming inadequate over time as a result of rapidly developing technology, and the reactions of non-governmental organizations on this issue have initiated the emergence of conservation efforts. Today, with the expansion of the borders of cultural heritage, the term "industrial heritage" has emerged [4].

The industrial revolution is a major stage in human history and is still ongoing. As the Industrial Revolution continued, especially after the Second World War, countries that were devastated first demolished their industrial areas while trying to renew their cities. The first reactions to preserve industrial areas were made after these demolitions by revealing the values of industrial areas [5].

3.1. Industrial Heritage, History, Relevant International Non-Governmental Organizations and Regulations

The first idea to preserve old industrial buildings emerged in Britain. The mining town of Røros, Norway, was added to the UNESCO World Heritage list as an industrial site for the first time in 1980, and the Ironbridge Gorge bridge in Britain was included in 1986. After that; The listing of the Engelsberg iron works in Sweden in 1993 and the Zollverein coal mines in Germany in 1994 added an international dimension to the approach to preserving industrial heritage [6].

TICCIH was established as a result of the meeting held in England in 1973 regarding the preservation of industrial heritage structures [7]. TICClH was established to develop principles and methods for the conservation and evaluation of industrial heritage and to support and implement related research. It is one of the advisory bodies of ICOMOS and is the first international organization established with a focus on industrial heritage [8,9]. In 1999, ERIH was established as an organization that aims to tour industrial heritage buildings and areas in European countries within the scope of various routes in location or production type categories [10,11]. DOCOMOMO, which was founded in 1988, is one of the most well-known organizations that has been active in Turkey since 2002, although its focus is on modern architectural heritage, with a field of work that also includes industrial buildings [12].

As a result of the international meetings held by these non-governmental organizations, various regulations providing definitions and suggestions specific to industrial heritage have been developed. The most well-known of these; is the Nizhny Tagil Regulation published by TICCIH in 2003 for the preservation of industrial heritage. In the regulation, industrial heritage is defined in detail and justifications are presented as to why such structures should be preserved [13]. Another well-known and most recently published regulation; is became the Dublin Principles. Accordingly, industrial heritage is no longer seen as the only structure that needs to be preserved, but as a problem that remains in the city center and needs to be solved or as a value that needs to be preserved. For this reason, the areas where these structures are located, the social fabric that emerges with production, and transportation networks are accepted as industrial landscape areas [8].

The concept of industrial heritage is also a topic in places like our country, where industrialization started later and to a limited extent compared to other countries. Türkiye was introduced to the concept of conservationing old industrial buildings and areas in the 1990s. Turkey has made progress on what needs to be done by signing universal documents on the preservation of cultural heritage, making legal regulations similar to European countries, and establishing authorized and responsible organizations [14].

4. TARSUS AND INDUSTRIAL HERITAGE

4.1. Historical Development, Geographical Location, Climate and Economic Situation of Tarsus

Tarsus is the largest district of Mersin province, located in the Mediterranean region of southern Turkey (Figure 1).

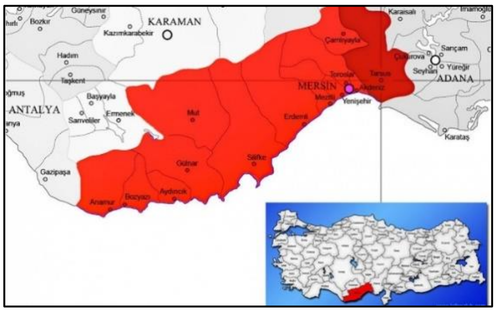

Figure 1. *Tarsus Study Area 2020 Google Map Image [15]*

Tarsus, which was founded approximately 8,000 years ago with the excavations carried out in Gözlükule Mound, is located in Çukurova and is on the migration and trade routes, which is the most important factor in why it was chosen as a settlement by different cultures in different periods. Adana is on the east side of the district, Niğde is on the north, Mersin is on the west, and Akdeniz is on the south. Tarsus was founded on the plain of the Berdan River. There are plains in the south of the district and the steep Taurus Mountains in the north. The Mediterranean climate generally prevails in the region [16].

The production of almost all kinds of products in Çukurova, which has fertile lands, and the abundance of raw materials have been the most important factors in the development of the industry in Çukurova. In the second half of the 1800s, foreign capitals realized the potential of the region and put ginning factories into operation. The first ginning factory in Tarsus was established in 1864. The first transition from ginning factories to spinning mills occurred in 1887 with the opening of the Mavromati and Şürekası Thread Factory. In 1920, the first canning factory in the region was opened in Tarsus and the industry began to develop further in Tarsus. The first electrical energy in Turkey started to be produced in Tarsus on September 15, 1902 [17]. When we look at the Adana yearbook, it is stated that there were 9 inns, 11 mills, 23 kilns, 50 looms, 1 tannery, 3 printing mills, 7 dye houses, 12 knitting factories, 2 cotton factories, and 1 automobile factory in 1872 and 1873. When we look at the records of the 1900s, there are 10 inns, 7 mills, and 6 cotton factories in the city [18].

4.2. Industrial Heritage in Tarsus

There are many buildings and campuses in Tarsus that can be considered industrial heritage, some of them have been registered and preserved.

It is known that the first known ginning factory attempts in Tarsus were made by Harison Debbas and his partners in 1862 [19]. After the Debbas factory, James Gont opened a ginning factory first in Adana and Mersin and later in Tarsus. In 1863, he established a factory consisting of 90 cotton gins, two water presses, and two water tribunes [20]. It is known that the ginning factory opened by Cemko Bezirgan in 1863 also had 90 ginning machines, two steam machines, two water presses, and two water tribunes [21]. Mavromati, who is of Greek origin, founded the ' Cydnos ' factory in Tarsus in 1887 with 60 cotton gins and 584 spinning machines, and this was the first yarn factory established [19]. Apart from these, there is a ginning factory in Tarsus, founded by Monsieur Avanya in 1893. Mehmet Rasim Dokur, the son of an Ottoman administrator, bought the land where the Debbas factory was located [22]. It is the second yarn factory established in this city and was established in 1911. In 1980, of the 131 ginning and pressing factories in the Çukurova region, around 30-40 were in Tarsus [20]. In the old factory area, which is used as a parking lot today, there is an old chimney associated with the factory, which is currently under preservation. Apart from the ginning and silk factories, the first flour factory based on engine power in

Tarsus was established in 1939. The most important forest products industry of the region is the chipboard industry, which was established in 1978. In addition, the largest textile dye factory in our country was established in Tarsus in 1966 [23].

Çukurova Industrial Enterprises campus was examined with a detailed thesis study prepared in the department of architecture titled "Industrial Preservation and Evaluation of Tarsus Çukurova Industrial Enterprises" [24]. The building is empty today. The Hydroelectric Power Plant was examined in detail in the master's thesis prepared in the department of architecture, titled "Evaluation of the First Hydroelectric Power Plant in Turkey - Tarsus HEPP within the Scope of Industrial Heritage and Making Conservation Recommendations" [16]. In the thesis study, in which survey drawings were prepared, suggestions were presented on the preservation and reuse of the campus. In the same year when the thesis was published, the building was registered as a 2nd-degree cultural asset to be preserved by AKVKK. Tarsus Ginning Factory was designed in 2013 and its implementation was completed in 2016 and started to be used as the BOUN Gözlükule Excavation Research Center. The project and its implementation received the building award at the TSMD 13th Architecture Awards in 2019 and the preservation category at the European Union Cultural Heritage Awards / Europa Nostra [18]. In addition to its current function, the building was used as the opening ceremony and work exhibition venue of the 1st Mediterranean Biennial, held between 15 October and 30 November 2023. The recognition restoration and use of these places by the people of Tarsus and the local government are valuable in terms of cultural heritage and city memory (Table 1). All structures given in the table are registered.

Table 1. *Analysis of Industrial Heritage Buildings in the Tarsus Study Area*

Building Name	Photograph	Year of Construction	Legacy Function	Use		Damage		Restoration	
				Empty	Reuse	Little	A Lot	There is	None
Rasim Dokur textile factory		1911	Textile factory	X			X		X
Tarsus hydroelectric Power plant		1902	Hydroelectric Power plant	X			X		X
Tarsus gining factory BOUN Gözlükule excavation research center		1950s	Ginning factory		X	X		X	
Çukurova industrial enterprises		1887	Cotton,yarn,weaving factory	X			X		X
Transformer buildings water cabinet		1903	Electricity distribution network	X			X	X	

5. YUVAM BRICK FACTORY AS AN INDUSTRIAL HERITAGE

5.1. History and Location of Yuvam Brick Factory

Yuvam Brick Factory is located in the northeast of Tarsus, 10.4 km away from the city center, within the borders of Yunusoğlu village, on parcel number 321 on the route of the D400 Highway (Figure 2a,b). Information about the factory was obtained based on the documents found and face-to-face interviews with its owners, Eyüphan and Mümtaz Eyüpoğlu. The owner and founder of the factory is the Eyüboğlu family. It was run by the same family from its establishment in 1974 until its closure (Figure 2d,f). In the 5-years between the end of the brick production function in 2016 and the sale in 2021, the campus; was used as a place for the production and exhibition of sculptures, plant cultivation, and nostalgic tools (Figure 2c). During this period, the factory chimney was registered and preserved by the Adana Cultural Heritage Preservation Regional Board. In addition, the balcony of the office building, decorated using ceramics produced in the factory, was deemed worthy of the second and first-place awards for the most beautiful balcony by Tarsus Municipality in 2004 and 2005, and the garden of the business was also awarded the most beautiful small business garden award by the municipality in 2006, within the framework of similar decorative elements. The building, which eventually became dysfunctional, began to wear out and damage its structural elements due to the lack of maintenance in its units. After its sale, it was largely demolished and all these heritage elements disappeared (Figure 2e).

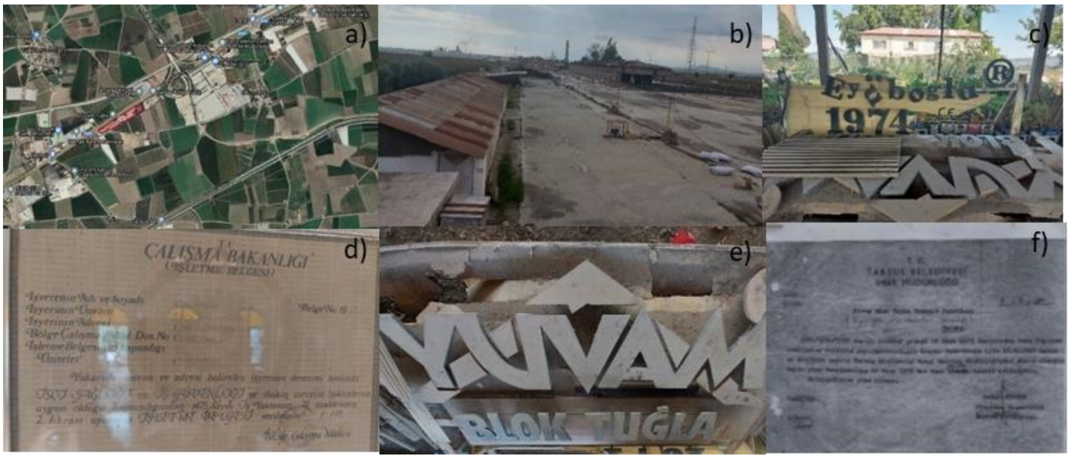

Figure 2. *Yuvam Brick Factories General View, Sign and TR Ministry of Labor Business / Opening Permit / Passage Road Permit Documents (Eyüpoğlu family archive; Uysal, 2020)*

5.2. Buildings on the Campus, Their Features and Determinations Before 2021

The construction process on the campus; was determined based on data obtained from factory archive documents, field-work, and interviews with the Eyüpoğlu family. Information on the functions, architectural features, and construction dates of existing, removed, or modified closed and semi-open structures were obtained from these sources.

Yuvam Brick Factory land is built on a land of 37,666.00 square meters with a frontage of 535 meters to the D400 highway. The factory's main entrance is on the north side of the land (Figure 3a,b). On the campus, there are two Hofmann-type brick firing kilns on the right and left of the entrance, a chimney opposite the entrance and in the middle of the two kilns, semi-open drying areas associated with the kilns, an engine room, laboratory, workshops on the side of the small kiln, two security booths opposite each other at the entrance, a diesel tank (Figure 3c). Flat, on the left arm of the entrance gate, there is a management building on the lower floor, a lodging and administrative building on the upper floor, three double-decker lodgings built in different parts of the land and at different times, a warehouse and wet areas.

Figure 3. a, b) *General Views of the Factory Campus;* ***c)*** *Unscaled Sketch of the Factory (Eyüpoğlu E.)*

Brick manufacturing process; It starts with transporting the soil to the stock area by trucks and keeping it there for approximately 1-1.5 months before aerating it. Afterwards, the soil turns into mud by giving water to the cradle with the help of a scoop. From the cradle, it moves to the crusher roller with the help of a band, where the soil is crushed into small pieces. The resulting soil is rested in a cradle. Then it is broken down again in the crushing waltz through the belt and passed to the mixer. It becomes mud by mixing with water passes through the crushing roller and goes to the vacuum press with the help of the vacuum pump. Here, it is compressed with great pressure and the brick is cut to the desired size with the mold tool. The bricks transported to the drying area by a tractor are dried within 7-10 days (Figure 4).

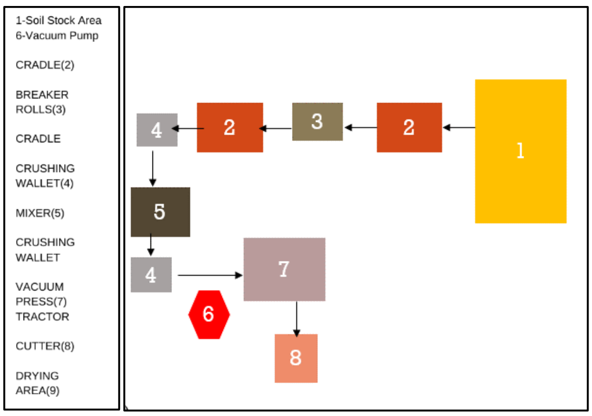

Figure 4. *Brick Firing Preparation Unit Workflow Diagram*

Kilns and Chimney: Cooking process It is the last stage of production and this process is done in kilns. At the entrance of the parcel, after the security and chimney, there are two rectangular brick-tile kilns, side by side in a north-south direction (Figures 5 and 6a,b).

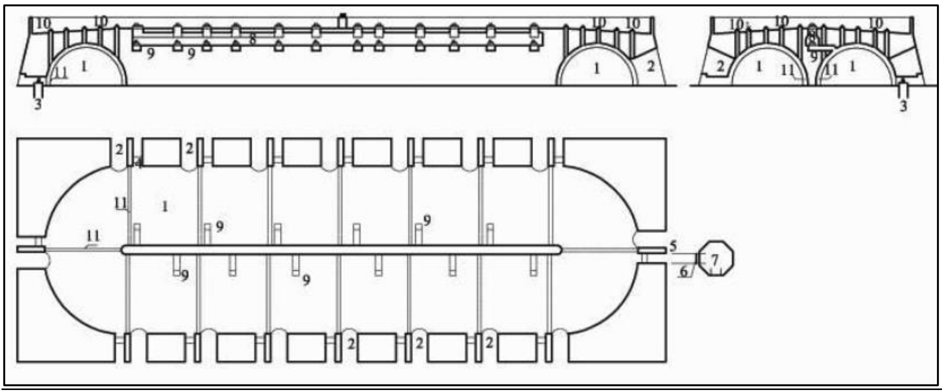

Figure 5. *Split Hoffman Type Brick Kiln Plan [25] - 1. Cooking section, 2. Door, 3. Flue hole chamber, 4. Flue hole cover, 5. Main smoke chimney, 6. Chimney cover, 7. Chimney,8. Hot air duct, 9. Chimney ducts leading to the compartments, 10. Feeding holes, 11. Flat arch*

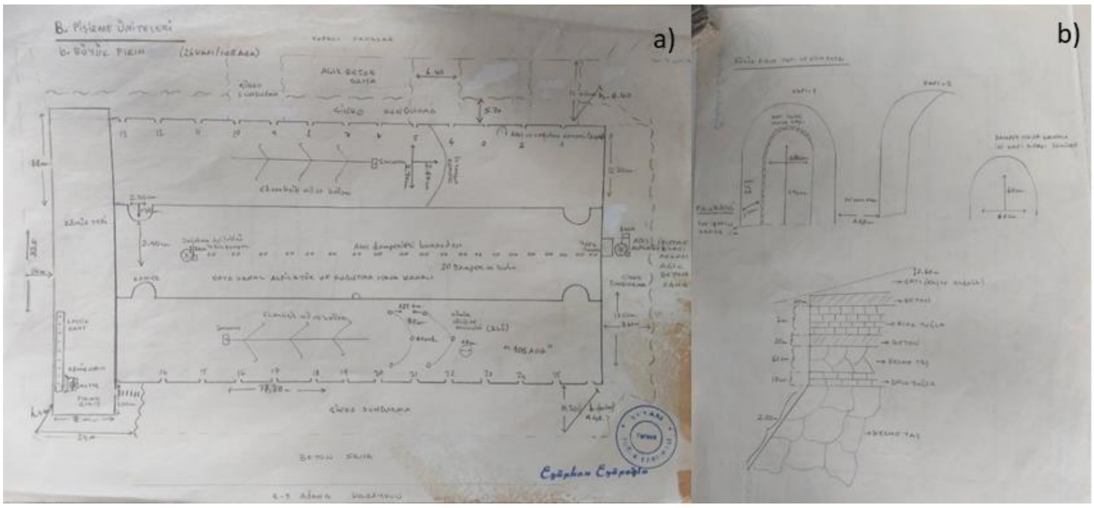

Figure 6. *Yuvam Brick Factory Baking Unit Plan and Kiln Belt Details (Eyüpoğlu E.)*

The small kiln was built in 1974 and is the oldest building on the campus. An engine room for the diesel tank, an infirmary, and a workshop that later functioned as a warehouse were built next to this kiln in 1980 (Figure 7a). The large kiln was built on the left side of the entrance gate between 1984 and 1986, when the small kiln became insufficient (Figure 7c). The kilns are built of rubble stone up to their upper levels. Later, another floor was added to the upper floors with bricks. There are 22 chambers in the small kiln and 26 chambers in the large kiln that provide access to the kiln (Figure 7e). The kilns were built in long, thin rectangular forms, connected from the inside. There are fire-feeding holes at the top of the vaulted interior of the kilns, allowing the fire to be fed with coal dust from above (Figure 7d). In front of the kilns, there are drying areas covered with a roof. The top of this area is covered with eaves supported by wood (Figure 7b).

There is a chimney located in the middle of these two kilns, 25 m high and 670 cm long in circumference. The chimney is made of brick using masonry technique. This chimney was used to remove gases released from the heating systems of the kilns. The connection between the kilns and the chimney is provided through underground channels (Figure 7f).

Figure 7. a) *Small Kiln Appearance;* ***b,c)*** *Large Kiln Views;* ***d,e)*** *Kiln Chamber Views;* ***f)*** *Chimney*

Drying Areas: After the kilns, the most unique building unit of the campus is the drying area. The drying process is carried out in semi-open areas with a concrete floor, built on reinforced concrete columns and beams, with wooden roof trusses, covered with metal sheets (Figure 8a,b,c,e,f).

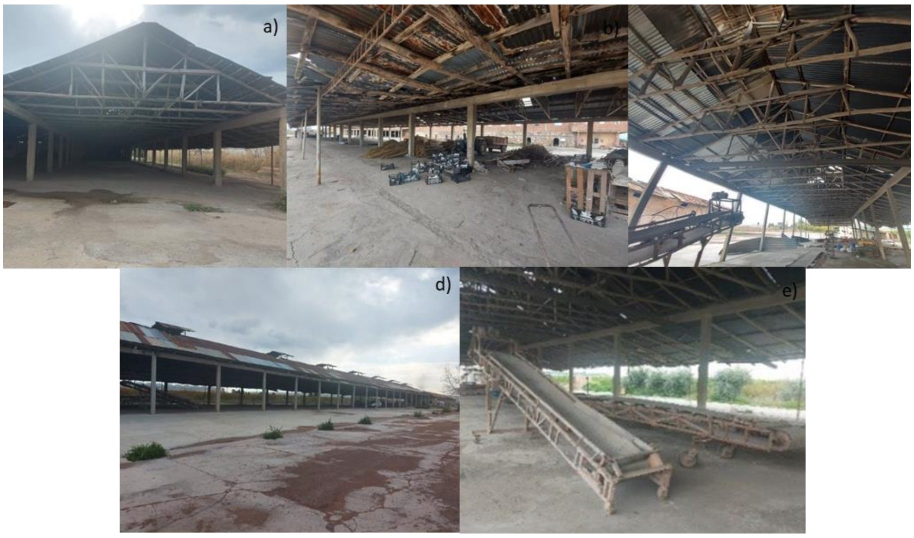

Figure 8. *Unit Used as Drying Area*

Engine Room, Workshops, Laboratory, Transformer Room, and Warehouses: There are engine rooms, workshops, transformer rooms, and warehouses in the southeast of the campus. These spaces, like drying areas; are small units built under hipped roofs covered with metal sheets, with a wooden truss system placed on reinforced concrete columns and beams.

The machine room is the unit where the crushing, crushing, and pressing of the mud take place before the bricks go to the drying area (Figure 9a,b). The engine room was built in 1980. Workshops are units where there is a rail system in connection with the kilns to send the bricks coming out of the kiln to drying (Figure 9c). The laboratory structure was built for the preparation of ceramic mixtures after the brick function ended (Figure 9d). The transformer room is the unit where the energy required for the factory is provided and the electrical equipment is located. In the warehouse units built between 1986 and 1988, the bricks are stacked and when the time comes, they are loaded and delivered to the places where they are sold.

The top of the engine room is a roof covered with wooden roof trusses and metal sheets. The transformer building is a masonry structure (Figure 9e). The laboratory, which was built in 1987 under the zinc-metal sheet roofs of the campus, is a single-story building containing ceramic materials and a kitchen (Figure 9f).

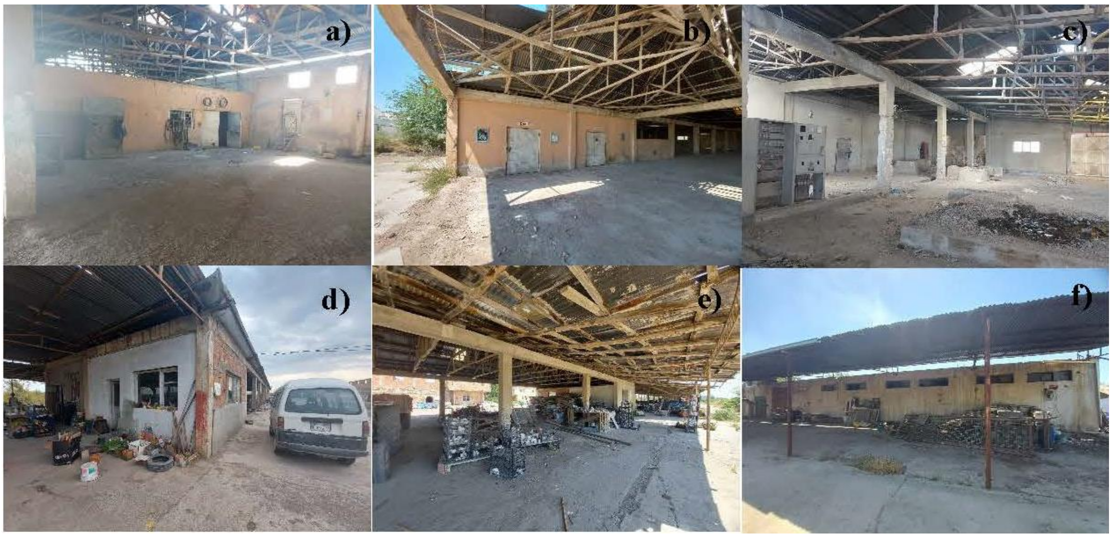

Figure 9. a,b,c,d,e) *Interior and Exterior View of the Engine Room and Workshops;* ***f)*** *Warehouse Located in the West of the Campus*

Administrative Structure and Security: The double-decker building, with offices on the ground floor and lodging on the upper floor, maintains its structural condition. This building was built in the masonry system and has a gable roof and a tiled roof. There are reliefs on its walls (Figure 10a).

The two security booths at the entrance of the campus were also built in the last 10-15 years (Figure 11c,d). Security huts are reinforced concrete and single-story structures. The balcony of the administrative building received the second and first prizes for the Most Beautiful Balcony in 2004 and 2005, and the Most Beautiful Small Business Garden Award in 2006 (Figure 10 b,c).

Figure 10. *Administrative Structure and Awards of the Campus*

Lodgings, Garden House, and Outbuildings: There are 3 lodging buildings built on the masonry system in the campus in the 1990s. There is a single-story garden house in the orchard located in the east of the campus (Figure 11b). The walls and walkways of this building are also decorated with mosaics and ceramics. There are also external wet areas and small warehouses on the land for the use of employees (Figure 11a).

Figure 11. a, b) *Housing Buildings on the Campus;* ***c, d)*** *Entrance Security Booths*

5.3. Determinations and Evaluations on Yuvam Brick Factory Buildings and Campus

Yuvam Brick Factory, which was founded in 1974, reflects the definition of a modern factory with its production, administrative, warehouse, technical, and security structures on the campus. Yuvam Brick Factory campus is an industrial structure that was built in different periods and uses different construction techniques and materials. In places outside the built environment, there are areas such as fruit gardens, water channels and concrete-filled walkways. Yuvam Brick Factory is a factory campus where natural and built environments coexist.

The production area has a large area with brick firing, cutting, and drying areas. In the campus, the buildings where manufacturing takes place are grouped according to their functions.

- Buildings where manufacturing is carried out other than firing are larger, higher, and less divided than the other buildings in the factory. These structures were designed in a simple architectural language due to their functions.
- The buildings used for mechanical and electrical works, storage, and brick cutting are single-storey with smaller volumes.

To evaluate the current situation of Yuvam Brick Factory on a building scale, evaluations were made in terms of material use, structural system, preservation, and deterioration.

First of all, cut stone, block brick, concrete, and wood are used as materials in buildings.

- The wooden roof trusses found in the drying area areas date from the period when the building was first built.
- The unique vaulted shape of the kilns and their underground relationship with the chimney preserved their integrity and originality until they changed hands in 2021.

Before 2021, the buildings partially preserved their originality in terms of plan and façade features. However, over time, use other than its function or the buildings remaining empty for a long time has caused material deterioration. The production buildings and semi-open areas in the factory campus, which changed hands after 2021, were demolished; All that remains is the registered chimney structure, lodging, and security building. Today, a new building with a different function has been built on the campus parcel (Figure 12a).

Yuvam Brick Factory, one of the pioneers of brick factories in Tarsus, is a unique structure for the region. The majority of the buildings on its campus have survived to 2021, preserving their originality. Due to the end of the production function in 2016, only a small part of the tools used in the past could be preserved, and unfortunately, the majority were sold to different places for economic reasons.

Its collapse today means the loss of an industrial heritage that sheds light on the history of Tarsus. This unfortunate process of the Yuvam Brick Factory campus, where the built and natural environment form a whole, is an example that should be taken from other industrial structures in Tarsus (Figure 12b).

Figure 12. a) *2021 Google Earth Photo of the Campus [26];* ***b)*** *2023 Google Earth Photo of the Campus [27]*

6. CONCLUSION

The Industrial Revolution, which started in the 18th century, brought about radical changes in many areas of communities. With the industrialization movement that continued after the second half of the 20th century, factories with different functions were established. During the process, these factories were closed and the factory structures became idle because they could not adapt to technology and time or because the products in production became outdated and lost their functions.

These structures are structures that have witnessed their own culture and therefore they must be sustainable in the name of cultural heritage. The sustainability of these industrial heritage works is possible by re-functioning them and bringing them back into city life to carry them to the future. These works need to be examined and preserved within the scope of industrial heritage. Due to the rapid process of loss of function and obsolescence, documentation of the concrete and intangible features of industrial heritage structures should be urgent. In addition, encouraging the public to reuse these structures will play an important role in spreading cultural heritage awareness and creating local memories.

Tarsus has a rich industrial heritage reflecting the economic and commercial environment of the period. In this study, some of the industrial heritage buildings in Tarsus were identified, examined on-site, photographed, and mapped. Thus, general information about the buildings was obtained. Of these structures, only the cotton gin factory, which served as the Gözlükule Excavation Research Center, was restored and put into use. Even though it is not widely used by the public, the preservation of the structure is positive. The power plant building, which was identified as Turkey's first hydroelectric power plant, was registered and taken under preservation only 3 months ago. While there are no conservation efforts yet for other buildings, it is pleasing that there are various activities where the buildings are used as they are.

Industrial structures in the Mersin-Tarsus region are important for understanding the industrial and historical development in the region. Despite being so important and some of them still maintaining their original functions, only a few buildings have been registered or restored. Others cannot be preserved and are slowly disappearing. The units of the Yuvam Brick Factory remaining from 2021, other registered factory chimneys in the region, ginning factories, power plants, and other archaeological heritage of Tarsus should be preserved holistically and within the framework of a plan, together with the traditional cultural heritage elements. Thus, the urban cultural memory of the Tarsus-Adana region will be maintained and the industrial heritage will be preserved in these buildings and used by future generations.

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ABBREVIATIONS

Abbreviations	Explanation
CM	Centimeter
DOCOMOMO	International Working Party for Documentation and Conservation of Buildings, Sites, and Neighborhoods of the Modern Movement
ERIH	European Route Of Industrial Heritage
ETC.	Et cetera
ICOMOS	International Council on Monuments and Sites
KM	Kilometer
M	Meter
NO.	Number
TICCIH	The International Committee for the Conservation of the Industrial Heritage
UNESCO	United Nations Educational, Scientific and Cultural Organization

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PART B: ART, HUMANITIES, DESIGN AND PLANNING

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Architect Kemalettin and Edirne Train Station Campus[1]

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Abstract

During a time when Western influence was changing living conditions and state order, new types of buildings were needed. Architect Kemalettin rose to the occasion and designed train station buildings for the Rumelia and Oriental railways in Plovdiv, Thessaloniki, Sofia, and Edirne. Construction began in 1870, with the Edirne Train Station being built due to the inadequacy of the existing station building in Karaağaç, known as Little Paris. The grand architecture of the Edirne Train Station is reminiscent of the Sirkeci Train Station in terms of plan and facade layout. Unfortunately, its opening was delayed due to World War I and remained unused for many years. Today, it is the main building of the Faculty of Fine Arts of Trakya University.
The station campus also includes hangars, lodgings, warehouses, and other auxiliary buildings. While some of these buildings were considered units affiliated with the Faculty, even after restoration work was completed, some existing buildings are still out of use. Despite the availability of posters, articles, and research on the Edirne Train Station building, this study aims to provide information about the renovation and usage status of the buildings throughout the campus.
To obtain accurate data, the author used on-site observation methods to take measurements and photographs of each building and prepare plans and views. Literature research and archives from the Trakya University Department of Construction Affairs were also used to collect data on existing buildings' old and new conditions.

1. INTRODUCTION

In an era where German architectural influence held great sway, Architect Kemalettin emerged as a leading figure in the 1st National Architecture movement, a response to the Westernization trend. Collaborating with German Architect August Jachmund, he oversaw the construction of Istanbul's Sirkeci Train Station, which marked the final stop of the Orient Express, connecting Europe and the East. As transportation technology and trade rapidly advanced, government institutions and transportation structures became increasingly diverse. Kemalettin's extensive education at Berlin's Charlottenburg Technische Hochschule paved the way for his successful design of numerous train station projects, including the Edirne Karaağaç station.

Located in the southwest of Edirne city lies the district of Karaağaç. Separated from the city center by the Tunca and Meriç rivers, reaching the old Edirne Train Station, currently serving as the Faculty of Fine Arts of Trakya University, can be done via Karaağaç Street, connected to the last part of the City Forest road. This road is also linked to the Pazarkule border gate. Additionally, two stone bridges from the end of Kaleiçi Saraçlar Street, the historical city center, can be taken to reach the campus. Situated near the Timurtaş Military Hospital to the east, the Greek border line passes approximately 2 km south of the campus.

[1] The preliminary version of this paper was presented at the Mimar Kemaleddin Symposium organized by Gazi University Faculty of Architecture in Ankara on December 27-29, 2023.

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Edirne's urban development has undergone significant cultural and socio-economic changes. The completion of the Karagaç railway station complex in 1872 profoundly impacted Edirne's commercial landscape. The railway station was an important hub connecting Edirne with other significant cities and facilitating trade and travel. The interconnections contributed significantly to Edirne's prosperity and expansion in the late 19th and early 20th centuries (Başar & Erdoğan, 2009). After the population exchange in 1923 and the relocation of the station building in 1977, the Karagaç region experienced a decline in population and economic activity. The population exchange between Greece and Turkey brought about significant demographic changes, with many Greek residents leaving Edirne and new Turkish residents arriving from Greece. This upheaval disrupted the region's social and economic fabric (Lamprou, 2023).

The shift of the station building caused further deterioration, reducing the area's significance as a transportation center. This led to the decline of economic activities that had once flourished around the station, resulting in a period of stagnation and regression for Karaağaç (Emekligil Erdoğu, 2013).

Establishing the Faculty of Fine Arts at Trakya University revitalized the Karagaç district. The University's presence attracted students, faculty, and visitors, bringing new life and economic activity to the area. This transformation positively impacted the urban and social fabric of the area, fostering a sense of community and cultural engagement (Emekligil Erdoğu, 2013; Güzelci et al., 2019). Revitalization efforts included restoring historic buildings and constructing new infrastructure to support educational and cultural efforts. These efforts preserved Karagaç's architectural heritage, created opportunities for local businesses to flourish, and supported the community's economic recovery (Esquinas & Pinto, 2014). In the past, Karaağaç was known as the "little Paris" due to the opening of the train station affiliated with the Rumelia Railways in 1872. However, with the relocation of the station building in 1977, it lost much of its population. The village became a farm and summer resort for Central district citizens. Its vitality was restored in 2011 with the settlement of the faculty. The Edirne Cultural Heritage Preservation Board registered and protected the campus and its buildings with a decision numbered 854, dated 14.02.2013.

***Figure 1.** The urban location of the campus and the photograph of the connected street in 1906 (URL 1)*

The urban features of the Edirne Karaağaç Station Complex underscore the importance of its adaptation as a campus. The transformation of the complex into infrastructure and a campus should be carefully assessed, considering Edirne's urban history and socio-cultural dynamics. The city's urban history encompasses numerous changes that have shaped the current use of the campus (Emekligil Erdoğu, 2013). During the 19th century, Edirne held significant strategic and commercial importance for the Ottoman Empire. The urban layout of Edirne underwent changes influenced by Westernization during this time. The Karaağaç area, in particular, emerged as a crucial hub for commerce and residential activities following the establishment of the railway station (Meral, 2016; Başar & Erdoğan, 2009).

In 2015, the current manager of Edirne Train Station, Ahmet Yıldırımlı, compared the maps obtained from the station's archive and the archive of Trakya University's Department of Construction Affairs. Figure 2 shows a comparison of the maps drawn at various times. The old map, which dates back to a time before 1977 and whose exact date is unknown, shows the station building and auxiliary structures along the existing rail route. These structures were positioned according to the train's travel distance. Additionally, buildings such as lodging, archives, and personnel units not directly related to the train were arranged near the entrance, with a garden surrounding them. The second map, drawn after 1998 when the Lausanne Monument was built, does not include the locomotive depot, workshop building, and surrounding structures active when the station was used for its original purpose. However, the quarantine building, which was not shown on the old map, was present.

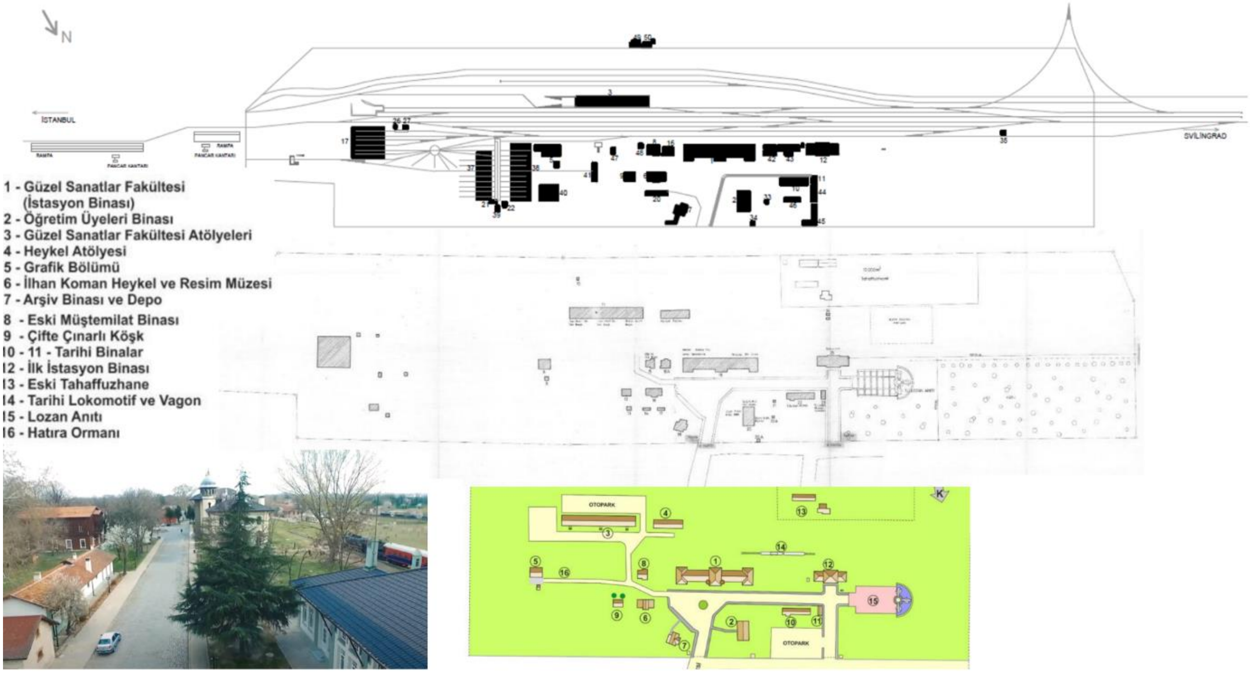

***Figure 2**. Maps of the campus drawn on different dates and a general photograph (Meral, 2016)*

According to the site plan drawing created after 2011, when the Faculty of Fine Arts of Trakya University relocated to the campus, it appears that the campus buildings were renovated and utilized, while the larger auxiliary structures, such as the traction building and workshops, remained in the background as they were primarily related to the station function.

This research investigates the renovation process and current utilization of the Edirne Karaağaç Station Complex as a campus. By incorporating existing literature on railway systems and buildings, this paper aims to clarify its position within the current body of work.(Başar & Erdoğan, 2009; Güzelci et al., 2019; Emekligil Erdoğu, 2013; Meral, 2016)

2. METHOD

This research is focused on exploring the history of railways, examining old buildings from the past, and investigating railway designs from the same period. The researchers delved into the history of Edirne, now a border town, and examined what the Karaağaç district was like when the railway was first built. They compared maps of the railway area from back then to now and obtained old photos and plans from archives. Based on this information, they conducted an inventory check and suggested ways to repurpose these structures for modern use.

3. EXISTING BUILDINGS IN THE CAMPUS

The inventory of the campus buildings was prepared after gathering information. Figure 3 shows the buildings that made up the Edirne Karaağaç Train Station campus from its inception until today. The original station building was constructed in 1872 but no longer exists. A photograph taken in 1890 of the Edirne train station shows the original building, but it was replaced by a new building located in the west due to its inadequacy. The second station building, which is also no longer standing, was used until the construction of the current large station building designed by architect Kemalettin. The building of the current station started in 1909 but was halted due to the war. The second station building was far west of the campus, closest to the current Lausanne Monument. According to the classification made by Başar and Erdoğan, the second station building was of the type "symmetrical plan with a high entrance and single-story sides." It was used as a TCDD (Republic of Turkey State Railways) restaurant building for a time, and after being transferred to the faculty, it was turned into a canteen. It is currently home to the Natural History Museum. (Başar & Erdoğan, 2009).

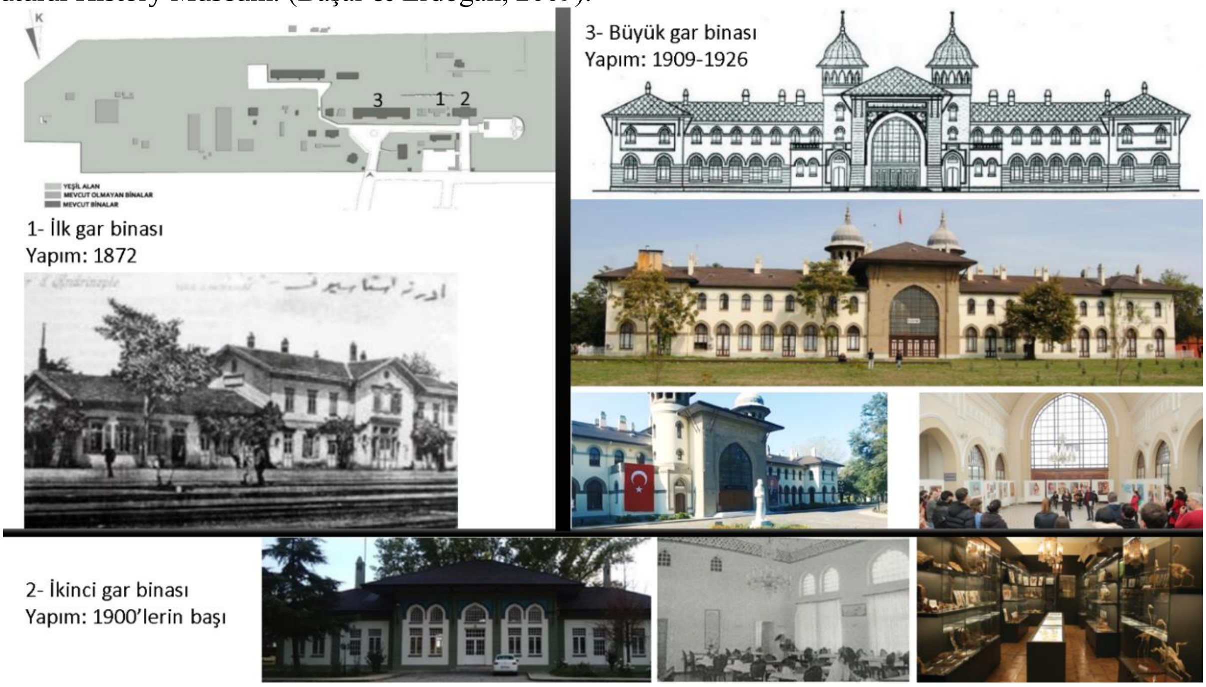

***Figure 3**. Station buildings used to date (Author's archive)*

The building currently serves as the deanery of Trakya University was previously a train station and then reserved for the Rectorate and administrative units of the university from 1998 to 2011. During the same period, the rooms on the upper floor were used as guesthouses and were converted into lodgings with separate wet areas during a renovation in 1959. The building has a corridor on both floors, facing north towards Karaağaç and opening only to the rooms in the south direction. The corner parts of the corridor are highlighted, and the stairs that provide access to the floors are positioned in these corners on the north facade. The building's façade structure is inspired by Seljuk architecture, and the transparent crown door interpretation on the main entrance façade, which faces the campus, is supported by wide eaves, higher than normal floor height, and towers on both sides. The front and rear facades of the building are 80 meters long, the only difference between them are the towers on the front facade and the terraces next to them. The neo-classical Turkish architecture is reflected by pointed arched windows, moldings, sashes, rosettes, and hourglass motifs that narrow as you go up to the upper floors. In the middle of the building, towards the entrance, there is a box office hall about two and a half stories high and connected to both facades. Currently, this hall serves as both the entrance to the deanery and an area where exhibitions and various collective events are held.

The Commodity Warehouse was a storage facility for Trakya University's Administrative Financial Affairs and Construction Works departments from 2001 to 2011. The building was designed to be built at a certain height above the ground, allowing for the direct unloading of goods from arriving trains. (Figure 4) This design also protected the stored goods from potential damage caused by floods. The basement floor, which houses storage and personnel offices, receives light from the areaway. The rectangular building, which measures 78.80 m x 10.00 m, underwent repairs in 1998 and 2001. As part of the renovations, some of the doors on the south-facing façade were filled into the parapet level and converted into windows. The roof is supported by wooden construction, and no flooring is beneath it, making it visible from inside the building. Today, the building is used as a workshop for faculty units.

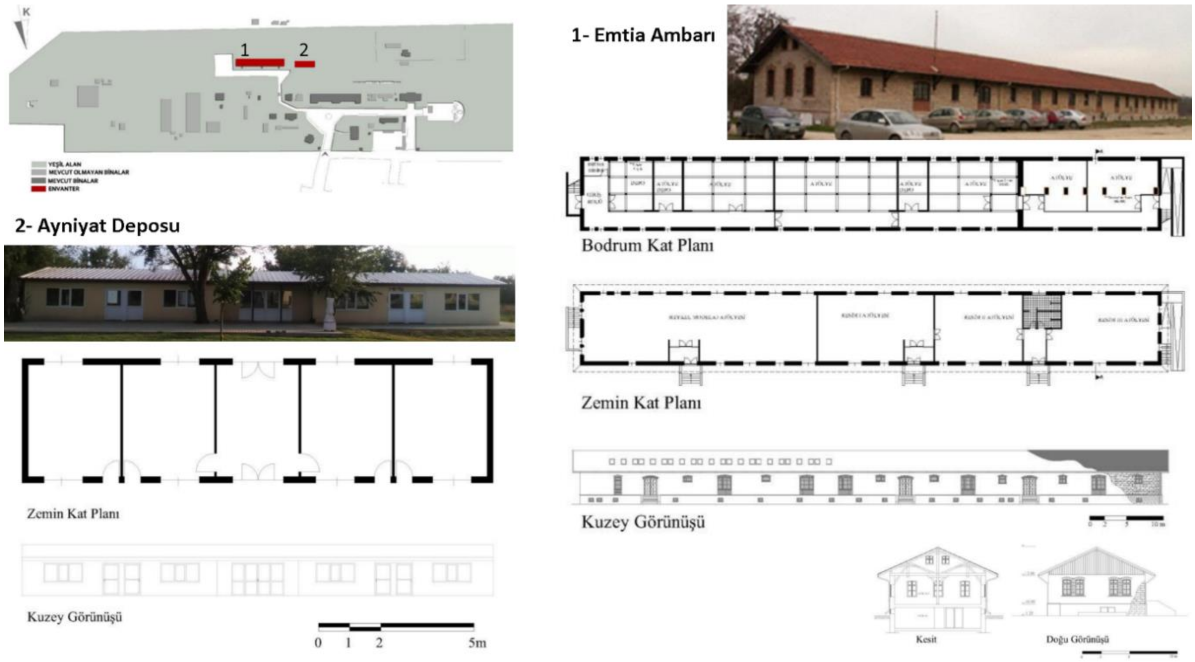

Figure 4. *Commodity Warehouse and Goods Warehouse (Meral, 2016)*

The warehouse for goods, located right beside the commodity warehouse, is a single-story building that was added to the university's campus. It was built prefabricated on a reinforced concrete platform and doesn't have a basement. Nowadays, this building is used as a sculpture workshop. It has three entrances from the campus and was constructed symmetrically. The building has a double-sided central hall with a workshop on both sides and additional workshops at the corners that can be entered from outside.

Figure 5 shows a photograph of a quarantine building. The building's construction system is reinforced concrete, and the façade structure is simple, with a wide window opening and no decorative features. It can be understood that the building was added later but was abandoned and unused after losing its station status. The shelter is used to keep animals that are brought from other places in transportation complexes. The animals undergo health checks; if needed, they are kept for a while and provided with veterinary services. Various elements like troughs, mangers, barns, and wagon-high ramps are created to cater to the needs of animals. Additionally, the building includes a staircase connecting the basement, ground, and ordinary floors, as well as wet areas, doctor's rooms, offices, and storage units on the basement floor.

Figure 5. *Tahaffuzhane and hangar (traction) buildings (Trakya University Department of Construction Affairs archive)*

The hangar, also known as the traction building, has a near-square plan and serves as a storage facility for wagons that are not in use. If necessary, these wagons are taken for repair in the workshops opposite the hangar through the rotating bridge in front of it. The building is far from the passenger transit route, and logistics services are provided by the surrounding water reservoirs, locomotive depots, transporters, rotating bridges, workers' rooms, wet volumes, and warehouses to ensure smooth transportation. The hangar used to be one of the large-span buildings, but it lost its function when the campus changed from being a train station. It was built with a masonry stone system, and its wide door and window openings are covered with a single row of brick flat arches. It may have been covered with two consecutive rows of gable roofs, similar to other structures. As of December 2023, Trakya University Department of Construction Affairs has decided to restore the hangar and give it a new function affiliated with the faculty. The work for this restoration has begun.

Most buildings on the campus have only one or two floors above the basement. The Karaağaç district, located close to the border of Edirne, used to experience floods from time to time until an additional canal was built on the Meriç River. This is one of the reasons why buildings in this area have subgrades. The basement is used for shelter and storage and has become a necessity for the village, especially in residences, considering the wood-on-stone construction systems of the period. The only exceptions are the repair shops and some small storage units.

During the early 20th century in Edirne, the construction of summer homes for consulate staff increased the population. Many citizens of European origin, mostly Greek, Armenian, Jewish, or Bulgarian, settled here and engaged in trade. The train station also played a significant role in the area's growth.(Emekligil Erdoğu, 2013) Before the 1923 population exchange, most of the inhabitants residing in Karaağaç were not Muslim, accounting for over 90% of the population. The houses they lived in were constructed based on their own beliefs and lifestyles. These homes had distinct features such as a large number of window openings on the façade facing the street, a square-shaped plan, a single door entrance opening directly to the street, the absence of shutters, with only a shade on the windows, wet areas located inside the house and bathrooms not included in the rooms. These features distinguish Karaağaç homes from the typical Muslim housing typology. (Figure 6)

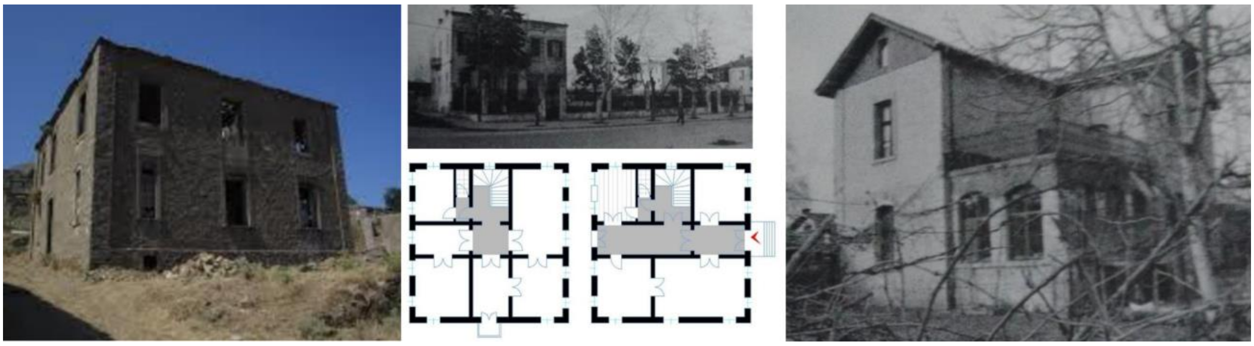

Figure 6. *Examples of a Greek house and Karaağaç houses in Gökçeada (Meral, 2016)*

There are different types of accommodations available at the Karaağaç railway station. The station building has a guesthouse/hotel, and auxiliary personnel units are located towards the Lausanne Monument. Additionally, there are lodgings for administrative personnel, which are closer to the campus entrance from the village and are positioned further back from the station's function. The plans and façades of these buildings have various designs. However, they are similar to the residences of non-Muslim citizens, considered indigenous people of Karaağaç at that time.

As illustrated in Figure 7, the building known as residence number 1, presently utilized as the Graphics Department, is located at the highest end of the campus. The structure comprises a basement floor, a ground floor, a typical floor, and a roof. Access to the central hall is through the entrance from the ground floor, which leads into the kitchen and toilet area. The standard floor is accessible by a single-arm staircase, and the end of the corridor leads to a room that connects to another room through a door. On the regular floor, four rooms are arranged to receive light from the outside and share a common wet area. The rooms around the chimney are connected and can be used for heating purposes towards the kitchen on the ground floor. Moreover, between the sloping surfaces of the gable roof, there are two separate rooms.

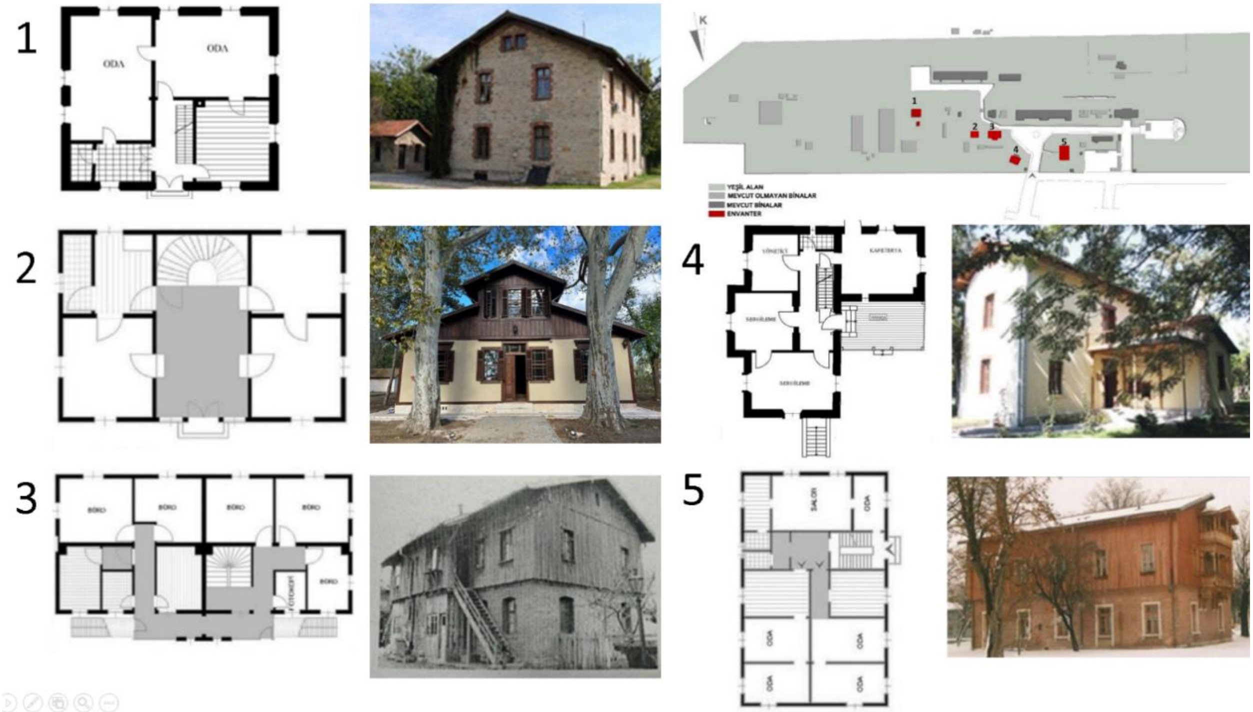

Figure 7. *Lodging buildings (Edited accordingly T.U. Department of Construction Affairs Archives)*

Building number 2, also known as Çifte Çınarlı Mansion, was the TCDD Garden Science Director's Residence from 1914 to 1977. Maps obtained from the archives of Trakya University's Department of Construction Affairs show that the building has a double-winged main entrance door on the south side, opposite the warehouse building. The building has a central hall plan type that can be accessed through three steps. Upon entering the outer door, you can access the world part via the balanced staircase climbed after a door. Apart from three interconnected rooms and a wet area, the wide central hall is also accessible. The purpose for which the building was recently restored in 2023 has not yet been determined.

Building number 3 in Figure 7, which currently houses the İlhan Koman Sculpture and Painting Museum, is closest to the Station building and at the corner of the large square in front of it. The building was constructed using the masonry brick system, and its normal floor façade is covered with wood over brick. The ground floor and normal floors have separate stairs and double entrance doors. However, today, access between floors is provided by a balanced staircase located on one side of the interior. Although the window edges lack brick jambs, there is a single brick keystone on the flat arches on the ground floor.

The structure marked with the number 4 in Figure 7 and situated closest to the campus entrance currently serves as an archive and warehouse. Previously, it was used as Trakya University's Strategy Development Department from 2000 to 2011 and as a faculty office for a year after that. The building, which comprises a basement, ground floor, normal floors, and an attic, has a total area of 370 m². The south terrace has three steps leading up to it, providing access to the building. Additionally, there is a basement entrance on the west side. The rectangular planned hall is the primary access point to all spaces, and a single-arm staircase facilitates the transition between floors.

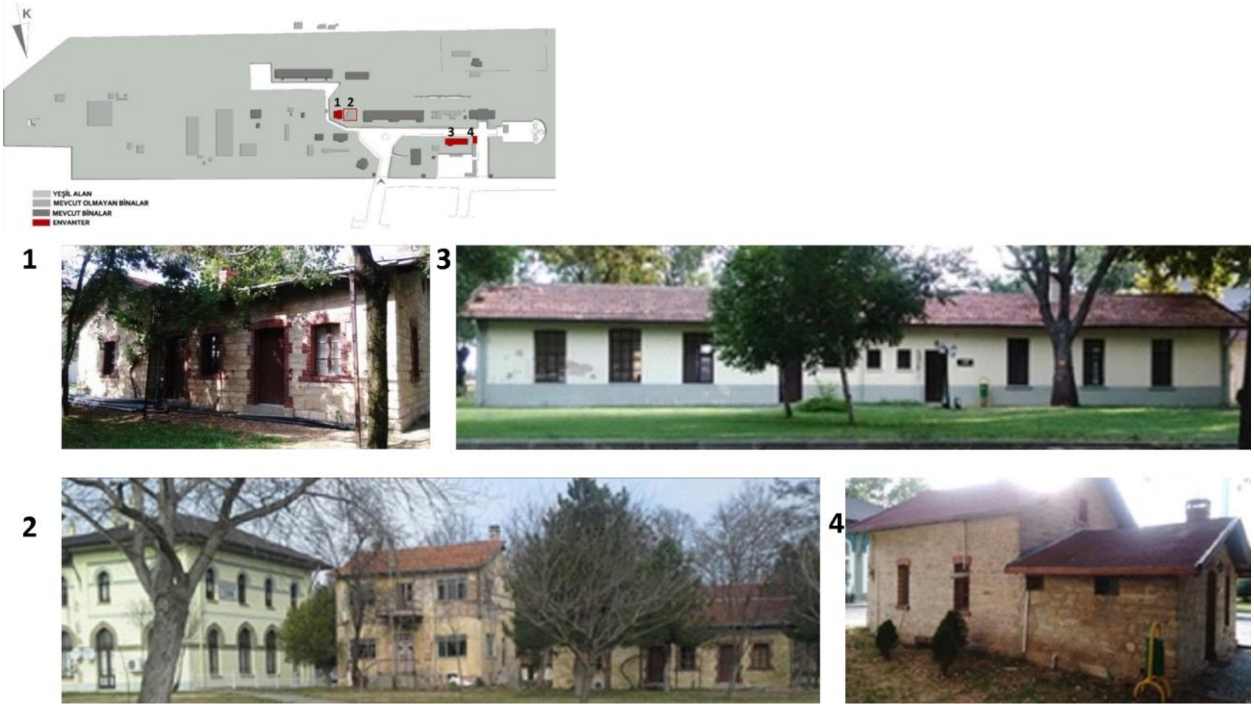

Figure 8. *Revision Office, Old PTT Building, Glass Workshop (former Lausanne Museum), and Guard Shack (Author's archive)*

The old revision office, now an outbuilding, is number 1 in Figure 8. It is situated east of the large station building, at the corner of the road leading to the sculpture workshops. This building has contributed to forming a secondary historical square on the campus and surrounding structures. The building is a single-story structure with two rooms not connected to the wet volumes inside and open to the rail section. Two additional rooms with an internal passage connected to a central hall can be accessed from the campus. These rooms also have wet volumes. The old PTT building, identified as number 2, no longer exists today.

The Glass Workshop, depicted in Figure 8 number 3, served as the Lausanne Museum from 2000 to 2013. The building is a single-story structure with two entrances that open into the same main hall. In addition to the wet areas connected to this hall, there are interconnecting rooms and a separate room. The windows of the building are made with wooden segmented construction, while the building itself was constructed with a masonry brick system.

Building number 4, on the other hand, was used as a guard hut during the station period and is distinguished by its two height levels on its façade. The building has a narrow entrance leading to kitchen and bathroom units, with a large room on the rising side. The flat arched window edges of the building were built using brick jambs, and the building itself was constructed with a stone masonry structure.

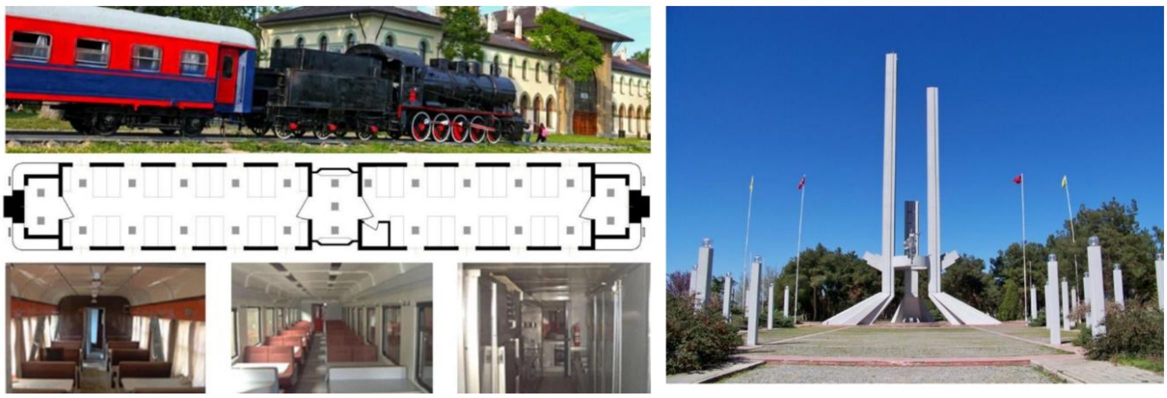

Figure 9. *Train wagon and Lausanne Monument (Author's archive)*

In 2002, an old train wagon was brought from Sakarya and placed in the old railway direction of the large station building. Its interior was designed as a restaurant (as shown in Figure 9 (Trakya Üniversitesi, 2002). However, since it remains within the educational campus today, its restaurant function has been excluded from evaluation and only opened for nostalgic touristic purposes. The Lausanne Monument was built on March 29, 1998, and opened on July 19. It consists of three columns on which the figure of a young girl holds a dove and a document representing the agreement's text. The first column is 36.45 m long and symbolizes Anatolia; the second is 31.95 m long and symbolizes Thrace; the third is 17.45 m long and symbolizes Karaağaç, which was won in the Treaty of Lausanne. The concrete circle on the ground symbolizes unity. The monument is located in the westernmost part of the campus, at the level of the second entrance, which is not used today, creating a square in front of it.

4. CONCLUSION

The study assesses the historical and architectural features of the Edirne Karaağaç Station Complex, as well as its urban characteristics and current use. It integrates literature on railway systems and buildings to establish its position within existing research. The study also examines the urban and social context of the campus in light of Edirne's historical transformations.

The railway is a significant milestone in the history of the world that has had numerous social, economic, and physical impacts. Railways in the early 19th century made international communication and transportation easier and faster. This led to a period of rapid development and progress. The impact of the railways is visible in the urban areas where they are located and the architectural styles around them. The station buildings, which are a new type of building and are considered a symbol of the region in which they are located, reflect the technological and cultural values of the period. The surrounding buildings also express the same values.

Industrial buildings, including railway structures, are being studied more seriously in architectural history and conservation. Previously, railway structures were not considered important in architecture and urban identity, but now they are being taken more seriously and included in architectural discourse (Güzelci et al., 2019). Railway buildings are significant structures representing the historical process of their construction period. They symbolize the change they brought to the city after their construction and the new urban area they created. The Karaağaç Train Station and campus buildings are the subject of the study of the principle of Ottomanism, which was put forward in the 19th century, and its reflections on architecture. Different styles came together in building groups with different functions.
The Edirne Karaağaç Station Complex is an example of urban transformation from the Ottoman period to the present. Its architectural and urban characteristics reflect the socio-economic and cultural dynamics of the time. Future studies on similar structures will benefit from this analysis, guiding the preservation and evaluation of historical assets.

The Train Station building is located at the furthest point of Turkish territory, opening to the Balkans and Europe. Many personnel living in residences built in the style of old Greek houses serve in and around the building. It was built in the 1st National Architectural style with Seljuk motifs. Although preserving these buildings' purpose is impossible due to current political and geological reasons, their geopolitical position is still significant. The campus is like an open-air museum, all buildings reflecting a particular ideology. To maintain and reinforce this ideology, it is important to restore all structures with the least possible intervention and to function them in a way that does not damage the original skeletal system. This aligns with the educational mission it carries today and the urban environment to which it is connected. By doing so, the educational institution can efficiently meet its space needs while ensuring that our historical assets are sustained responsibly.

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PART B: ART, HUMANITIES, DESIGN AND PLANNING

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Evaluation of Lodging Model Housing Production in 100 Years of the Republic: State Archives Ankara Lodgings[1]

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Abstract

Following the years of the Independence War, with the proclamation of the Republic, Ankara was designated as the capital, necessitating the relocation of public institutions and organizations to the capital. Due to the unplanned nature of this development, Taşhan and a few rental houses became insufficient, highlighting the urgent need for the development of housing and accommodation facilities. Following the construction of rental apartments and government-built housing, cooperatives and social housing projects also played a significant role in the capital's urban development, Ankara. Lojmans, also known in Turkey as " memur meskeni (government housing)," " kurum konutu (institutional housing)," or "kamu konutu (public housing)," have been a vital housing model in meeting the housing needs of the working population.

This paper evaluates the government-built lojmans constructed for the housing needs of civil servants under the scope of social housing; the housing development, zoning, and regulations created for urbanization in the capital Ankara; and the concept of social housing. Within this framework, a chronological evaluation was made using archival data and a literature review. The study mainly focuses on the Ankara lolmans under the T.C. Presidency State Archives Presidency, examining and evaluating them in terms of the spatial organization, including site plans, their positions within the campus about the Archive buildings, and the assembly and hierarchy of the blocks along with their relationships with recreational areas. The data obtained is presented with various graphic representations and visuals to support the analysis.

1. INTRODUCTION

Ankara, which had a population of around 30,000 in the last years of the Ottoman Empire and is located in the center of the city today, has undergone tremendous growth during the Republic period, becoming Turkey's second-largest metropolis. The old fortress of Ankara has transformed into a modern city of note with a population exceeding 5 million. This process occurred in two main stages, before and after becoming the capital [1]. The city has a long history, undergoing significant evolutions from the old fortress and surrounding settlements to its present-day metropolis status. Despite its limited population during the Ottoman period, Ankara's rapid urban growth during the Republic era has led to significant economic, cultural, and social changes [2]. With Ankara becoming the capital, the city expanded outward, implementing modern infrastructure and urbanization projects. This process has transformed Ankara into an administrative center and an economic and cultural hub of the country [2].

[1] The preliminary version of this paper was presented at the Mimar Kemaleddin Symposium organized by Gazi University Faculty of Architecture in Ankara on December 27-29, 2023.

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The Process Before Ankara Became the Capital

Ankara has hosted many civilizations, maintaining its importance due to its strategic location and status as a constant settlement. It reached its zenith during the Roman era. Ankara emerged as a significant intersection of the Roman Empire in Anatolia during the 1st and 2nd centuries A.D., leading to the development of its administrative, military, and commercial functions. During this period, the city was situated on the plains at the foot of the castle and experienced significant growth compared to the previous century. Ankara's expansion during the Roman period was mainly concentrated in the area between Dışkapı and Hacettepe, which reflects the city's strategic location at the intersection of important trade routes of the Roman Empire [3]. In the year 334 AD, Ankara came under the rule of the Byzantine Empire, and during this period, it was influenced by the Byzantine-Islamic struggles and faced several invasions. Despite the damages from these invasions, the city was reconstructed. In the Middle Ages, Ankara followed a model observed in European cities by withdrawing within its walls and appearing as an actual border city. Due to its strategic importance during this period, Ankara was constantly at the center of various political and military events [4]. During the development period of the Ottoman Empire, Ankara emerged as an important trade center. The existence of more than 30 hans (caravanserais) in the city and the Bedesten (covered market) built in the XV-XVII centuries indicate the intense commercial activities during this period [5]. The establishment of political unity by the Ottoman Empire in Anatolia, along with ensuring the security of interregional trade, led to increased market opportunities for production in cities. In this context, Ankara's population grew during this period, particularly witnessing significant development in the southern and western directions around the city fortress (Figure 1) [2].

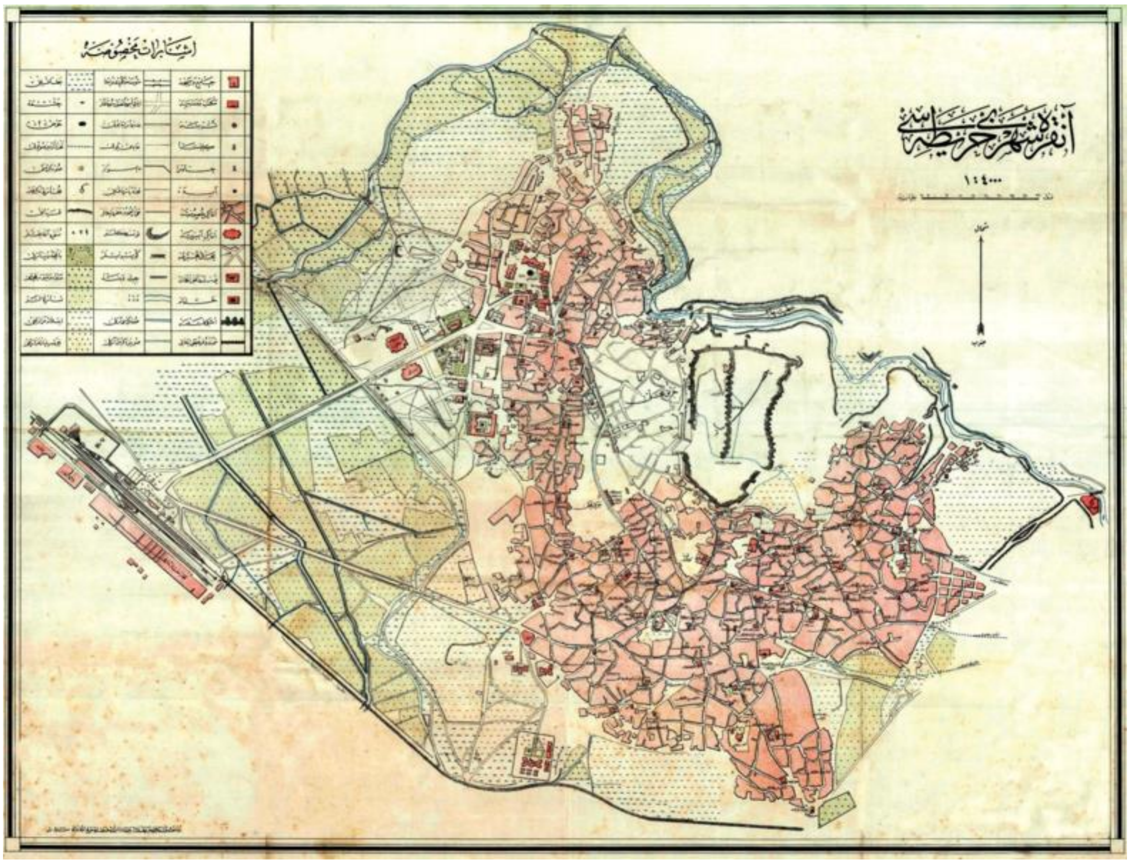


Figure 1. *1924 city map of Ankara* [32]

Ankara maintained its status as an important city until the 19th century. However, during the decline of the Ottoman Empire, the town lost its former significance. Towards the end of the 19th century, signs of revival appeared in Ankara, and in 1892, it was connected to Istanbul by railway. This development not only influenced the city's socio-economic life but also its physical appearance. Warehouses and depots were established, and the Station and Talatpaşa avenues, which connected the station to the old city, were opened during that period. The Ulus area developed at a faster pace.

However, by the end of the 19th century and the beginning of the 20th century, Ankara's population dropped to 20-25 thousand due to wars and the 1917 fire. Despite this challenging period, these declines in Ankara's history would pave the way for significant development and transformation of the city in the subsequent years.

The Process After Ankara Became the Capital

Mustafa Kemal chose Ankara as the headquarters for the War of Independence; the Representation Committee settled in Ankara on December 27, 1919, the convening of the Grand National Assembly of Turkey (TBMM) on April 23, 1920, and the establishment of the new government significantly influenced the spatial, demographic, and socio-economic structure of Ankara. With the proclamation of the Republic on October 29, 1923, not only was there a regime change, but also the capital, which had become synonymous with the old regime, was abandoned. Ankara, the center of the War of Independence, was designated as the capital on October 13, 1923, with a decision taken. This decision changed the fate of Ankara [6]. The spatial strategy behind selecting Ankara as the capital included military and political factors and an ideological stance against the old regime.

An essential factor was creating a center of gravity in Anatolia for the country's service provision. This strategic decision positioned Ankara as a political center and provided an opportunity for economic and cultural development. They were being chosen as the capital allowed Ankara to play a significant role in the construction of modern Turkey and facilitated the country's development as an administrative center. After the declaration of the capital, the housing problem came to the forefront with the arrival of bureaucrats and government officials to Ankara. Until the early 1900s, there were only one or two small accommodation units in the city, but their numbers increased in the 1930s. The most important of these structures is Taşhan. Since the 1930s, Taşhan has been used as a hotel named Taşhan Palas (Figure 2). This building, with its architecture and capacity of 60 beds, played an essential role in Ankara's social life in the early years of the Republic, becoming one of the core social spaces of the city, contributing not only to accommodation but also to Ankara's cultural and social life [7].

Figure 2. *Ankara Taşhan -Salt Archive* [33] [34]

The rapid increase in public buildings and industrial areas after 1950 led to a serious housing problem in Ankara, where the housing demand could not be met, and the problem of informal settlements, known as "gecekondu," emerged. In 1966, the "Gecekondu Kanunu" had to be enacted [8]. The construction of low-standard housing due to compulsory reasons affects the city's appearance. As a solution to the increasing housing problem and the city's appearance, planned housing areas such as mass housing projects and housing cooperatives began. In order to facilitate the establishment of housing cooperatives by the increasing number of civil servants due to the strengthening of the newly established state institutional organization, an advance payment of half of their salaries was granted to civil servants in

1925 [9]. The 1944 Law on the Construction of Civil Servants' Housing is a law that regulates the construction of housing for civil servants. This law granted the Ministry of Public Works the authority to construct civil servant housing in areas where it was needed. In Ankara's Saraçoğlu Neighborhood, 434 houses, which the government owned under the law, were built, and these houses were especially rented out to high-level bureaucrats. This practice aimed to meet Ankara's growth and urbanization needs at that time [9]. During these years, banks and institutions started to provide housing loans to public employees and workers [10]. Thanks to these loans, employees could become homeowners individually or in cooperatives.

Another solution to the housing problem was the construction of staff lodgings. Lodgings are housing units provided to employees such as workers, civil servants, or staff by a public or private institution or company. These units are generally owned by the government or the employer, and occupants usually pay rent. Management and maintenance of lodgings are typically the responsibility of the government or the employer. Among the lodgings built in Ankara to solve the housing problem, the 'State Archives Ankara Lodgings' hold an important place.

In this context, a detailed literature review was conducted to explain the significance of the State Archives Ankara Lodgings, which were selected as the first place in the 'State Archives Site Project Competition' and implemented. Meetings were held with the residents of the lodgings and the officials working in the state archives to gather oral and written information about the lodgings. Based on the fieldwork and collected information, the lodgings' location, plan, and section were drawn, and the structures were photographed and documented. The competition phase of the lodgings was presented in a tabular form.

2. PLANNING PROCESS OF ANKARA AFTER THE REPUBLICAN PERIOD

As the capital, Ankara is the most important implementation area of the Republic's modernization project. One aspect of the modernization project implemented by the Republic in Ankara is directly related to new vital principles. The other aspect is related to the newly designed spaces for these new vital principles that are attempted to be disseminated in society [11]. The selection of Ankara as the capital has not only carried a social dimension but also led to significant changes in the city's spatial, economic, and cultural appearance. The rapidly increasing number of public institutions gave rise to a new social class, the civil servant sector, contributing to Ankara's social fabric. This process made the city a massive construction site, pioneering spatial changes. Ankara embarked on a significant urbanization process with the evolving construction activities for new public buildings, infrastructure projects, and housing, initiating a transformation within the society [2]. The designation of Ankara as the capital and the housing needs of the bureaucrats and civil servants arriving in the city led the housing policy of the time to focus primarily on civil servant housing. After the Republic, the housing policy was generally divided into three periods, and researchers studied them accordingly. These periods are 1923-1950 (the period including the establishment of the nation-state/civil servants' housing problem), 1950-1980 (the period of rural-to-urban migration of the workforce/worker's housing problem), and post-1980 (the period when capital established hegemony in cities) [10]. Ilhan Tekeli, on the other hand, includes the period from the second half of the 19th century to the Republic in the process. In his approach, he discusses adopting the Western world's urban planning developments in Turkey during the modernization process in four sections [12]. Below, the housing policies starting from Ankara becoming the capital are discussed chronologically. The process that began with establishing the Ministry of Exchange, Reconstruction, and Settlement in 1923 attempted to be resolved with laws and decisions aimed at civil servant housing needs, and the practices within this scope are indicated in the table (Table 1).

Table 1. *Post-Republic Housing Policies*

DATE	LAW/DECISION	EXPLANATION
1923	The Ministry of Exchange, Reconstruction, and Resettlement (Mübadele, İmar ve İskân Bakanlığı) has been established.	Various policies were developed to meet the housing needs of migrants coming with the Treaty of Turkish-Greek Population Exchange signed in Lausanne in 1923, and bureaucrats and officials arriving in the city due to Ankara becoming the capital.
1925	The Civil Servants' Housing Law (Memur Konutları Yasası) Law No. 586	It was decided to provide civil servants with an advance equivalent to half of their salaries to establish housing cooperatives.
1926	The Real Estate and Orphans' Bank (Emlak ve Eytam Bankası) has been established by Law No. 844.	Civil servants and applicants were enabled to obtain housing loans. Saraçoğlu Neighborhood is also a successful activity of this bank.
1928-29	Law No. 1352	The Ministry of Finance was granted the authority to build official buildings and civil servant residences with Treasury resources, but it was not implemented.
1932	Jansen Plan	It was put into practice.
1929	Law No. 1452	The practice of providing housing compensation to civil servants was initiated and lasted from 1929 to 1951.
1944	The Civil Servants' Housing Law (Memur Konutları Yasası) Law No. 4626	With the Law No. 4626 dated 1944 on "Construction of Civil Servant Residences," the construction of civil servant residences became one of the duties of the state. The Ministry of Public Works undertook this task. The law was implemented in the Saraçoğlu (Namık Kemal) Neighborhood in Ankara.
1946	The Real Estate and Orphans' Bank (Emlak ve Eytam Bankası) has been transformed into Turkey's Real Estate Credit Bank (Türkiye Emlak Kredi Bankası).	It was tasked with building and selling buildings, as well as supporting the construction, building materials industry, and trade.
1948	5218 sayılı yasa	Shanty towns within municipal boundaries were legalized. This law was also the first law that acted as a shanty town pardon.
1949	Law No. 5417, the "Old Age Insurance Law (İhtiyarlık Sigortası Kanunu)	It aimed to solve the increasing housing problems of workers.
1950	Social Security Institution for Workers (İşçi Sigortaları Kurumu)	It started to provide housing loans. It only provided housing loans to cooperative members.
1961	Army Mutual Assistance Institution (Ordu Yardımlaşma Kurumu (OYAK))	It provided its members with individual housing loans and cooperative housing loans.
1971	Social Security Institution for Tradesmen, Artisans, and Other Self-Employed Individuals (Esnaf ve Sanatkârlar ve Diğer Bağımsız Çalışanlar Sosyal Sigortalar Kurumu (Bağ-Kur))	It offered credit facilities to its members.
1984	Mass Housing Law (Toplu Konut Kanunu)	When the law came into effect, the housing loan practices of social security institutions ended, and loans began to be provided within the framework of the Mass Housing Fund.

Ankara has emerged as a model city in the tangible realization of a modern and enlightened vision for Turkey. This has been achieved partly due to the influence of an ideology supported by the state. The fact that Ankara was founded as a new city allowed it to fulfill its roles more efficiently in the modernization process. This situation enabled the rapid modernization of the city's physical and social structures [15]. Housing projects carried out with state support have been directly associated with modernization, making significant contributions to this transformation. These projects have met the need for housing and promoted new lifestyles and social norms, contributing to the widespread adoption of modern urban planning. Planned urbanization and modern architectural concepts have come to the forefront during this process, creating urban fabrics enriched with elements such as wide avenues and boulevards, green spaces, public parks, and public buildings that cater to societal needs.

3. STATE-BUILT HOUSING

The term "state-built housing" is used broadly in the literature. Housing units owned by the government (such as cooperatives, local government housing, etc.) and housing constructed or financed by the state are referred to as state-built housing. State-built housing is defined as housing units directly produced, owned, or managed by the government through local or central government decisions.

The concept of "state-built housing" is difficult to define precisely due to its variety, but it essentially refers to housing units under government control. These units are typically designed to cater to low-income groups [13].

Since the beginning of the Republic of Turkey, great importance has been given to the country's development, urbanization process, housing issues, and particularly meeting the housing needs of workers and civil servants through housing policies [13]. With Ankara being designated as the capital, the housing problem arose for bureaucrats and civil servants moving to the city, and state-built housing became a solution to the housing needs arising from post-Republic industrialization and the increasing need for housing in cities. Numerous mass housing projects, lodgings, and industrial facilities have been constructed with government support. For example, in 1925, seven sample houses were built in Ankara by Architect Kemaleddin Bey and Arif Hikmet Koyunoğlu for the Directorate General of Foundations. These houses, intended for rental by civil servants, were situated within their gardens, each featuring unique design characteristics (Figure 3) [31].

Figure 3. *The sample houses of the Directorate General of Foundations, Kemaleddin Bey and Arif Hikmet Koyunoğlu* [16]

With government support, the first mass housing project designed for government officials was implemented in Ankara-Bahçelievler in 1935 (Figure 4). The construction of government employee housing was aimed at Law No. 1352 in 1928 to meet the housing needs. The same year, architect H. Jansen proposed workers' quarters and government employee housing in the Ankara urban planning competition he won, targeting low and middle-income groups. However, neither the government employee housing nor the workers' quarters were built, and instead, the Bahçelievler mass housing project designed by H. Jansen was constructed. This project developed a modern urbanization concept in Bahçelievler, with two-story houses designed in a garden-city style within green areas, along with a market, PTT (Post, Telegraph, and Telephone) building, police station, and tennis club. H. Jansen's approach in this mass housing project in Ankara can be seen as a negotiation between the new and the old, reading the modernization process through spatial transformations [17].

Figure 4. *Bahçelievler mass housing project plan, photograph from 1934 [17].*

The mass housing project in what is now called Namık Kemal Mahallesi, formerly known as Saraçoğlu Mahallesi, designed for "high-level bureaucrats and military personnel" between 1944 and 1946, can also be cited as an example of the housing projects in Ankara (Figure 5). In 1944, with Law No. 4626, "Construction of Officer Residences," the construction of officer residences became one of the state's duties. The Ministry of Public Works took on this responsibility, prioritizing Ankara in the law. In the rare example of its implementation, 434 government-owned residences were built in Ankara's Saraçoğlu (Namık Kemal) Mahallesi and rented out to high-level bureaucrats [13].

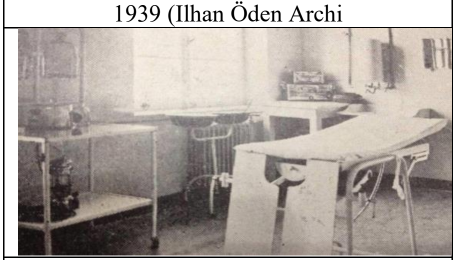
Figure 5. *Saraçoğlu Mahallesi housing project and photographs [18], [19], [20]*

Mass housing and lodges designed for clerks, workers, and engineers working in industrial facilities that started to be established during the Republic era are also among the state-built housing. The first industrial facility built in Turkey is the Kayseri Sümerbank Cotton Mill and its campus (Figure 6). The campuses include schools, shops, playgrounds, sports fields, parks, libraries, lounges, and open communal spaces.

Figure 6. *Photo and campus plan of Kayseri Sümerbank lodges [35],[21]*

The subject of the study, the State Archives site, is another example of lodges constructed by the state. Lodges are housing units provided by a public or private institution or company to employees such as workers, civil servants, or staff. The government or the employer generally owns these accommodations, and occupants typically pay rent. The origin of lodges can be traced back to the Ottoman period when single-room housing units known as "Hücerat" (cells) were the precursors of worker housing. These single-room units, which first appeared in the 15th century in the Ottoman Empire, are the earliest examples of worker housing. During this period, these structures, known as Hücerat or worker houses, accounted for 37% of the total housing stock in the 15th century [22]. Lodges constructed by the state after the Republic period are generally within walking distance of workplaces. Within the same campus, there are shopping units, a swimming pool, sports facilities such as basketball, football, and tennis courts, entertainment venues such as cinemas, ballrooms, and casinos, as well as vocational courses and schools for primary and secondary education as social amenities (Table 2). Social activities such as music groups, sports competitions, theater performances, etc., in which lodge residents can participate, are organized.

Table 2. *Examples of social life in lodges - Nazilli Sümerbank Factory [23]*

		
Nazilli Sümerbank Factory Music Band - 1939 (Ilhan Öden Archi	Sumer Music Group -1939 (Günver Güneş Archive)	Nazilli Sümerbank Factory Nursery (İlhan Öden Archive)
		
Nazilli Sümerbank Printing Factory Hospital Examination Room (İlhan Öden Archive)	Nazilli Sümerbank Factory Opening Day with Sümerspor Photographers (Günver Güneş Archive)	Young Girls in Sewing Course at Sümer Community Center (İlhan Öden Archive)

Lojmans and social housing, allowing employees to live in modern spaces designed differently from the traditional urban fabric, have provided opportunities for socialization and the involvement of women in work and social life. These structures built by the state have aimed to achieve the goals of social modernization and industrialization in these building complexes and sites. Therefore, loans or social housing are not just solutions to a housing need but are spaces for implementing the ideology of modernization. Along with the modernization process, they contribute significantly to transforming spatial and social life after the Republic. In this regard, these structures are of great importance. Additionally, the attachment developed by users to their work and environment, social memory, and experience of a way of life are fundamental aspects.

The housing units found in the State Archive site, which constitute the subject of the study, are examples of state-built lojmans. Therefore, their documentation and preservation are not only important for architectural heritage but also significant for social and cultural history. As discussed in the previous section, documenting and studying this valuable asset for preservation is crucial for understanding its architectural features and historical significance.

4. STATE ARCHIVE SITE LOJMANS

In 1959, the General Directorate of Archives submitted a letter stating the need for a modern state archive building to the Prime Ministry. The Prime Ministry considered this letter, and a commission was formed to conduct the necessary research and studies. In 1968, the commission completed its report stating the necessity of constructing the State Archive Building. The topic of State Archive buildings and facilities began to take shape after a long preparation process, which included examining modern archive buildings in different European countries. Based on the findings of these examinations, a needs program was prepared to determine how a building that meets the requirements should be. Following these stages, in 1971, the Ministry of Public Works and Settlement Directorate initiated the "State Archive Site Project Competition" as a free, national, and single-stage competition by the "Regulation on Architecture and Engineering Project Competition" [24], [25]. The needs program was organized to respond to various functions, as indicated in the table below.

Table 3. *Summary of Needs Program [26]*

1. Attached to the General Directorate;	a. National Archives Board b. Inspection Board c. Technical Affairs Directorate
2. Under the General Manager's Supervision;	a. Department Directorates b. Publication and External Relations Directorate c. Consultation and Transcription Directorate d. Archives
3. Attached to the General Secretariat:	a. Supply Directorate b. Personnel and Correspondence Directorate c. Conservation Directorate d. Department Directorate
4. General Facilities	a. Conference and Exhibition Hall b. Library c. Cafeteria
5. Staff housing (Lojmanlar)	

The projects submitted to the competition were evaluated by a jury composed of experts with diverse backgrounds. The jury members and rapporteurs are listed in the table below.

Table 4. *Names and Identities of Jury Members and Rapporteurs* [26]

Consultant Jury Members:	Mithat SERTOĞLU, Retired Director General of Prime Ministry Archives Fazıl IŞIKÖZLÜ, Deputy Director General of Prime Ministry Archives Hamit ŞERBETÇİOĞLU, Civil Engineer, Head of Construction and Planning Department Turgut TUNCAY, Architect, Urban Planning Department of Ankara Municipality İbrahim ULUALP, Mechanical Engineer
Main Jury Members:	Orhan AKYÜREK, Civil Engineer, Architect Hayri ALPTEKİN, Civil Engineer Cengiz BEKTAŞ, Civil Engineer, Architect Sedat GÜREL, Prof. Architect Sami SİSA, Civil Engineer, Architect
Substitute Jury Members:	Erdem AKSOY, Civil Engineer, Architect Adnan ÇAKIROĞLU, Prof. Civil Engineer İnal UŞŞAKLI, Civil Engineer, Architect
Reporters:	Metin Girgin, Civil Engineer, Architect Ali Üstüner, Architect

The architectural competition for the Ankara State Archive Site concluded on February 21, 1971. The results were published in the Official Gazette of the Republic of Turkey on Sunday, March 14, 1971, by the Directorate of Construction and Planning of the Ministry of Public Works.

The architects who were awarded in the Ankara State Archive Site Architectural Project competition are as follows:

1. Award: Vesile Gönül Aslaner, Architect, Mustafa Aslan Aslaner, Architect
2. Award: Yurdanur Sepkin, Architect, Öner Olcay, Architect, Halis Pektaş, Architect
3. Award: Enis Kortan, Engineer Architect
4. Award: Alpay Aşkun, Architect, Gültekin Korucuklu, Architect, Yalçın Çıkınlıoğlu, Architect
5. Award: Rezan Önen, Engineer Architect, Yavuz Önen, Engineer Architect

1. Honorable Mention: Turgut Alton, Architect, Tuncay Çavdar, Architect, Alparslan Ataman, Architect, Fulin Bölen, Architect
2. Honorable Mention: Eren Boran, Architect, Ersen Gömleksizoğlu, Architect
3. Honorable Mention: Adnan Taşçıoğlu, Engineer Architect

The award-winning projects were exhibited at the Chamber of Architects exhibition hall until March 15, 1971.

The architectural team led by Architect Vesile Gönül Aslaner and Architect Mustafa Aslaner was selected by the jury as the first prize winners.

The construction of the State Archives Site is included in the Third Five-Year Plan. Therefore, construction of the State Archives Site began in 1974 in Ankara on an approximately 108-acre land, based on the winning project of the competition being developed [25]. According to the competition's program, in addition to technical units, common areas such as a conference hall, exhibition hall, library, and dining hall were included, and the competition project also included the construction of lodgings. The building covers 10,400 m2 on a 108,000 m2 plot of land and has a total area of 38,210 m2. Of this, 5,978 m2 is for the general directorate, 30,364 m2 for warehouses and department directorates, 638 m2 for the dining hall and garage, and 1,230 m2 for lodgings [28].

The State Archives Site's construction began in 1974 and was completed and inaugurated on October 29, 1988. The spatial organization, massing, and material selection of the State Archives Site were considered as a whole. This monumental complex of buildings, creating an impressive impact, allows different functions to work together functionally and reflects a geometric harmony in its designed spaces to meet various needs, making it a modern building and an essential work of Republic-era archiving [24], [28].

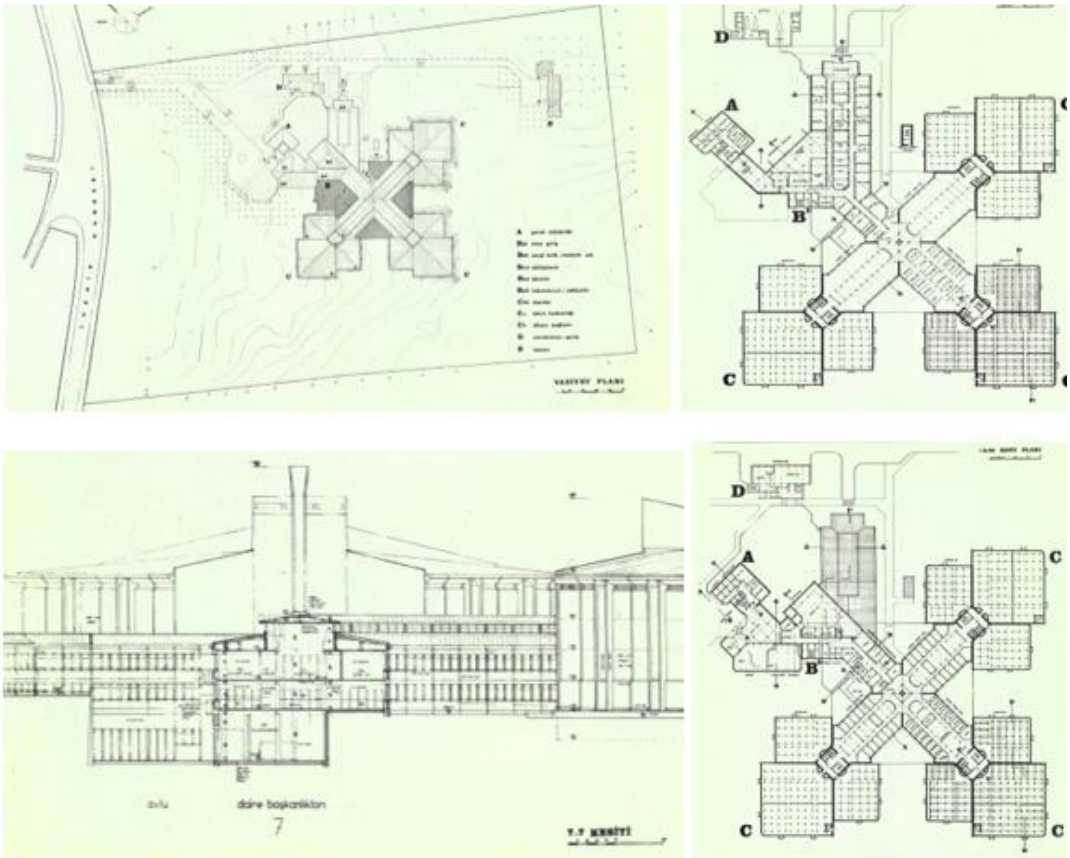


Figure 7. *Drawings of the State Archives Site [28]*

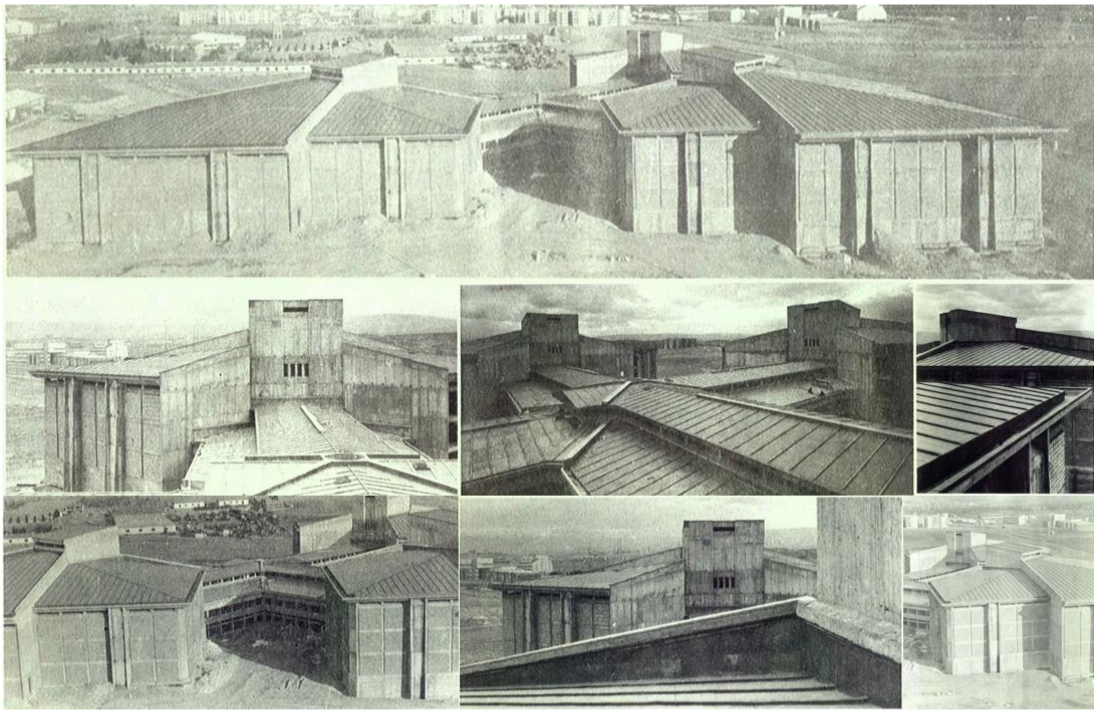


Figure 8. *Drawings of the State Archives Site [28]*

4.1. Location / Site Plan

The Presidency State Archives Directorate is in the Gayret Neighborhood of Yenimahalle district. Surrounding the Presidency State Archives Lojmans are the Presidency State Archives building itself, the Ankara Tax Directorate, and Ministry of Agriculture and Village Affairs Lojmans, the former National Intelligence Organization (MIT) campus, and currently active MIT residences.

Figure 9. *The State Archives Site [29]*

There are 3 apartment blocks on the State Archives site. The apartments are constructed southeast of the archive building, bordering Ahmet Hamdi Street. The apartments are named E-1, E-2, and E-3. Access to the apartments is provided from 2 different points. The entrance to the apartments can be reached either from the entrance between the E-3 block and the security building on Ahmet Hamdi Street or from the main entrance of the Archive Building on 95th Street. Approximately 50 m away from the apartments, there is a boiler room, and at the intersection of Ahmet Hamdi Street and 95th Street, there is a soccer field. The closest apartment block to the archive building is the E-2 block, approximately 130 meters away. The E-1 and E-3 blocks are parallel, while the E-2 blocks are positioned perpendicular to these blocks. There is an inner courtyard for vehicle entry in front of the blocks. Since the terrain rises towards the north, a ramp is in front of the E-2 block.

Figure 10. *Surroundings of the Apartments*

Greenery and landscaping have been prioritized at the State Archives site. The abundance of shared spaces allows residents to spend time together. In addition to the greenery, walking paths provide a spacious environment. Along the walking paths, there are seating areas at specific points. Another shared space is the children's playground located around the blocks.

Figure 11. *Green area and children's playground*

In addition to the common areas surrounding the blocks, each block has its gardens due to direct access from the ground floors of the blocks. Stairs provide access to different levels due to the slope between the blocks, leading to internally organized gardens and green areas for the users between the lodgings.

Figure 12. *Gardens and Green Areas of the Lodgings*

Approximately 10 parking spaces are next to or in front of the blocks. After entering the State Archives site by car, access to the area where the lodgings are located can be provided by car. Open and semi-open parking lots serve the residents of the lodgings.
The garden walls surrounding the State Archives site are original and have been preserved until today. However, metal railings will later be added to the cast concrete garden walls.

Figure 13. *Original garden walls*

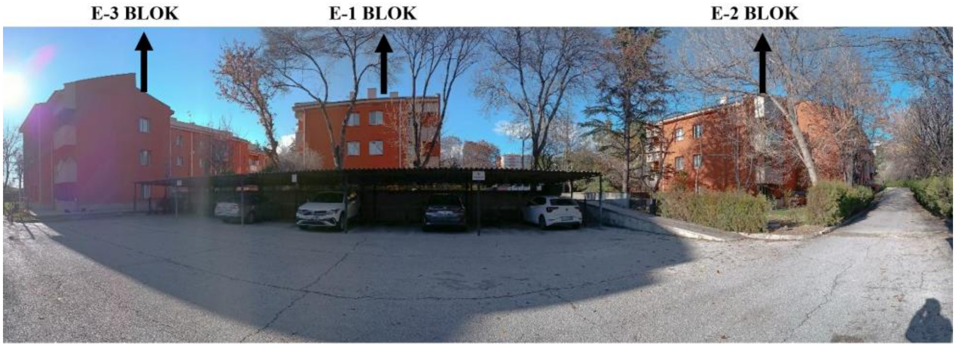


***Figure 14**. Location of the Lodges*

4.2. Facade Design

The apartments are constructed in a reinforced concrete frame system. Due to the slope in the area where the apartments are built, there is an elevation difference. The foundation levels of the blocks are constructed differently from each other due to the elevation difference. Therefore, the blocks vary in height with 2 or 3 floors. The differentiation in elevations and the different entrances to the apartments are reflected in the facade design. Because of the slope, the blocks placed at different elevations have a staircase with a height of one and a half meters at the building entrance for access. Additionally, there are windbreakers at the building entrances to protect against cold and wind.

,

***Figure 15**. Facade Design*

The apartment block facades are designed quite simply with no decorative elements. There are no decorative elements on the facade. The staircase, windbreakers, doors, windows, balconies, and roof on the facade provide movement. Renewed the construction work for the painting, external insulation, and finishing of the E1, E2, and E3 apartment blocks of the Ankara State Archives General Directorate in 2015 [30]. The original exterior of the building has yet to be preserved. The balcony projections are painted cream, while the other walls are painted terracotta.

Similarly, with the addition of later architectural elements or changes, the original appearance has yet to be preserved. The door and window openings have been preserved, but the frames have been replaced with white PVC. The entrance doors to the building have been replaced with aluminum doors. Due to the floor plan, the different floor heights in blocks with various numbers of floors also add movement to the facade.

Figure 16. *Facade Design*

4.3. Plan Organization

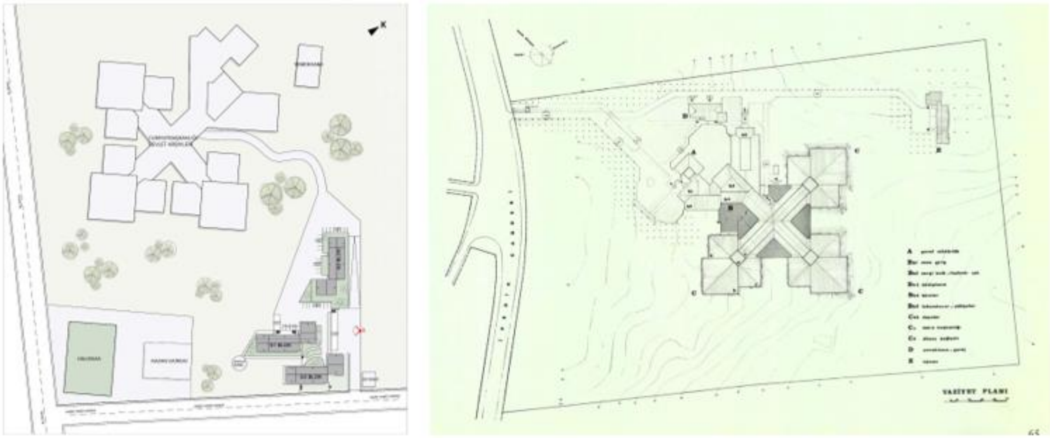


Figure 17. *State Archive Site Location Plan*

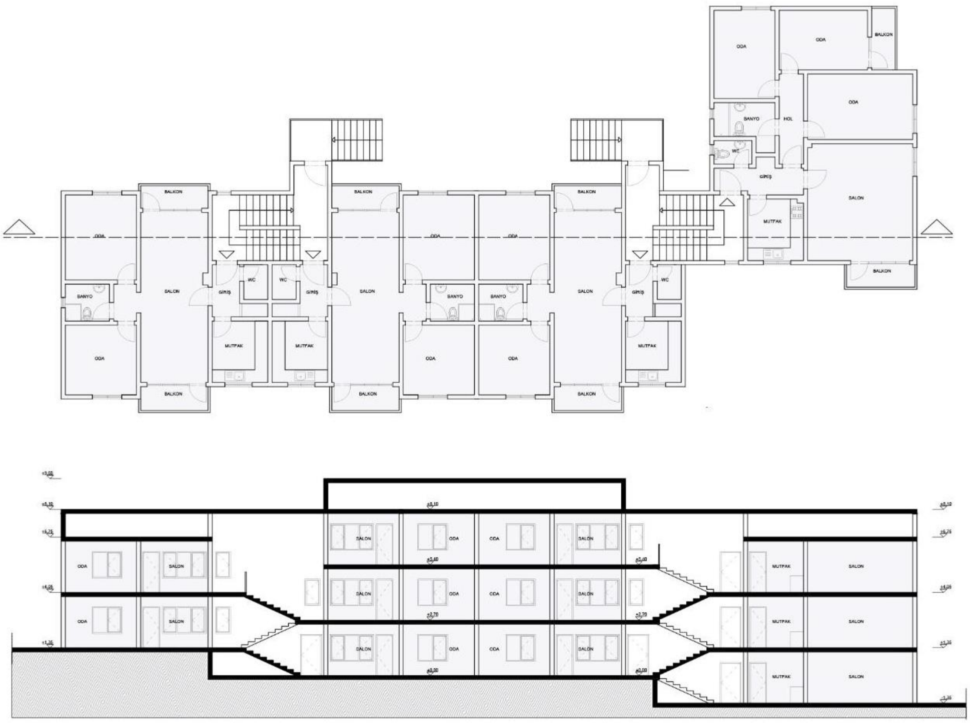


Figure 18. *Plan and Section of E-1 Block*

There are 9 units of 3+1 apartments and 24 units of 2+1 apartments in 3 blocks of the State Archives Site Residences. Due to the slope of the area where the residential blocks are constructed, the foundation levels are positioned with a staggered arrangement, and the apartments are also arranged in a staggered manner. The E-1 block, with its plan and a section provided, has 2 main entrances. In the section where entrance A is located, there are 3 units of 2+1 apartments and 3 units of 3+1 apartments. Upon entering the building, the 3+1 apartment, number 1, is half a floor below, and the 2+1 apartment, number 2, is directly opposite. On the side where entrance B is located, there are 5 units of 2+1 apartments. Access to the apartments is provided at a half-floor level. The staircase shafts give access to the apartments at different levels from the landings. The original staircase handrails, balustrades, and staircase steps have been preserved in their original state up to the present day.

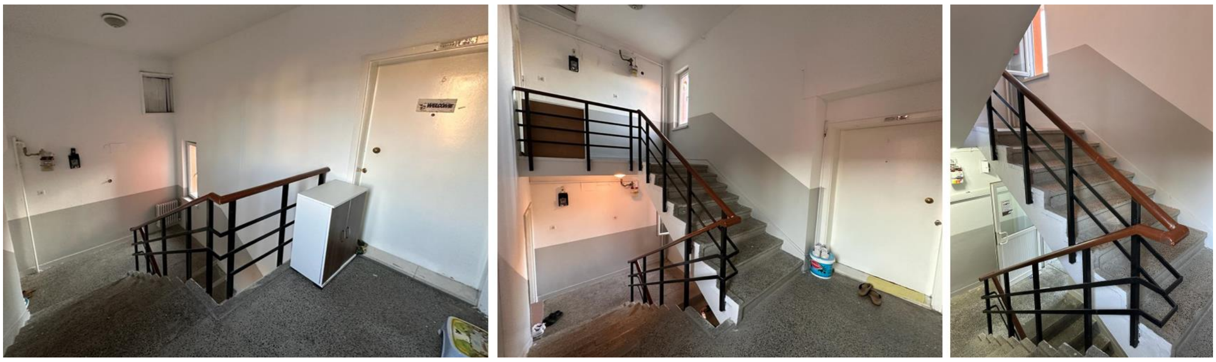


***Figure 19**. Staircases of the Residences*

In the blocks, the 2+1 apartments are positioned adjacent, while the 3+1 apartments are shifted and placed at the ends of the blocks. Therefore, the blocks have an L-shaped footprint on the ground. While the E-1 and E-3 blocks do not have basements, the E-2 block has a basement floor for technical infrastructure.

3+1 apartments

***Figure 20**. 3+1 Apartment Plan*

There are 9 units of 3-bedroom and 1 living room apartments in each block, 3 units per block. The net area of these apartments is approximately 100 m2. These apartments have a plan scheme consisting of rooms around an L-shaped corridor. The entrance door to the apartment opens into a hall. One can reach the toilet, kitchen, and living room from the entrance hall. The toilet is located opposite the entrance door. Next to the toilet door is a niche designated as a cloakroom. Next to the entrance door, there is the kitchen. The window of the kitchen space is located in front of the sink. At the end of the entrance hall, there is the living room. The living room has a balcony facing the inner courtyard. The door opening to the balcony is designed as a French window. In addition to the balcony window in the living room, there is another double-leaf window facing the north. The L-shaped hall divides into two arms separated by doors. This allows for the distinction between day and night areas. Continuing from the separated hall, there are 3 bedrooms. The corner room has a balcony.

2+1 apartments

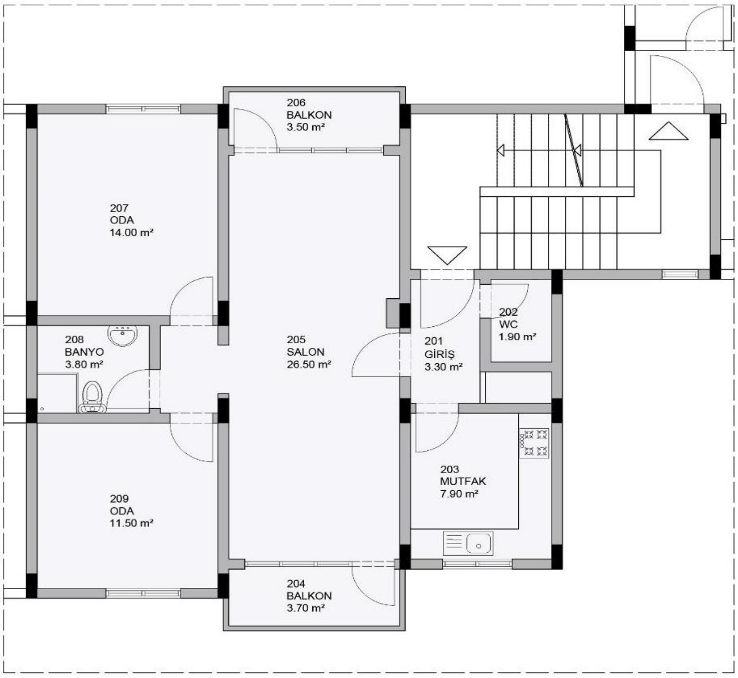


Figure 21. *2+1 Apartment Plan*

There are 24 units of 2 bedrooms and 1 living room apartments in each block, 8 units per block. The net area of these apartment is approximately 80 m2. The main entrance door opens into a rectangular-shaped hall. One can access the kitchen, toilet, and living room from this hall. There is a toilet next to the main entrance door. Next to the toilet, there is a niche used as a cloakroom. Opposite the entrance door, there is the kitchen. The kitchen counter is in an L-shape, and the window of the space is in front of the sink. The living room is in the middle of the apartment, and access to other rooms is through the living room. The living room has balconies on both sides. The bedrooms are positioned opposite each other, and a bathroom is located between the two bedrooms.

5. CONCLUSION

Ankara's selection as the capital and its development as a new city led to the housing needs of bureaucrats and officials, which in turn directed the era's housing policy primarily towards the needs of civil servants. As one of the cornerstones of this modernization process, state-supported housing projects solved the housing problem and promoted new lifestyles and societal values.

During this period, modern urban planning principles gained importance, and the city was equipped with wide avenues, ample green spaces, public parks, and public buildings designed to meet the community's needs, all contributing to a new urban identity. These developments allowed Ankara to emerge as a symbol of modern Turkey and made significant contributions to the modernization process.

In conclusion, state-supported housing projects played a significant role in shaping modern Turkey and led profound transformations in architecture and urban planning, providing substantial contributions to the modernization process. These projects emerged as essential tools supporting the modernization of societal structures and physical spaces.

The competition project of the State Archives site and the lifestyle depicted therein through spatial organization and modern architectural lines aim to convey the significance of this monumental architectural complex. This structure and era are noteworthy examples of the application of contemporary living methods and the representation of spatial changes. In this context, the plans, campus positions - relations with archive structures, and the creation and hierarchy of the blocks with recreation areas of the State Archives Site have been addressed. The building's site plan, floor plans, and section have been drawn, and the building has been documented through photography.

Lodgings evolve depending on social, economic, and technological factors that change over time. Therefore, significant differences emerge between lodgings built in different periods. There are differences between contemporary lodgings and the State Archive Site Lodgings regarding plan typology, design style, materials used, and structural solutions.

The housing units within the State Archives site, which are the subject of this study, are examples of state-built housing. Therefore, their documentation and preservation are crucial not only for architectural heritage but also for social and cultural history. This article emphasizes the significance of the State Archives Site in the context of the efforts made towards housing solutions for the public and bureaucrats after Ankara became the capital.

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The Role of Social Media in Shaping Industrial Design Practices: Insights from Turkish Practitioners

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Abstract

With the inclusion of internet technology in daily life, individuals have tended to conduct their social interactions in virtual environments. Social networking platforms, which bring together millions of people, have allowed people to move a large part of their living spaces to the virtual environment. These platforms, called social media, are occupying a more prominent place in our life day by day. Social media attracts great attention from users across a wide age range due to its interactive nature that allows interaction and gives individuals the opportunity to express their personal opinions.

This aim of the study is to examine the use of visual-based social media by industrial designers in Turkey and to analyse their usage habits. Since the research aims to measure the impact of social media on the industrial design profession, social media platforms were limited and the evaluation was made through visual interaction-based social media platforms.

During the data collection phase of the research, information was collected through a questionnaire distributed over the Internet to 269 industrial designers. The findings show that social media usage is inversely proportional to age; in other words, as age progresses, the duration of social media usage tends to shorten. It was determined that the device that users most frequently use to access social media platforms is the smartphone. In addition, statistical data on social media usage purposes were obtained.

1. INTRODUCTION

The rapid development of internet technologies and the rise of social media have been one of the elements that have shaped the basic dynamics of modern society since the beginning of the 21st century. This transformation; It has had profound effects on a wide range from access to information to communication styles, from ways of doing business to daily social interactions.

The new internet era, called Web 2.0, has brought to the fore the participation of users as content creators and multi-faceted interaction. The concept of Web 2.0, introduced by Tim O'Reilly [1], defined the internet as a dynamic and interactive platform beyond static pages. With the emergence and popularization of social media platforms, communication and information sharing between people have varied. Platforms such as Facebook, X, and Instagram have brought together billions of people, providing a vast stage for individuals to showcase their thoughts, experiences, and creativity. These platforms have come to play a central role not only for social interaction but also for various purposes such as news dissemination, marketing, and political campaigns.

Industrial design aims to increase the quality of life of individuals by building a bridge between functionality and aesthetics. This process starts with user needs and expectations and centres on their

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experiences. Social media provides designers with large data sets about their target consumer audience, providing valuable insights into user needs and wants. This gives designers access to user feedback that is difficult to access through traditional methods, as well as the opportunity to keep up with the current work of competitors and designers. Answers to questions such as which company has done what, what are the new trends in the sector, what do people need, are users satisfied with this product can be accessed through these interactive virtual networks. Hagen and Robertson [2] argue that social technologies also create new opportunities for participation and change traditional design methods. Beyond being a content-sharing platform for users, social media is also becoming a research tool for designers that allows them to better understand their target audience. Interactions on social media can provide valuable insights to designers, making user needs, expectations, and experiences more transparent and accessible. By leveraging discussions, shared content, and user interactions on social media platforms, designers can predict what users value, what aesthetic understandings they gravitate towards, and what functionalities they desire.

It can be mentioned that social media can provide support to industrial designers in the development of new products and services, improving existing products and services, and evaluating the performance of a product or service after it is launched. This article aims to examine this important interaction between industrial design and social media. The answers to the questions of which social media platforms the designers prefer, how much time they spend on social media platforms during the day, and for what purposes they use professionally were investigated.

2. WEB 2.0 AND SOCIAL MEDIA

With the spread of the Internet, individuals have started to maintain their social interactions in online environments through digital networks integrated into the daily lives of communities. Initial phase of the internet, known as Web 1.0, is characterized by websites where users could only view content, whereas with the advent of Web 2.0, the internet became more interactive and social. “Web 2.0," or second-generation internet services, have made digital networks more accessible, enabling users to engage actively in creating content and facilitating two-way communication [3]. The concept of Web 2.0, introduced by Tim O'Reilly in 2004, describes the internet as an environment formed through user collaboration. Web 2.0, unlike Web 1.0, has enabled users to take on the role of content producer, leaving the position of not only buyers [1]. This is the new era of the internet; It has offered a dynamic structure that supports multi-faceted interactions such as information sharing, social networking, blogging, and online games.

Web 3.0, which followed Web 2.0, represents a period where the internet became more intelligent and efficient through the incorporation of technologies such as artificial intelligence and machine learning. Web 4.0 defines our current era, where the widespread use of mobile devices has made the internet accessible anytime and anywhere, enabling continuous interaction between people and devices. Web 5.0 is the anticipated future phase. In this phase, it is expected that advancements in artificial intelligence and emotion analysis technologies will allow the internet to interact in a more human-centred and emotionally responsive manner [4]. This paper on social media focuses on Web 2.0, the phase which the web became interactive and social.

Manuel Castells [5] defines the social organizational structure that has developed with the emergence of Web 2.0 as a "network society". This new social structure can be clearly observed on social media platforms. The concept of Web 2.0-based social media, which allows two-way interaction, is defined by Boyd & Ellison [6] as:

“...social network sites as web-based services that allow individuals to construct a public or semi-public profile within a bounded system, articulate a list of other users with whom they share a connection, and view and traverse their list of connections and those made by others within the system.”

Kietzmann et al.[7], on the other hand, define social media as "…highly interactive platforms via which individuals and communities share, cocreate, discuss, and modify user-generated content." Another researcher, Tuten [8], considered social media as technological tools that enable communication, transfer and cooperation between interconnected individuals, communities and companies by looking at them from a marketing perspective. Kaplan & Haenlein [9] use social media as more inclusive. They defined it as "a group of Internet-based applications that build on the ideological and technological foundations of Web 2.0, and that allow the creation and exchange of user-generated content." Kaplan & Haenlein [9] stated that when an application with similar features is developed in the future, they keep their definition broad to ensure that it can be included under the inclusiveness of this definition.

Social media technologies enable many people to be together online at the same time. When social media statistics are examined, it is observed that the number of users is increasing every year. According to the 2024 statistics prepared by “we are social”; the number of internet users globally accounts for 66.2% of the total world population. The number of social media users is equal to 62.3% of the world's population. It is seen that the majority of internet users are also social media users [10].

In Turkey, 74.41 million people, accounting for 86.5% of the population, utilize the internet. The number of user IDs on social media is 57.50 million people, 66.8% of the population. When the user accounts on social media are compared with the number of individuals aged 18 and over, it is seen that 86.8% of the population is a social media user. The desire to communicate with friends and family has been stated as the first reason why people use social media in Turkey. The reasons for the next high rate of use are respectively; to gain knowledge, to spend leisure time, to discover content, to review products that can be purchased and to share ideas. The most used social media platforms between the ages of 16 and 64 were Instagram, Whatsapp, Facebook, X, Telegram, Tiktok, Facebook Messenger, Pinterest, Snapchat and Linkedin, respectively. It is seen that the top 3 social media platforms where the most time is spent in this age range are Instagram, Tiktok and Youtube [10].

It can be said that the way we interact has changed as social media has become an integral part of our lives [11–13]. The effects of internet technologies and social media on societal and cultural evolution are visible in community dynamics. Prensky [14] introduced the concept of "digital native" to describe today's young generation in his article titled "Digital Natives, Digital Immigrants Part 2: Do They Really Think Differently?". Digital natives, who grow up in the network society and can easily adapt to new technologies, perceive meeting online as natural and are more prone to producing, sharing and collaborating content through this environment than the previous generation. Tuten [8] shows social media as the place where digital natives live their social life. Prensky [14] named the previous generation, who were not born in a network society, who were introduced to the products of internet technologies after adolescence, and who felt alienated from internet technologies, as "digital immigrants".

In this context, the X, Y, and Z generations are among the most frequently referenced. People are classified into certain generations according to their birth year: individuals born between 1965 and 1980 are classified as Generation X; Those born between 1981 and 1999 are Y (also known as millennials); and individuals born or to be born between 2000 and 2020 represent Generation Z. Generation X is a transition generation that has witnessed a period in which technological developments are integrated into our social and individual lives. Members of this generation, based on their life experiences, tend to secure their future financially and find it important to save in this context. In business life, it is observed that they exhibit a competitive approach. Generation Y is defined as a group that develops in parallel with the evolution of digital technologies and places these technologies at the centre of their lives. The most striking characteristic of Generation Z is their intensive use of technological tools such as smartphones, tablets and computers [15]. Today, social media serves as a platform where the target demographic for industrial designers willingly engages, forms connections, acquires knowledge, and shares their thoughts.

3. INDUSTRIAL DESIGN AND SOCIAL MEDIA

Industrial design plays a crucial role in allowing manufacturers to stand out in the market through unique product differentiation. Social media is also conducive to creating new forms of communication and interaction between users and industrial designers. According to Yum [16] with the development of technology, communication in the online environment changes and turns into interaction. In addition to communicating with the help of social media, people get in touch with the likes of content, commenting, and many other interaction methods [6].

De Vere [17] explains the industrial design process in 4 steps as analysis, creation, definition and implementation (Figure 1). He states that social media can be used at many stages of the industrial design process. In the analysis phase, designers create a problem definition by researching the users who are their target audience. Industrial designers have an idea about the future user of the product or service while performing the act of designing [18]. Designer; in addition to demographic information such as age, gender, and education level, it also obtains information about the functional needs and aesthetic taste of users [17–20]. Social media makes it possible to access more data compared to traditional sociological methods. "Big data" obtained from social media provides researchers with much more information about human behaviour [21,22]. Social media, which contains a large amount of numerical data, is used effectively in many areas from researchers to companies, from governments to politicians. According to Zhan et al. [23], the most well-known benefit of using social media in the product development process is to provide information to organizations.

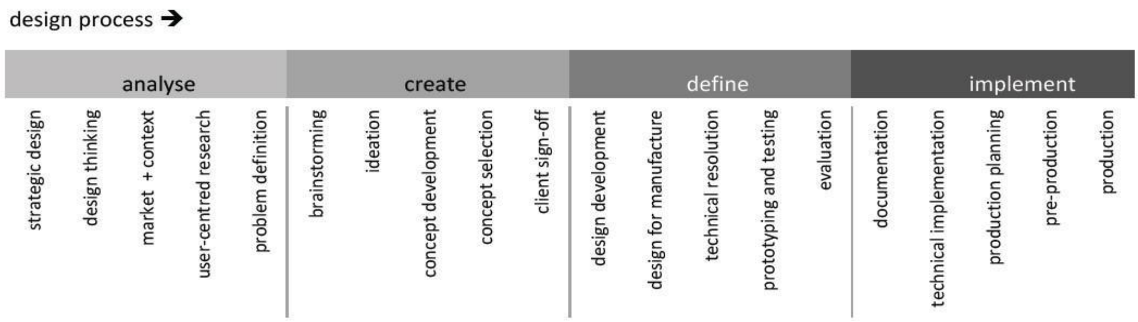


Figure 1. *The Design Process (De Vere, 2014)*

In the creative phase, user participation in the design process can be ensured through online environments. With the participation of more skilled users (engineers, designers) at the identification stage, the product solutions can be produced on the problems that may be experienced in production. Feedback can be obtained about the designed product or service. During the implementation phase, sponsors can be found with the project crowdfunding, and comments about the product can be received on forums and blogs with a preview [17]. Social media is characterized by being engaged, open, communicative, connected, and a sense of community [9]The characteristics of social media are compatible with participatory design. Social media enables collaboration between users and industrial designers in the analysis and creative stages of the design process.

According to Hagen & Robertson [2], social media offers a new way to participate. The fact that it does not require expertise and allows distant relationships creates an advantage for participation through social media [24]. According to Li [25], another advantage of social media is the ease of group creation. On social media, groups can appear almost instantly and can be made up of people from all over the world. With the opportunities brought by technology, groups have become more visible and powerful. The fact that social media allows for collaborative and simultaneous content creation is an important advantage for participatory studies [9]. While conducting an online study has the effect of reducing the cost of research, it can also provide access to a much wider geography and participants [26]. Näkki & Virtanen [27] stated that one of the biggest challenges in participatory design is to force people to be participatory and give feedback. On social media, people voluntarily participate and produce content. In addition, individuals who do not want to participate in face-to-face work have the opportunity to express themselves online.

4. METHOD

As part of this research, a questionnaire was carried out involving 269 industrial designers in Turkey. The survey method is a systematic and standardized data collection technique that allows the researcher to gain access to broad and comprehensive information about a specific segment of society [28]. Thanks to the homogeneity of the responses, questionnaires can be easily processed during data analysis and offer the opportunity to generalize across large data sets [29].

In this survey conducted with industrial designers, questions were prepared by limiting social media platforms as visual interaction-based social media platforms. These platforms are divided into three:

- Media Sharing Platforms: These are platforms such as Instagram and Facebook that allow the user to share media and interact through these media.
- Portfolio Sharing Platforms: These are platforms that allow designers such as Behance and Dribble to publish their works and interact through these works.
- Software Platforms: These are platforms such as Canva and Miro, which contain tools to help design, allow more than one user to connect online and design together, and where prepared designs can be published.

In the first part of the survey, there are factual questions that will create demographic profiles of designers. These questions revealed the factors of age, education level and professional experience. In the second part, the focus is on the social media usage habits of designers. This section includes questions to evaluate behavioural characteristics such as time spent on social media, reason for using social media, as well as potential relationships between these characteristics and demographic factors. The questions were prepared using multiple choice, short answer and 5-point Likert scale. Research indicates that social media use may be related to the demographic characteristics of individuals [30]. It is important for the study to determine whether there is such a relationship in this questionnaire as well.

In cases where it is impossible to reach the entire universe, general trends are determined with the help of samples. A sample is a subgroup that is supposed to be representative of the universe [31]. While selecting the sample from the universe of industrial designers, “stratified sampling” method was preferred. Obtaining a sample that has the competence to represent the universe in probability sampling is the main reason why this sampling method is preferred. In the stratified sampling method, which is one of the probability sampling methods, the demographic characteristics in the sample form the layers [32,33]. In this context, the selection of the "age" factor as the demographic characteristic considered in this research is a strategic decision. Especially when dealing with social media use and technological interactions, the age of individuals plays a decisive role in these habits and preferences. The fact that social media usage habits vary according to age groups has been the main motivation behind this choice.

Concepts such as "digital native", "digital immigrant" and “X, Y, and Z generations”, which are used to distinguish age groups, define the characteristics of different generations related to the use of technology and social media. These concepts were used as a guide in organizing the age ranges determined for the research. Thus, it is aimed that the results of the research reflect the social media usage habits of different generations more clearly and accurately.

$$n = \frac{N \times Z^2 \times p \times (1 - p)}{(N - 1) \times d^2 + Z^2 \times p \times (1 - p)}$$

In this formula:

n: Sample size

N: Total population (10000)

Z: Z score (based on confidence interval; Z=1.645 for 90% confidence level)

p: Success rate in the population (0.5)

d: Acceptable amount of deviation

For the universe, which is approximately N=10000 people, the estimated deviation amount is taken as d = 0.5, and the confidence level is (1-α) = 0.90. The Z value for this confidence level is 1.645. The sample size for N=10000 and 0.5 deviation was calculated with the above formula and the result was found to be 266 people [32]. Considering the sample size of at least 266 people predicted in this study, the preliminary application of the questionnaire was carried out meticulously on 13 individuals. As a result of this pre-test process, the questions that could not be understood or found ambiguous by the participants were updated, and the integrity and clarity of meaning of the questionnaire were increased by combining similar or repetitive expressions. The obtained sample size has been distributed as a percentage among age groups based on the age criterion selected in stratified sampling. Since most of the Generation Z group to collect data in the study is still university students, student designers were also included in the sample (Table 1).

Table 1. *Percentage distribution in the sample*

Age	Percentage in Sample	Generation	Digital Native or Immigrant
18-24	30%	Generation Z	Digital Native
25-30	25%	Generation Y	Digital Native
31-35	20%	Generation Y	Digital Native
36-42	15%	Generation Y	Digital Native
43 and up	10%	Generation X	Digital İmmigrant

After the completion of the pre-application, the survey questions were transferred to Google Forms, a web-based survey application. Internet-based surveys provide participants with access without time and place limitations. This allows researchers to reach a wide range of participants in a short period of time, while at the same time significantly reducing costs. Thanks to these features, many researchers prefer internet-based survey methods, especially in studies that appeal to wide geographies and demographic groups [32,34]. The survey was delivered to the participants using the “snowball sampling” method. This method is a recommended method for reaching special occupational groups. In this method, it is based on the fact that the current participants encourage other potential participants to be involved in the study by referencing or suggesting them.

5. FINDINGS

The survey was conducted online using Google Forms with a total of 269 people. The demographic information of the participants is given in the table below. 31.23% of the participants were between 18-24, 27.88% were between 25-30, 20.82% were between 31-35, 14.14% were between 36-42, 5.95% were between 42 and over (Table 2). The approximate percentages determined in the age-based stratified sampling to be reached were approached.

Table 2. *Distribution of demographic information of respondents*

	Frequency	**Percent (%)**
Age Range		
18-24	84	31.23
25-30	75	27.88
31-35	56	20.82
36-42	38	14.13
42 and above	16	5.95
Total	**269**	**100.00**
Educational Background		
PhD and beyond	31	11.52
License	142	52.79
Student	41	15.24
Master	55	20.45
Total	**269**	**100.00**
How long have you been practicing your profession? (Active working experience)		
0-5 years	113	42.01
10 years and above	43	16.73
5-10 years	70	26.02
I am a student	41	15.24
Total	**269**	**100.00**

Participants were asked a question about which tools they use to reach image-based social media platforms. Since image-based social media tools can cover many different purposes, these tools are divided into three as media sharing platforms (Instagram, Facebook, etc.), portfolio sharing platforms (Behance, Dribble, etc.), and software platforms (Miro, Canva, etc.). 92.94% of the participants access media sharing platforms via their smartphones. However, they mostly prefer the use of computers as a tool when accessing portfolio sharing and software platforms.

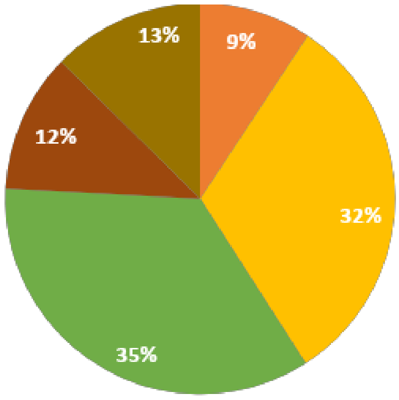
Table 3. *Tools used to reach image-based social media tools.*

	Frequency	Percent (%)
To media sharing platforms		
Smartphone	250	92.94
Computer	18	6.69
Tablet	1	0.37
Total	269	100.00

	Frequency	Percent (%)
To portfolio sharing platforms		
Smartphone	70	26.02
Computer	167	62.08
Tablet	23	8.55
I don’t use it	9	3.34
Total	269	100.00

	Frequency	Percent (%)
To software platforms		
Smartphone	41	15.24
Computer	194	72.11
Tablet	24	8.92
I don’t use it	10	3.71
Total	269	100.00

The time that participants spend on visual-based social media platforms on a daily basis varies. This data is visualized in the graph below (Figure 2).



Orange: Less than 1 hour / Yellow: 1-2 hours / Green: 2-3 hours Deep Brown: 3-4 hours / Brown: More than 4 hours

Figure 2. *Approximate daily time spent by respondents on visual interaction-based social media platforms.*

It was investigated whether there was a significant relationship between the age of the participants and the time they spent on social media. As a result of chi-square analysis, it was determined that there was a statistically significant relationship. As the age of the participants increases, the time they spend on image-based social media platforms decreases. Accordingly, the proportion of those in the 25-30 age group who spend less than 1 hour per day on visual interaction-based social media platforms (18.7%) is significantly higher than the 18-24 age group (1.29%) and the 31-35 age group (1.8%). In the 31-35 age group, the proportion of those who spend approximately 1 hour-2 hours per day on visual interaction-based social media platforms (48.2%) is significantly higher than the 18-24 age group (22.6%) and the 25-30 age group (22.7%). Among those in the 36-42 age group, the proportion of those who spend more than 4 hours a day on visual interaction-based social media platforms (34.2%) is significantly higher than the 18-24 age group (11.9%), the 25-30 age group (8%) and the 31-35 age group (8.9%). Among those aged 42 and over, the proportion of those who spend approximately 1 hour-2 hours per day on visual interaction-based social media platforms (87.5%) is significantly higher than the 18-24 age group (22.6%), the 25-30 age group (22.7%) and the 36-42 age group (21.1%). In the 31-35 age group, the proportion of those who spend approximately 1 hour-2 hours per day on visual interaction-based social media platforms (48.2%) is significantly higher than the 18-24 age group (22.6%) and the 25-30 age group (22.7%). The 18-24 age group, which we can call Generation Z, has been determined as the group that spends the most time on social media (Table 4).

Table 4. *Comparison of Time Spent and Age Information of the Participants*

			Age Range					
			18 - 24	25 - 30	31 - 35	36 - 42	42 and above	Total
How much time do you spend daily on visual interaction-based social media platforms?	Less than 1 hour	Frequency	1a	14b	1a	7b	2a, b	25
		Percent	1.2	18.7	1.8	18.4	12.5	9.3
	1 hour - -2 hours	Frequency	19a	17a	27b, c	8a, c	14b	25
		Percent	22.6	22.7	48.2	21.1	87.5	9.3
	2 hours -3 hours	Frequency	41a	29a, b	14b, c	10a, b, c	0c	94
		Percent	48.8	38.7	25.0	26.3	0.0	34.9
	3 hours -4 hours	Frequency	13a	9a	9a	0a	0a	31
		Percent	15.5	12.0	16.1	0.0	0.0	11.5
	More than 4 hours	Frequency	10a	6a	5a	13b	0a, b	34
		Percent	11.9	8.0	8.9	34.2	0.0	12.6
Total		Frequency	84	75	56	38	16	269

	Percent	100.0	100.0	100.0	100.0	100.0	100.0

Participants were asked to write the social media platforms they use the most as a short answer. The top five visual interaction-based social media platforms used by the participants were Instagram with a rate of 73.98%, Pinterest with a rate of 72.12%, Behance with a rate of 36.06%, Youtube with a rate of 31.23%, and Canva with a rate of 21.19% (Figure 3). According to this statistic, it is seen that industrial designers prefer media sharing platforms more.

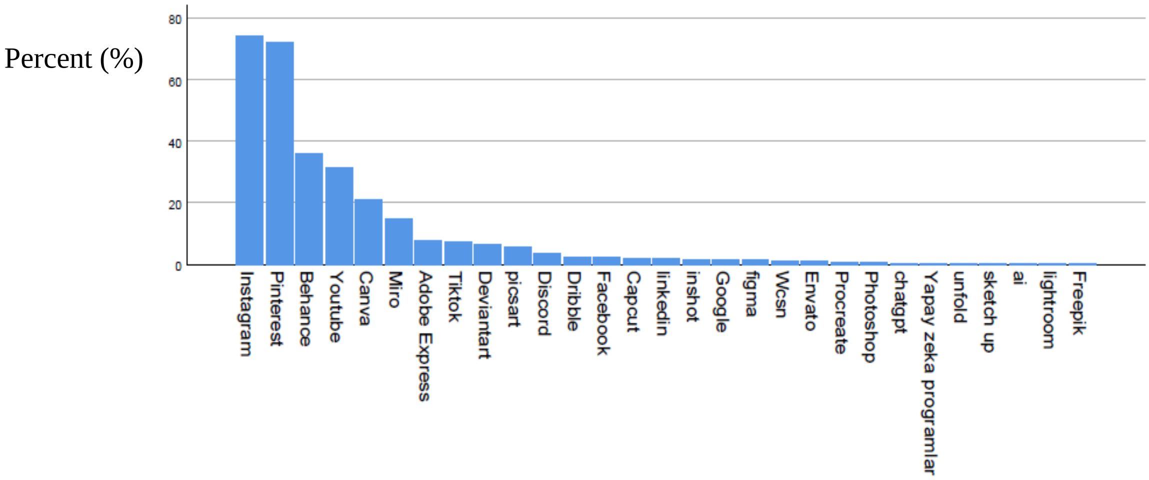


Figure 3. *Bar graph of participants' social media usage distributions*

In the second part of the questionnaire, they were asked to score using a 5-point Likert scale (strongly disagree, disagree, partially agree, agree, strongly agree). This part under the title of "For What Purposes Do You Use Visual Interaction-Based Social Media Platforms Professionally?", 12 questions were asked to the participants. Statistical information on the responses obtained from here is given in the table below (Table 5). According to the averages of the responses obtained from here, industrial designers mostly use visual interaction-based social media platforms for the purpose of "obtaining associations that will guide their designs" (4.39) and "monitoring design trends" (4.33). From this, it can be deduced that one of the main reasons why industrial designers use social media professionally is to obtain data that they can use in the design process. Afterwards, the answers "to reach professionally up-to-date information" (4.28), "to follow the designers I find remarkable" (4.19) and "to reach professionally instructive content" (4.12) were determined as the answers with high scores, respectively.

Table 5. *Statistics on the items in the section ''For What Purposes Do You Use Visual Interaction-Based Social Media Platforms Professionally?''*

	Median	1. Quarter	3. Quarter	Smallest	Biggest	Average	Standard Deviation
To keep up with professional up-to-date information	4	4	5	2	5	4.28	0.79
To access professionally instructive content	4	3	5	2	5	4.12	0.89
To be able to share my own designs	4	2	5	1	5	3.51	1.25
To track my design orientations	4	4	5	1	5	4.33	0.82
To get associations to guide my designs	5	4	5	2	5	4.39	0.71
To increase the recognition of my name (brand)	3	2	4	1	5	3.14	1.45

To be able to connect professionally	4	3	5	1	5	3.65	1.16
To be able to exchange ideas professionally	4	3	4	1	5	3.60	1.15
To follow designers that I find noteworthy	4	4	5	1	5	4.19	0.88
To be able to acquire customers	2	1	4	1	5	2.80	1.48
To be able to direct people to my site/blog	3	1	4	1	5	2.78	1.54
To be able to create engaging visual content for my designs	4	3	5	1	5	4.09	1.11

The 18-24 age group differs from others as the age group that uses social media to access professionally instructive content. According to the Kruskal Wallis analysis, there is a statistically significant difference in the age groups and the scores given to the question "to reach professionally instructive content" ($p<0.001$). In order to investigate the source of the difference, the Dunn-Bonferroni test was performed, the score distribution of the 18-24 age group is different from the 31-35, 25-30 and 36-42 age groups. The reasons for the least use of social media were determined as "directing people to my own site/blog" and "acquiring customers" and "increasing the recognition of my name (brand). Since these three questions included industrial designers who could be the owners of their own business, it was considered normal to obtain low scores.

6. CONCLUSION

This study has deeply examined the social media usage habits of industrial designers in Turkey. The results of the research revealed that industrial designers actively use social media platforms, especially Instagram and Pinterest. This preference stems from the fact that these media sharing-oriented platforms are aligned with the needs of designers to showcase their visual work and find sources of inspiration. The 24/7 ease of access and portability offered by smartphones, in particular, leads designers to adopt these devices as the primary tool for social media interactions.

The age factor also plays a decisive role in the interaction times of industrial designers on social media platforms. Participants between the ages of 18-24 were found to be the group that spent the most active time on image-based social media platforms as digital natives. This finding reflects Generation Z's predisposition to digital technologies and its natural relationship with the internet, a result that is also supported by the literature.

In addition, the analyses made for the purposes of industrial designers to use these platforms showed that designers mostly use visual media platforms for the purpose of "getting ideas to inspire their designs" and "following design trends". These findings reveal that designers see such platforms as an effective resource in their search for diversity and innovation for their projects.

As a result, this survey conducted among industrial designers in Turkey showed that social media has a significant impact on design processes and professional development. The high use of image-heavy platforms reflects designers' constant search for visual inspiration and industry trends. In addition, the natural interaction of digital natives with social media makes the use of digital tools even more important in the design world.

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