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## Volume 9 (1); June 15, 2020

### Research Paper

#### An analytic discussion on architecture as an art.

Alabi AS and Alabi OA.

*J. Art Arch. Stud.*, 9(1): 01-04, 2020;

pii:S238315532000001-9

DOI: <https://dx.doi.org/10.51148/jaas.2020.1>

#### ABSTRACT

Architecture has been characterized to be a form of art by different scholars in the design field. Questions as to 'whether architecture is always, sometimes of never an art form?', and 'if architecture is an art form, what makes it distinct from other art forms?' have arisen. These questions are answered in this paper through metaphysical discussion underpinned by analytic philosophy of architecture. The argument put forward in this study provides a platform from which students of architecture and practicing architects can grasp the knowledge of the fundamental need for architecture to perform as an art and be much more than a mere aesthetic message. Thus, the study reveals architecture to be an art form which is distinct from other art forms because it goes beyond art to reveal itself as design which provides a particular functional requirement that shows responsibility for its existence.

**Keywords:** Architecture, Art, Buildings, Analytic Philosophy

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Figure 1. Basílica de la Sagrada Família – architecture as a prominent work of art (Source: [www.trishoba.com](http://www.trishoba.com))

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### Research Paper

#### A method proposal for interior design analysis via Villa Savoye.

Özsavaş Uluçay N.

*J. Art Arch. Stud.*, 9(1): 05-13, 2020;

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DOI: <https://dx.doi.org/10.51148/jaas.2020.2>



Özsavaş Uluçay N. (2020). A method proposal for interior design analysis via Villa Savoye review. *J. Art Arch. Stud.*, 9 (1): 05-13.

#### ABSTRACT

The aim of this study is to examine the subject of modernism and the international style and to analyse a building of that period. The study provides a method for interior design analysis. In order to make interior analysis, a system consisting of basic design principles and architectural design criteria has been created. According to this method, space is evaluated in two parts as physical environment that includes architectural and interiors parts and aesthetic environment that includes elements of design and principles of design. In the study, interior design analysis of Villa Savoye designed by Le Corbusier is performed. Villa Savoye, which constitutes the basis of the design principles of the modern period and is one of the important examples in interior design, is analysed according to this method. As a result of this examination, Villa Savoye has been found to have the characteristics of the term appropriately but also has some application problems. With this study, it is aimed to contribute literature about interior design analysis method and adapt this method to a building.

**Keywords:** Interior Design Analysis, Method Proposal, Modernism, The International Style, Villa Savoye.

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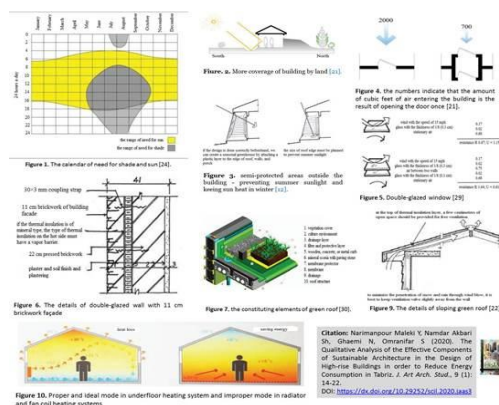
## The Qualitative Analysis of the Effective Components of Sustainable Architecture in the Design of High-rise Buildings in order to Reduce Energy Consumption in Tabriz.

Narimanpour Maleki Y, Akbari Namdar Sh, Ghaemi N, Omranifar S.

*J. Art Arch. Stud.*, 9(1): 14-22, 2020;

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### ABSTRACT

The issue of energy in our country has not received considerable attention for years, however, in recent years, designers and planners sought to focus on the subject of the optimization of energy consumption in one of the major centers of energy consumption, that is building, due to the high cost of energy consumption and the concern about the depletion of these energy resources and the pollution arising from consuming these fuels. Meanwhile, tall buildings consume a large portion of non-renewable energy resources. Due to the construction of high-rise buildings, growing urban population, and limited proper land, designers should seek to reduce its negative environmental effects instead of rejecting it. Therefore, it is necessary to pay attention to sustainable architectural strategies in the process of designing and the exploitation stage of these buildings because of the accumulation of users at a limited level the significant use of energy resources in tall buildings. This paper attempts to analyze the effective elements in sustainable architecture in the design of high-rise buildings in Tabriz to reduce energy consumption. This study is of quantitative nature and data was collected using archive or library study. The findings of this research highlight that observing the effective components of sustainable architecture in the design of towering buildings contributes to saving energy consumption for space heating by 66%, and saving energy consumption for space cooling by 37.5 %.

**Keywords:** Sustainability, Climate, Energy Consumption, High-Rise Buildings

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## Research Paper

## Conceptual art in Turkey: Cengiz Çekil.

Suyum FN and Zöngür C.

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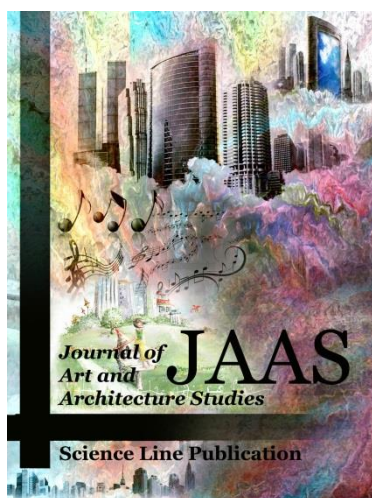
### ABSTRACT

Conceptual Art emerged in the 1960s and displayed an entirely idiosyncratic structure as compared to those years' prevailing form pursuits. It involved the art object in an intellectual process rather than a structural process. This very understanding, which keeps its distance from art object and prioritizes the artists' ideas, enables the artists to express themselves by exploiting all kinds of materials. Similar tendencies became manifest in Turkey during the end of 1970s. Some Turkish artists returned back to the country after completing their studies abroad and with the occasion of biennials they became effective in the scene of conceptual art. Each of these artists produced individually important conceptual artworks, which represent their own time. This research is focused on Cengiz Çekil, who is an important representative of Conceptual Art in Turkey, the period when Conceptual Art emerged, its leading artists back then and their works. Furthermore, this paper includes the examination of Cengiz Çekil's works which carry the social and cultural traces of his time, his interviews, art perception and both his position and importance in today's Conceptual Art. Based on the existing examples the literature has been reviewed and the artist's works have been analysed. When it comes to Conceptual Art in Turkey, one of the first names that come to mind is Cengiz Çekil. For, by means of the unique mentality he demonstrates through his 'new' and astonishing style, he has been one of the most prominent artists in Turkish art history.

**Keywords:** Cengiz Çekil, Conceptual Art, Sculpture, Installation.

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# AN ANALYTIC DISCUSSION ON ARCHITECTURE AS AN ART

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## Research Article

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**ABSTRACT:** Architecture has been characterized to be a form of art by different scholars in the design field. Questions as to ‘whether architecture is always, sometimes or never an art form?’, and ‘if architecture is an art form, what makes it distinct from other art forms?’ have arisen. These questions are answered in this paper through metaphysical discussion underpinned by analytic philosophy of architecture. The argument put forward in this study provides a platform from which students of architecture and practicing architects can grasp the knowledge of the fundamental need for architecture to perform as an art and be much more than a mere aesthetic message. Thus, the study reveals architecture to be an art form which is distinct from other art forms because it goes beyond art to reveal itself as design which provides a particular functional requirement that shows responsibility for its existence.

**KEYWORDS:** Architecture, Art, Buildings, Analytic Philosophy

## INTRODUCTION

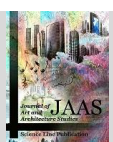
For centuries, there has been debate as to whether architecture ‘always, only sometimes or never is an art form’ [1]. Many scholars termed architectural works as being generated from the abstract to the real. While in the artistic world, works are created from the real to the abstract [2-6]. This gives a clear understanding of the formality of architectural works. Architecture as a profession contends with various disciplines and is guided by different principles within the field of arts, sciences, economics and many other diverse disciplines. It has always been considered an art, because it requires imagination and creativity. However, it goes beyond that. It must extend to the end users of the building, their experience, feeling, emotion, satisfaction etc. This broad application sometimes gives architecture an edge over the mere art form which can sometimes be understood and interpreted by only the artist.

### Architecture as an Art – the Argument

Architecture is both an art and science at the same time [7, 8]. The art of a building and the science of that same building must exist before it can be referred to as architecture [9]. However, architecture is influenced by the philosophical stand of the designer and therefore the translation of thoughts into a form designed to function as a space for housing a functional space, at the same time an expressive activity [10]. The structure loses value as an architectural form and becomes a purely artistic

form if the factor of functionality is ignored. Likewise, if the sense of expression is ruled out in the creation of a building, it immediately loses its architectural quality and remains a mere building. This thought is emphasised by Pevsner [11] who stated that building designed with aesthetic appeal is architecture.

In a bid to understand the genealogy of these ideas, there is need to appreciate what constitutes architectural form (elements). Architectural forms can be combined in various elements, just like artistic elements, which also are mostly related to architectural elements such as basic elements, sensory elements, formal elements, technical elements, and expressive elements [12]. Architects design buildings using a creative process by which they manipulate different elements to create integrated and pleasing statement which must satisfy basic attributes, which according to Vitruvius are three guiding principles connoting – firmitas (strength), utilitas (functionality and venustas (aesthetics). In the light of this, architecture can be perceived to always be an art form characterised by other external attributes. As posited by Hillman [13], in his article ‘How to Make Architecture, Not Art’, art is defined as a form of self-expression with absolutely no responsibility to anyone or anything while architecture is connoted to mean a piece of art which must be responsible to people in its different contexts. Therefore, in Architect Richard Meir’s words, “Architecture is the greatest of arts”.





## DISCUSSION

### Architecture as more than an art form

The major frustrations most architects experience professionally is the difficulty in making analytic arguments in favour of aesthetic decisions in design [14]. Architecture, generally speaking, consists of arts, sciences and other diverse disciplines. In fulfilling Vitruvius' triad of *firmitas*, *utilitas* and *venustas*, architecture encompasses the utilitarian concept, performs certain functions and accommodates human needs, behaviours and ergonomics through which it is holistically defined. However, in dealing with artistic tendencies, architects must be able to distinguish *venustas* from one of Vitruvius triad principle of which the anchor strength is in beauty, aesthetics etc. On this premise, we can base our argument of differentiating art form in architecture from other art forms such as sculpture, painting and music.

Architecture comes about through a systematic process in response to a need while other forms of art are manifest without a responsibility to a need. Art is a creative expression that transcends the functional requirements of its existence in any form one chooses to manifest it. An artist is someone who expresses his/her thoughts irrespective of what others like or dislike. It is an extension of the artist's mind and has nothing to do with the constraints. Architecture on the other hand is artistic products derived from the process of synthesizing information in construction, engineering, human behaviour and needs, and formal aesthetic order for the purpose of responding to a particular problem involving human use and habitation which contributes to the cultural capital of the society that benefits from such a product.

Architecture is a science, which is a subset of art, which involves solving problems with an artistic approach, considering constraints and coming out with the best possible optimized solution. When an intended piece of architecture is forced to be an art, it likely ends up being a sculptor and loses the enabling characteristics of architecture. However, there are occasions of the craft of architecture becoming art: where the intention was not to make art but where the craft was so exquisite that the result is mystical appellation. An example is the Basilica De la Sagrada Familia designed by Antonio Gaudi (1852-1926) [15] see figure 1.

Art now bears no responsibility for its actions. It is subversive. Art is not a service, but an opinion [16]. Architecture has a social responsibility; it must appeal to the client, must follow by-laws and meet

deadlines and budgets. Architecture is at its core, part of a service [17]. Therefore, while architects resolve pre-existing problems into something with harmony, artists create the "problem" and then resolve it into something with harmony [14].



**Figure 1.** Basilica de la Sagrada Familia – architecture as a prominent work of art (Source: [www.triphobo.com](http://www.triphobo.com))

The excellence of a visible work of art such as a sculpture is dependent on factors of balance and expressiveness of the forms employed' [14]. However, balance and expressiveness of form in conjunction with functionalism identifies a work of architecture. Therefore, a building designed primarily to be a work of art denies that building from being regarded as architecture in the pure sense of the word.

Architecture cannot be moved about and remains unchanged unlike other forms of art. Books, music and pictorial art works can be created in one place and moved or reproduced in another place without experiencing any change in aesthetic character. Examples are books written, translated into various languages, reproduced and distributed all over the world yet carrying the same message (such as the Holy Bible) or music playing in Nigeria and getting a response from the audience which is exactly the same as those listening to the same artist in Belgium and yet still inspiring yet the same reaction from an audience in South Africa listening to a reproduction of the same music by another artist. However, an attempt at moving a work of architecture from its original place to another or creating a replica or prototype changes the characteristic of the moved or replicated building from being a work of architecture because the action would have made it lose one or two of the three functions making it architecture. This is because architecture has a highly localized quality [14, 18].



The site of the architectural work greatly influences its features in terms of the terrain, orientation, climatic conditions, cultural setting, materials etc. Hence, when architecture is relocated, it is placed within an alien site which was never considered during the creation of the original building causing it to lose its value as a work of architecture.

Most 'drastic' changes in the aesthetics of architecture such as the movements in history of architecture are borne not because of change in taste but more because of the discovery of new technology [14]. For instance, the discovery of the use of concrete to achieve various forms tending towards organic architecture such as buildings manually designed by Frank Lloyd Wright evolving into more complex structures designed with the use of advanced computer aided design software by Zaha Hadid. Meanwhile changes to other arts are primarily because of changing attitude to which art gives. For illustration, the black art movement came as a need to transform the way African Americans were portrayed in the arts and literature [19].

Architecture is different from many other art forms as it cannot be ignored by the public while other art forms can be. The public can decide not to be entertained by art works such as literature, music or painting, which do not appeal. However, due to the unmistakable physical presence of a work of architecture, the public is compelled to experience it, making architecture a public object. The expressive character of other arts is acquired from the personal way they are approached while the expressive character of architecture is acquired from an objective representation of manner and style. Thus, architecture speaks publicly and without intimacy to the observer but generates feelings that may be very strong emotions mostly tied to wonderment of the creator. Similarly, strong emotions can be generated by other art forms but expressions of most of these other art forms are quite private, generating a connect not with the creator but with the art [14].

## CONCLUSION

Architecture by definition is the built environment that results from a scientifically grounded collaboration between different service-base parties. Built environment can both be interpreted subjectively and objectively by the viewer, but must adhere to rationalised processes concerning design, construction, engineering, and peer review, if it were to be realised in the real world. Architecture goes

beyond art; it is a design process. If it ceases to be design, then it no longer provides a particular functional requirement. Art in architecture is the art in craft, the ability of the architect to manipulate light and materials to define space is a good equivalence. This is essentially not different from a master craftsman making baskets, pottery, furniture, etc. as craftsmen strive to impress our mentors and peers.

## DECLARATIONS

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### Authors' Contributions

Alabi A. S. is the lead author of the manuscript. He provided the background, the body of the work and analytical interpretation of the work. Alabi O. A. developed the abstract and worked on the conclusion. All the authors directly participated in analysis of this study, and have read and approved the final version submitted.

### Competing interests

The authors declare that they have no competing interests.

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# A METHOD PROPOSAL FOR INTERIOR DESIGN ANALYSIS VIA VILLA SAVOYE

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## Research Article

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**ABSTRACT:** The aim of this study is to examine the subject of modernism and the international style and to analyse a building of that period. The study provides a method for interior design analysis. In order to make interior analysis, a system consisting of basic design principles and architectural design criteria has been created. According to this method, space is evaluated in two parts as physical environment that includes architectural and interiors parts and aesthetic environment that includes elements of design and principles of design. In the study, interior design analysis of Villa Savoye designed by Le Corbusier is performed. Villa Savoye, which constitutes the basis of the design principles of the modern period and is one of the important examples in interior design, is analysed according to this method. As a result of this examination, Villa Savoye has been found to have the characteristics of the term appropriately but also has some application problems. With this study, it is aimed to contribute literature about interior design analysis method and adapt this method to a building.

**KEYWORDS:** Interior Design Analysis, Method Proposal, Modernism, The International Style, Villa Savoye.

## INTRODUCTION

At the end of the 19th Century, modernism emerged with the development of the industry. It is used to describe a style other than traditions. Coates, Brooker and Stone [1] describe that modernism is a movement that developed between 1890-1960, defining the modern world, and being a social as well as design and architecture. As a new cultural approach, modernism is based on the idea of seeking simple solutions to the requirements of the age and questioning everything [2]. The ideas of modernism spread in the first period of the 20th Century. In architecture, it is an apparent, smooth, pure and complete approach that the function is at the forefront. Adolf Loss, Frank Lloyd Wright, Peter Behrens, Auguste Perret, Le Corbusier, Walter Gropius, Mies Van Der Rohe are regarded as pioneers of modernism [3]. Thomas Broad [4] says that the term of modern in architecture cannot have any other meaning, which is “honestly contemporary”. Nevertheless, Colquhoun [5] states that modern architecture is a term that is open to interpretation that can mean more than one. Based on abstraction and anti-historical expression, architecture was seen as an expression form in art in modernism and it also emerged increasingly from

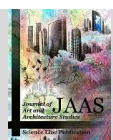
new technologies during the nineteenth and twentieth centuries [6].

The International Style is the modern architectural trend that came to the fore in the 1920s and 1930s. Modernism and the International Style began to replace the tradition-oriented and modernistic directions [7]. It is based on a book by Henry Russell Hitchcock and Philip Johnson for the International Exhibition of Modern Architecture in New York in 1932. This exhibition was held to describe modern architectural works and the style. In this style, the seminal figures are Ludwig Mies van der Rohe, Walter Gropius, J. J. P. Oud and Le Corbusier [8]. Pile [7] emphasizes that all works in the exhibition have similar qualities: “flat roofs, smooth (and usually white) walls, large areas of glass and asymmetrical planning, along with a total of any historical or ornamental detail”.

*As tastes changed and the construction industry embraced the technology necessary to detail and build to this new aesthetic, industrial products became features and in many instances, along with the parallel decline in the use of ornamentation, came to define the essential character of a work of architecture [9].*

In the International Exhibition of Modern Architecture, there were eleven works and the interior illustrations were included in these works.

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This was one of the basic principles of modernism, as architectural design included interiors and these illustrations had the same features such as the absence of historic and ornamental detail just like the external form of the building [7]. “Among the principles of the International Style, volume, regularity, and the avoidance of applied decoration were explored in special detail” [10].

Villa Savoye, which is the subject of this study, is one of the important examples of the International Style. In this project, the mentioned internal-external relationship is emphasized to a great extent. The project was designed by the Swiss origin French architect Le Corbusier (Charles Edouard Jeanneret) (1887-1965). For Philip Johnson who was curated and co-authored the catalogue and book of the exhibition, Le Corbusier's "Vers Une Architecture" signalled the beginning of the new style [11]. Le Corbusier is known with his designs in the style of Modernism and the International Style. He believed the aesthetic of engineering for modernism and his designs was always regulated by an orderly, mathematical modular system [12]. According to Le Corbusier; “Architecture is the masterly, correct and magnificent play of masses brought together in light” [13]. Le Corbusier and Pierre Jeanneret explained five points towards a new architecture in 1926. The first item is the supports that he expresses as “pilotis”. Thus, the walls cease to be carriers and the mass is separated from the floor by columns. The second one is the roof gardens. Gardens are located on the flat for the natural environment and structural harmony. The third one is the free designing of the ground-plan. Free plan design can be made because the walls are not any longer carriers. The fourth item is the horizontal windows (ribbon windows). Horizontal windows along the facade and providing light to the rooms. The fifth item is free design of the facade. It provides free designs that separate the facade from the structural function of the building [14]. Roth [15], emphasizes that the five points of modern architecture mentioned by Le Corbusier, are seen in Villa Savoye with its structural frame with pilotis that lift the mass off the ground, its free plan by means of the concrete frame, highlighting the floors from the carrier columns, horizontal windows providing good illumination and a roof garden inspired by the Mediterranean architecture.

Interior design, which was a tradition before the 20th century, started to be seen as a profession with the 20th century. In this period, there were two different approaches in professional practices, both traditionalist and innovative. With its simplicity,

functionality, and spatial structure, Villa Savoye is not only a good example of the international style and five points of modern architecture Le Corbusier based on his architectural view but also becomes a milestone that has a great impact on interior design. For this reason, it is aimed to conduct space analyses of Villa Savoye within the determined method, which reflects all the features of the period. Due to the fact that it is one of the important examples of modern period interior design and its widespread influence on today's design approach, this structure was chosen as a sample.

## METHODOLOGY

This study aims to present a method for analysis of many studies in the field of interior architecture. As a result of the researches, it is seen that there is no certain method for analysing the space. It is anticipated that determining the criteria for interior design analysis will be useful for guiding future studies and creating a systematic analysis. To create a method, the definitions and limitations of profession determined by international federations (such as IFI: International Federation of Interior Architects/Designers, ASID: American Society of Interior Designers), and the criteria determined by the accreditation institutions of interior architecture/design education (such as ECIA: European Council of Interior Architects, CIDA: The Council for Interior Design Accreditation) are taken into consideration. In addition to the mentioned criteria, the classifications and definitions in the books of Pile [12] and Ballast [16] are discussed and an analysis scheme is created. In this context, the building is aimed to be handled separately within its physical and aesthetic environment.

Considering as a part of a whole, it is seen that the aesthetic and physical needs of the structure are defined by the general needs. These emerge from the needs of the whole rather than a singular function [17]. In Pile's book there are three stages of space evaluation. These are Function, Structure and Materials, Aesthetics. When these three stages are examined in detail; function stage consists of the size and shape of space, placement, and choice of furniture, circulation, lightning and acoustical environment. Structure and materials stage consists of material selection according to function, durability, maintenance ease, good quality construction and cost, safety and environmental conditions [12]. In this study space analysis divided into two parts. In the first part, the physical environment deals with function, structure, and

materials as a whole. This section is divided into architecture and interiors design. Information about the structure and the function is given, construction, facade, mass, mechanical systems, wall, ceiling, floor, dominance, and circulation are examined in this section. The second part, called aesthetic environment, is evaluated in two sections as elements of design and principles of design. In Pile's book [12]; design elements are point and line; form of shape; texture, pattern, ornament; value and colour; opacity, transparency, translucency. And principles of design are size, scale, proportion; unity and variety; balance; rhythm; emphasis. For evaluating space design, harmony and light should be in the list of analysis. In the book of Ballast [16], elements of design are form, scale, colour, texture, pattern, and light; also the principles of design are balance; harmony and unity; rhythm; emphasis and focus; contrast and variety; proportion. Thus, the aesthetic part of the method is completed with these sections. The classification required for a space design analysis is determined. The analysis scheme used in the study is below.

**Table 1.** Interior design analysis scheme

Physical Environment		Aesthetic Environment	
Architectural	Function Structure Material Mechanical Systems -electrical, sanitary, acclimatization, fire, security	Elements of Design	Form Scale Colour Texture Pattern Light
Interiors	Wall Ceiling Floor Dominance Circulation	Principles of Design	Balance Harmony and Unity Rhythm Emphasis and Focus Contrast and Variety Proportion

### Villa Savoye interior design analysis

All the cited papers in the text must be listed in References. All the papers in References must be cited in the text. Villa Savoye was designed by Le Corbusier and his cousin Pierre Jeanneret in 1926 in Poisy / France for the Savoye family. It is among the 11 projects exhibited in the International Exhibition of Modern Architecture and is one of the best examples of the International Style. Villa Savoye put its stamp on this period with its simplicity and design; horizontal windows, terrace gardens, and the structure separated from the ground with thin columns. The mutual relationship between the interiors and architectural structure draws attention.



**Figure 1.** Villa Savoye, Poissy, France [18].

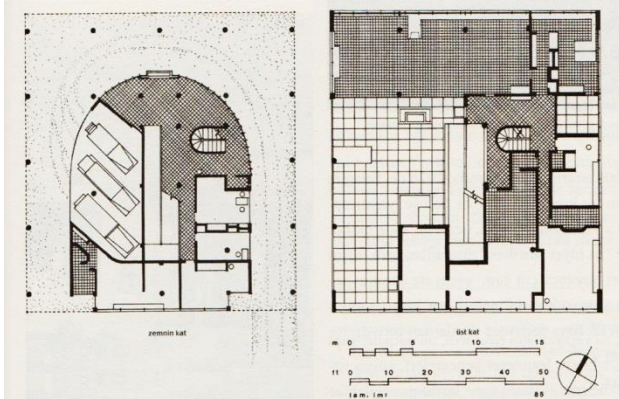
### Physical environment

Villa Savoye is known as a structure where five basic principles of Le Corbusier on architecture can be seen. The villa was designed as a residence and later started to be used as an exhibition gallery. It was built in Poissy, near La Seine River, 30 km from Paris in France. It is located on large green land and is located separately from the main street and other residential areas.

**1) Architectural (function, structure, material and mechanical systems):** The building was designed primarily as a residence, and it is observed that suitable solutions are made for the housing function. However, there is currently no function plan other than exhibiting. With a ramp, general usage, core concept, integrated design with nature, and adequate space analysis show usage in accordance with the function plan. Villa Savoye looks like a box raised from the ground and is located on its thin columns. Le Corbusier had shown that the building could get carried to the columns without bearing walls. It was built using reinforced concrete [19]. The facade has a simple mass. The horizontal windows of the house are not interrupted even in the open-top balcony section, the facades of this section are also shown as living room windows. Birksted [20] states that Le Corbusier created a major turning-point in architecture with these windows stated in five points of modern architecture.

*At other times, they hold a thin metal section window frame, painted black and set nearly flush with the white concrete wall, except for a minimal drip. The wall itself creates a rebate on the internal face, providing the window with a ledge. The rebate is on the interior face of the wall, leaving the external wall smooth and flat. Thus any differences between the outdoor openings of the internal courtyard and the internal window openings are*

eliminated [20]. Le Corbusier [21] describes Villa Savoye as “the house is a box above the ground, perforated all around, without interruption, by a long horizontal window...” The regular geometric ratio on the facade draws attention. The form of the villa gains motion with circular walls. The garage is located at the bottom of the house and can be reached from a ramp. This ramp serves the transportation of all floors from the entrance to terrace floor.



**Figure 2.** Villa Savoye floor plans [15]

Detailed drawings of the building’s mechanical systems (electrical, sanitary, acclimatization) could not be reached. However, when the structure is examined, attention is paid to natural lighting. The rooms were located according to the sun’s direction and space arrangements had been made according to the natural lighting. Clean and wastewater systems show an innovative approach compared to the period in which they built. Besides, the free passages of the spaces and the open terraces provide natural air circulation. Drawings of fire and security, heat, acoustics, graphics and guidance could not be reached. However, in addition to the dampness problem, it is stated with a letter written by the homeowners that rainwater comes in [22]. This negative situation indicates that mechanical systems were considered but there were problems in the application.

**2) Interiors (function, structure, material and mechanical systems):** Savoye's thin and numerous columns carrying the big body, creating the feeling of flying, constitute the carrier system. The columns, which continue on all floors and the terrace, are not interrupted and it can be seen that they continue inside the windows in interiors. As the columns are not very rough in mass, the visibility of the system is an aesthetic element. The carrier system and the dividing system consisting of walls are separated from each other

and a free plan is formed. Ramps, fluidity in space and correct analysis of circulation provide a free plan. Independence of interior walls from the structural system allows designing large, uninterrupted and free spaces [23]. Also, the facade design independent of the carrier, which was the feature of that period, was allowed to horizontal windows without encountering the obstacle of the carriers.



**Figure 3.** View of the carriers [24]

The building has a grid plan model and is in a square form. It is calculated based on the golden ratio and divided into two symmetrical areas. The ramp, which is the vertical circulation area that connects the floors to the intersection point of these areas, is positioned [25]. The entrance hall, garage, maid’s room, laundry room are at the entrance of the building. There is a ramp at the entrance that leads the visitors up. Bedrooms, bathrooms, toilets, kitchen, and living room are on the first floor. Also, the roof designed as a terrace has a small garden. The ramp continues from the hall on the first floor to the solarium and roof terrace on the second floor. The terrace and garden roof create free usage as in the whole structure.



**Figure 4.** The ramp [26]

The relationship between the exterior and interior of the building is quite clear and excessive. When we consider it as a house, we need to divide spaces into private, semi-private, and public spaces. While interiors are partially separated by the walls, the free plan set up, the interior-exterior relationship established with the windows surrounding the spaces, and the use of the roof as a terrace reflect this. Carriers and windows are among the main elements that dominate the building. In some interior walls, the use of dominant color and



free plan layout draw attention. The dominant element in the interior is the ramp that provides the circulation of the space. Considering the interior and exterior relationship, the density of the gardens and the gardens on the terraces can be shown as the dominant element.



**Figure 5.** Interior-exterior relationship [27]

### Aesthetic environment

Pile [12] states that *“in engineering, design may deal with sizing structural members, piping, or ducts, while in the fine arts it deals with the way an artist organizes the formal elements of line, shape, color, and texture in a space.”* In this study, aesthetic environment examined in two parts as elements of design and principles of design. Villa Savoye has a sculptural structure that creates the feeling of being on a pedestal. It has features to cover many principles in terms of design. The correct integration and usability of these features with the function is important. It is seen that the concept of the garden, terrace, and free plan in a modern design affects the visual balance positively.

**1) Elements of design (form, scale, colour, texture, pattern and light):** The form should be examined in two aspects, two-dimensional and three dimensional. The term of the two-dimensional describes the plan of the structure and the term of the three-dimensional describes the form created by the architectural elements such as furniture and columns beams [12]. In terms of form; Villa Savoye is a rectangular prism designed in accordance with the principles of purity, simplicity which is the pioneer of modernism. This form is disrupted only by the cylindrical walls surrounding the roof terrace sunbathing place, and the fixed mass gains motion. Columns that lie inside independently of the exterior and walls do not partition indoors and create a unique effect. Transparency supports the relation of spaces with each other. In the interior, the plan is divided symmetrically with the ramp in the middle. Horizontal dominant windows and width gather the perception in this direction. The fact that the carrier system is not reflected on the exterior also balanced

this integrity and openings. In the interior, its appearance as thin columns adds an aesthetic appearance.

Brooker and Stone [23] divided scale into people, rooms, and buildings. As the building scale, the structure spreads over a large area. It has lightened a heavy and large mass with the appearance of hanging in the air. In the scale of the room, the interior spaces are visually clear as they are defined by a free plan. Transparency, which does not interfere with the spaces instead of the dominant walls that cover each other, supports the fluidity of movement in the space. Considering that it is designed as a house, the area sizes of the rooms and the distribution of the furniture show that the spaces are very large in scale. This does not make the interior of the building easy to perceive.

Some colours are seen as physical features and/or cultural connotations [1] as well as certain architectural period features. Colour, with its physical and psychological effects, can provide the perception of surfaces differently than they are. Tate states that [28] the effect of the colour used changes by its interaction with other colours, the size and the place of application, light, and textiles. For this reason, factors such as usage style, location, and intensity of use create a difference in the perception of space. Villa Savoye has a reputation for showing an important feature of this period with its white mass. White shows itself as it is completely intertwined with nature. In addition to columns that lighten the mass, horizontal windows provide transparency. To balance all this whiteness, dark and warm colours are used in the interior especially with wall surfaces and furniture. It can be said that this colour scheme indicates the characteristics of the period.

Textures that materials naturally have or that can be applied to them often define the main characteristics of space [29]. In addition to the technical properties of the materials, the texture and pattern of the surface they possess create many perceptions such as temperature-coldness, weight-lightness added by the colour. Looking at Villa Savoye in terms of texture and pattern; smooth white wall and glass surfaces provide lightening in the texture. The dark colour preferred in furniture is balanced with glass and metal parts. With the dark colours and ceramic surfaces, smooth and white surfaces are tried to be balanced, but the whiteness of the very large areas created the feeling of emptiness in the space. The use of ceramic and mosaic in wet areas gives a bright and smooth

texture and a small size pattern. At the same time, with the green area and terrace gardens surrounding the building, the green texture is felt completely inside the house. Apart from these perceptions, different materials and textures are not seen.

Light provides the realization of the vision event by perceiving all the properties of the objects. All spaces in Villa Savoye are designed to receive natural light. Since almost all of the spaces are in a close and open relationship with the exterior, natural light can be used excessively. The direction of the hall opening to the terrace is south, with tall windows so that it can be fully illuminated by sunlight. The bedrooms are located in the south-east, north-east direction, the main bedroom is in the south and can receive natural light. Since natural lighting is sufficient, a different lighting source is not needed during the day. Luminous windows from the ceiling have been opened to the spaces without windows like bathrooms. However, it is stated that this had become quite noisy on rainy days [30, 31].



**Figure 6.** Bathroom [1]

**2) Principles of design (balance, harmony and unity, rhythm, emphasis and focus, contrast and variety, proportion):** Balance can be created in several ways such as symmetrical, bilateral symmetry, radial symmetry and asymmetrical [12]. In the plan, symmetrical

balance is seen by dividing the centre with a ramp, the interior spaces are located asymmetrically. The continuation of the windows in the terrace gardens on the exterior and the arrangement of the columns provide balance by creating symmetry.

Harmony in a composition is the agreement of the parts to each other and the whole [16]. From the perspective of harmony, the architectural and interior design elements form a meaningful whole. This meaningful integrity is an indication that they are in harmony with each other. Unity consists of the fact that the elements seemed to belong together, not randomly placed. Also, unity is formed when all elements agree in design [32]. The windows and walls, the column and the carrier system, and the interior spaces have a separate unity in themselves. It is intended to create harmony in the use of materials and colours in the facade and interior spaces of plain and simple lines, which are characteristic of modern architecture. The dominant layout in the horizontal and numerous delicate columns in the vertical is in a meaningful whole with each other.

Rhythm relates visual elements together in a regular pattern. Rhythm is an important element in both historic and modern design [12]. Repetition produces rhythm [7, 32]. Looking at the whole structure, there is a rhythm created with both horizontal and vertical element repetitions. The effects of surfaces on the rhythm continue with forms and colours. Vertical perception of columns and horizontal perception of windows is a rhythm consisting of contrasts both in the interior and the facade.

From the perspective of emphasis and focus, it is the line with the ramp that dominates the design. Despite the intensity of all horizontal and vertical linear lines, the ramp that rises up to the roof and reaches the roof is an indicator of fluency and circulation, emphasis and focus interiors and exteriors. At the same time, continuing both inside and outside provides integrity. The spatial dominance of terrace gardens is in the foreground. The predominant use of white is dominant and is supported in some places by primary colours. In terms of lighting, it is seen that natural lighting is the focus. Also, the internal-external relationship is dominated by the perception of transparency. However, the scale focus point was not kept in the space-user relationship.

White [32] states that in order to one element to dominate another there must be contrast and it is related to dominance. There are repetitions with the carrier system and opposite directions with the

windows. Repetitions, hierarchy, and contrast appear in all elements as a whole. The repetition of horizontal windows on the facades, the repetition of the bearing system in the whole structure, the circular walls rising on the roof despite the completely angular lines and the staircase form also show that there are contrast and variety in the design.

Proportion of an element is perceived according to the whole or the parts next to it [12, 32, 16]. Villa Savoye is a structure in which the internal-external relationship is strongly established. As in free plan understanding, there is no limit in interior spaces. The design is free as the walls are saved from being a carrier element. However, this freedom created in the interior of the building damages its suitability to the human proportion and creates a feeling of emptiness with very large volumes. It is seen that the exterior and the structure are proportional, the structure of the interior and the rooms do not have the same proportion.



**Figure 7.** Exploded perspective drawing [33].

## RESULTS AND DISCUSSION

Villa Savoye was designed with ideas beyond the era in terms of both architecture and interior space and became one of the pioneers of modern architecture. The building contains five points of modern architecture that Le Corbusier based on his architectural view. Free plan has been implemented that provides independence by removing the carrier feature of the walls. All carrier systems and walls are used as an aesthetic element. With the use of horizontal windows and terrace gardens, natural

lighting was provided in the interior and integrity had been achieved with green nature.

In the study, physical environments, which are architecture and interior design, and aesthetic environments consisting of elements and principles of design are analysed. The building has been one of the pioneers of modernism with an approach beyond the age and has shown innovative approaches in structure and material use. However, problems with functional solutions and mechanical systems have not been unnoticed. Although problems such as moisture and dampness were encountered, the fact that the mechanical system was available at that time is one of the most important features. Dominance and circulation issues are well emphasized in interior spaces, and free plan implementation is a great innovation for design. Walls and floors are detailed, but lighting windows related to ceilings have had negative results.

When examined in terms of aesthetic environment, the simple form and design details used in the building are important for its period. However, although the scale is properly worked on the building, the relation of the interior space and the furniture is in accordance with a monumental structure rather than a house. White colour was used predominantly following the style of the period in which it was made, only some of the dominant dark colours on the walls and the materials and colours used in the furniture are also different. It is seen that natural lighting is at the forefront throughout the building, and even lighting windows are considered in the bathrooms. Unfortunately, homeowners had problems, especially in rainy weather due to the noise coming from these windows. The building plan provides a symmetrical visual balance by ramp, architectural and interior design elements have meaningful harmony. Unity is seen in walls-windows, carrier system and the facade. The fact that the horizontal windows and openings can be kept so large is also due to the positioning of the carrier system inside and adds an aesthetic value to the interior. Rhythm is seen in horizontal windows and structural repetitions. Principles of design such as contrast and variety are seen with emphasis and focus being on the ramp in the building centre, angular and circular lines, and directional contrasts.

Considering all the criteria, two issues are open to discussion. The suitability of the house on a human scale is particularly controversial about proportion. In addition, according to complaints



about moisture, humidity, and precipitation that may arise from the application, had Villa Savoye become a house that does not provide comfort for the users?

## CONCLUSION

This study aims to present an interior design analysis method proposal for examining a building in detail and contribute to the literature. As a conclusion, definitions and limitations of interior architecture profession that determined by international federations and the accreditation institutions are examined. In addition, studies, methods, and classifications conducted in this context have been investigated. And an interior design analysis method is proposed. According to this method, the building is examined separately in physical and aesthetic environment. To make the method more readable an iconic building has been examined and the method has been adapted. Villa Savoye has achieved a successful result in terms of design for the period of modernism. According to the evaluations made in spatial analysis, it is seen that most of the stated principles have been followed. As Le Corbusier has an important place in the history of architecture and Villa Savoye has a positive contribution to International Style and Modernism, detailed analysis is made for this structure. And it leads to creating ideas for and offers an insight into new designs.

## Competing interests

The authors declares that there is no competing interests.

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# THE QUALITATIVE ANALYSIS OF THE EFFECTIVE COMPONENTS OF SUSTAINABLE ARCHITECTURE IN THE DESIGN OF HIGH-RISE BUILDINGS IN ORDER TO REDUCE ENERGY CONSUMPTION IN TABRIZ

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**ABSTRACT:** The issue of energy in our country has not received considerable attention for years, however, in recent years, designers and planners sought to focus on the subject of the optimization of energy consumption in one of the major centers of energy consumption, that is building, due to the high cost of energy consumption and the concern about the depletion of these energy resources and the pollution arising from consuming these fuels. Meanwhile, tall buildings consume a large portion of non-renewable energy resources. Due to the construction of high-rise buildings, growing urban population, and limited proper land, designers should seek to reduce its negative environmental effects instead of rejecting it. Therefore, it is necessary to pay attention to sustainable architectural strategies in the process of designing and the exploitation stage of these buildings because of the accumulation of users at a limited level the significant use of energy resources in tall buildings. This paper attempts to analyze the effective elements in sustainable architecture in the design of high-rise buildings in Tabriz to reduce energy consumption. This study is of quantitative nature and data was collected using archive or library study. The findings of this research highlight that observing the effective components of sustainable architecture in the design of towering buildings contributes to saving energy consumption for space heating by 66%, and saving energy consumption for space cooling by 37.5 %.

**KEYWORDS:** Sustainability, Climate, Energy Consumption, High-Rise Buildings

## INTRODUCTION

Considering the statistics related to the high rate of urbanization all over the world, especially in developing countries as well as Iran, it could be estimated that, in the next 20 years, about 60% of the world's population will live in cities.

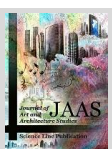
This number in Iran has been predicted to be 70%. The addition of each household to the urban population has different consequences, the most important of which is the provision of housing [1]. The issue of high-rise buildings is also at the beginning of a great transformation. Today, the crisis of housing quality has overcome the issue of quantity crisis, which is due to the adoption of policies to solve the problem of housing like constructing buildings "as fast as possible", "as small as possible", and "as cheap as possible", that are high on the agenda [2].

On the other hand, in our country, energy consumption in buildings amounts to 40% of total

consumed energy. For the meantime, among the components of energy consumption in the building, the heating systems of buildings that mainly use fossil fuels, are among the major consumers of energy, so that 70% percent of natural gas consumed in buildings is spent on heating [3]. Also, in large cities, 30% percent of air pollution is generated from buildings. So, our environment is being harmed and is moving in an unpleasant direction [4].

On sustainable development and, of course, sustainable architecture, it has become clear that every building must interact with its natural environment. The controversial and considerable part of this issue is how to establish the interaction and also the type of measures considered. Given the cold and dry climate Tabriz, designing buildings should be done in a way that we can use natural energies to the maximum, and thus we can direct the criteria of a building towards sustainability [5]. This study, first, discussed the issue of sustainable architecture and its principles. Then, the climatic

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design strategies of high-rise buildings in accordance with the cold and mountainous climate of Tabriz city, and the impact of these strategies on reducing fossil fuel consumption will be studied and analyzed. The aim of this study is to explain the design models of large buildings consistent with the cold and mountainous climate of Tabriz to reduce energy consumption.

Hypothesis: there is a feature in sustainable architecture that has led to reduced energy consumption in massive buildings.

Research question: How and using what strategies will architectures reduce energy consumption in high-rise buildings?

## MATERIAL AND METHODS

To create a cohesive foundation, data in this quantitative research has been gathered based on library study and field research and this study deals with analyzing effective components of sustainable architecture in designing high-rise buildings to reduce energy consumption in Tabriz.

### Sustainable architecture

Today, the issue of sustainable development is considered to be one of the most fascinating and common discussions at the international level. The extensive and scholarly discussion on this topic led to the opening of The United Nations Conference on Sustainable Development, also known as Earth Summit in Rio de Janeiro, Brazil.

This conference was later called Rio Summit in which a resolution was issued to offer strategies for the sustainable development of countries around the world [5]. This is the most important definition of sustainable design presented at the Rio Summit: sustainable design is a kind of design that aims to fill the current needs without damaging the resources of future generations. In sustainable design, the socio-economical sustainability should be considered just like the degree of energy consumption and the environmental effect of buildings and cities [6].

### The principles of sustainable architecture

To achieve sustainable development, the following strategies and principles should be observed:

1. Using and sustaining the consumption of renewable resources (sun and wind).

2. Optimizing the use of resources and minimizing the use of natural resources in a proportion that is less than their natural growth.

3. Minimum production of waste and pollution that can be absorbed on a scale and capacity ranging from the environment to world.

4. Providing basic human and Social needs and creating a healthy environment for future generations [7].

### Housing

The great land of Iran is one of the few countries that has provided a unique type of architectural culture to the world architecture during its history. Important cultural and geographical features of Iran have made for a great variety in its architecture [8]. The formation of housing is subject to cultural, climatic, economical, and subsistence factors and conditions [9].

Studying the history of housing, it could be found out that human beings have inevitably adapted themselves and their living space to climatic and cultural conditions. It could be found out that three important factors constituting the primary man-made shelters include the climate in which they lived, the type of material that they had access to, and predicting and developing methods to prevent dangers that might threaten them [10].

In the second meeting on human housing which took place in Istanbul, favourable housing has been defined as follows: desirable shelter does not simply mean a roof over the head of each person, rather it means desirable comfort, desirable space, physical access and greater security, ownership security, stability, construct durability, proper lightening, ventilation, and heating system as well as proper basic infrastructures such as water supply, hygiene, good environmental quality, and suitable place in terms of work and basic facilities all of which need to be provided according to the people's affordability [11].

### Climatic design

The term 'implementing climatic design' is used to refer to specific construction techniques the aim of which is to reduce heating and cooling costs using natural energy flows to create comfort conditions in buildings. Climatic design is a method that is used to reduce the overall energy costs of a building and creates better comfort conditions for buildings [12].

**Table 1.** The table of literature review in order of historical sequence

Time	Author(s)	The title of research work	Results
2004	Hariri, Rezai et al. [13]	The national Building regulations of Iran. Discussion 19-Lowering Energy Consumption	In addition to the location of building, it is necessary to observe other factors such as the installation of controlled entrances, the use of rough textures and dark colors to cover the exterior surface of buildings and reducing the area of opening surfaces.
1999	Pourdeyhami, S. [14]	Construction in Accordance with Climate	The formation and direction of building shell should be in such a way that it can absorb maximum radiation in winter.
2000	Nagizadeh, M. [15]	The qualitative features of desirable building (the basics of design the ways to achieve it)	Desirable and proper housing must have these characteristics: the possibility of interacting with environment: buildings should be designed so that the need for artificial regulators of environmental conditions be reduced to the minimum.
2014	Golabchi, M. [16]	The Basics of Designing High-rise Buildings	High-rise buildings consume large amount of non-renewable energy resources and are regarded as one of the most non-ecological buildings. Given the need to construct towering buildings, designers should seek to reduce its negative environmental effects instead of ruling it out.

The analysis and processing research was from the point of view of author.

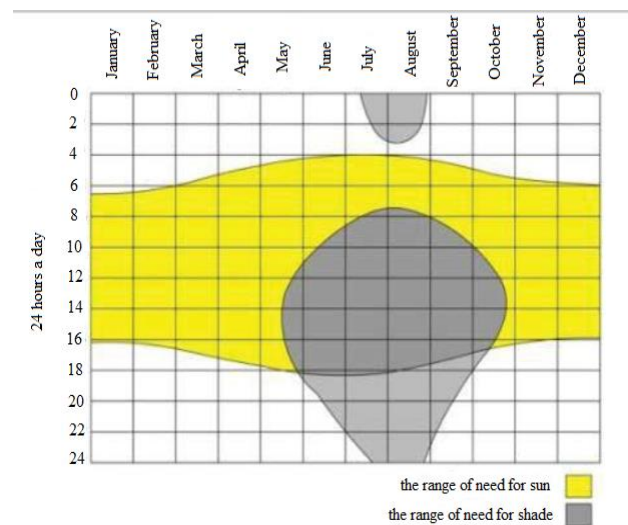
### Tabriz climate

Tabriz is the center of Eastern Azerbaijan province which is located at approximately 46 degrees 25 minutes east longitude, 38 degrees 2 minutes north latitude from Greenwich Meridian. The elevation of Tabriz is 1340 m [17]. Among the climatic characteristics of Tabriz, we can refer to its bitter and long winters, and for several months of the year, the earth is covered with ice and snow. Rainfall is low in summer due to mountain range in western Iran, which, as a barrier, prevents Mediterranean air from entering Iran and retains moisture in its hillside. Rainfall in winters is mostly in the form of snow, and in general, in the region, short spring separates winter and summer from each other. Examining temperature information in Tabriz, it could be found that 62% of the time the weather is cold and very cold, and 17% of the time the weather is hot and basically the weather is not very hot, and 21% of the time the weather is mild [18]. Figure 1 shows the range of need for shade and sun in different months of the year in Tabriz. This figure supports that buildings in Tabriz need shade in the hours of the day in the months of June, July, August, and September, and need sun in the other months of the year.

### Climatic design measures for high-rise buildings in Tabriz to reduce energy consumption

Climatic design measures for housing in cold climate includes the following: 1) Landscape design arrangements; 2) Building design arrangements; 3)

Building shell design arrangements; 4) Mechanical heating system.



**Figure 1.** The calendar of need for shade and sun [24].

### Landscape design arrangements

Landscaping using trees and plants can reduce energy consumption for heating and cooling. In this method, by the shading of trees, the ability of trees to direct the flow of air as well as by the evaporation of plants, inactive and cooling can be created. Using careful landscaping and design ideas, we can be influential in the optimization of energy consumption and energy storage, especially at the height of summer and winter. Studies on the analysis of the energy consumption of households

suggest that landscaping helped reduce energy consumption by 25% for heating, and by 50% for cooling [19]. Landscape design measures in winter and summer have been shown in Table 3.

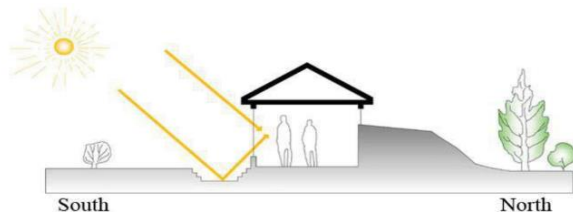
**Table 2.** Landscape design measures in winter and summer [19].

Landscape design measures	Description
Using plants for protecting against winter wind	Evergreen trees in the northern and eastern sides of the building slow down the wind and create a layer of thermal insulation
Using plants to create shade in summer	Trees that shed their leaves, reduce indoor temperature in summer and increase it in winter on the south and southwest fronts of the building.

### Building design measures

#### Placing building deep in the ground

Harsh weather conditions in the basement can be significantly stabilized and mitigated, and this can barely be considered as an advantage for underground buildings. In fact, below the depth of 1.5 to 2 ft (45 to 61 cm), not much of daily temperature changes are noticeable [12]. With more building coverage by land, the building can be protected from the air. In surface structures, up to 35% of heat loss can often be due to air penetration [20].

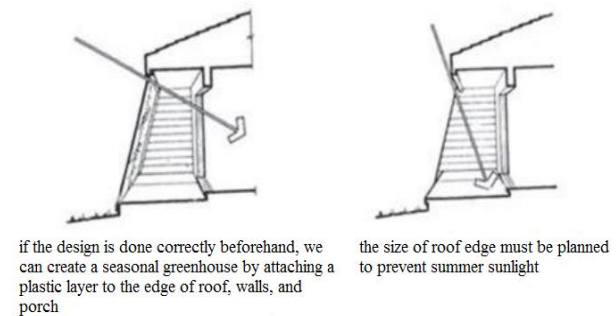


**Figure 2.** More coverage of building by land [21].

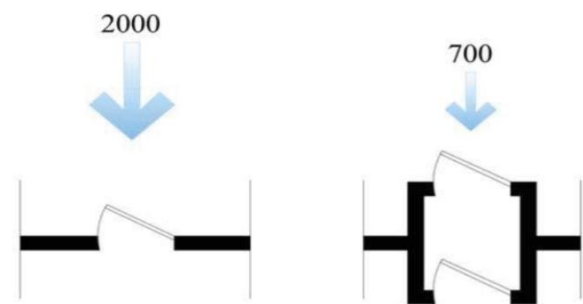
#### Semi-protected areas outside the building

Patios, porches, and enclosed areas outside the house contribute to the comfort of the interior space and function as a private space. The protrusion in front of the roof and porches in summer casts a shadow over walls, openings, and the area around the building, and this helps keep the air temperature outside the building down. These outdoor spaces are also beneficial in winter. Buildings can be designed to create a series of solar boxes next to the building. These boxes can keep the air around the house warm by using sun's heat which will not only increase the length of time the building's outdoor space is used, but also will help create a warmer environment, and so the building's heat loss will be reduced. Plants, outdoor walls and even greenhouse can be used for this purpose [12]. These semi-protected areas

outside the building reduce energy consumption for heating spaces by 20% [22].



**Figure 3.** semi-protected areas outside the building - preventing summer sunlight and keeping sun heat in winter [12].



**Figure 4.** the numbers indicate that the amount of cubic feet of air entering the building is the result of opening the door once [21].

#### Using vestibule at the entrance of the building

Under normal winter conditions, while doors and windows are closed, air infiltration will increase the building's thermal load by 1.3 times. Heat loss through air penetration will reach about 75% of the total thermal load of the building. Vestibule design in the part of the building that faces the north wind, will also be of high value. Although, an attempt must be made not to put the entrance door in this part of the building [12].

#### Building shell design arrangements

Shell is also an efficient component in design and faces three general methods with buildings shells to achieve proper design with climatic principles:

1. Shell as the separator of building from the outside climatic conditions through thermal resistance (insulation).
2. Shell as thermal mass (delaying the conduction of heat through the body of the building)



3. Shell as the storage and distributor of heat in the building [22].

### Using double-glazed windows

Windows are more vulnerable to unwanted heat transfer than any other element in the building shell. The thermal resistance of normal glass is much less than that of insulated walls. The thermal resistance of double-glazed windows is 1.2 times that of single-glazed windows [12]. Double-glazed windows help to reduce energy consumption by 37%.

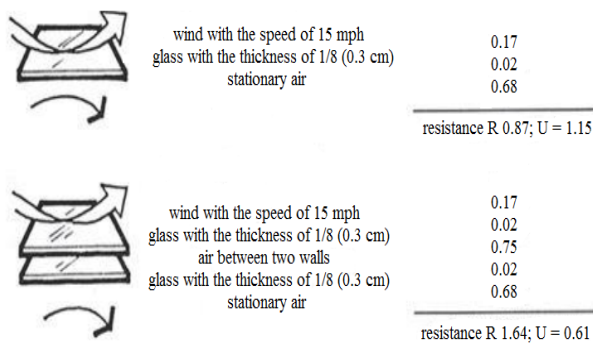


Figure 5. Double-glazed window [29]

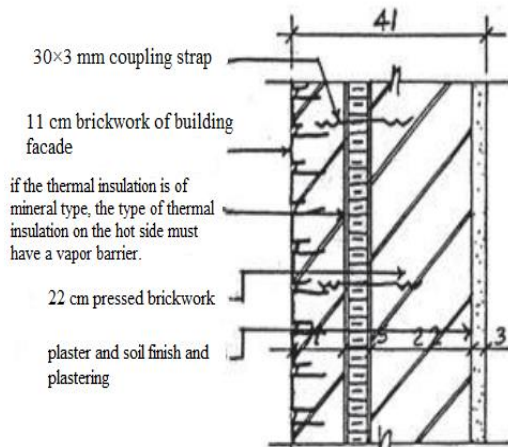


Figure 6. The details of double-glazed wall with 11 cm brickwork façade

### The insulation of exterior walls of the building and the proper design of openings

To achieve the goals of sustainable architecture and the design of building's shells with the climatic approach, observing the following points can be effective:

1. The direction of the building is one of the serious issues for using sunlight in winter in cold and mountainous climates. To reduce energy consumption, the design based on inactive system is influential [23].

2. Using double-glazed or multiple-glazed walls with an empty space between two shells, is a method to avoid heat loss [23].

3. Using proper materials with high capacity and thermal insulation is one of the solutions that can be used to prevent outer cold air [23].

4. Maintaining heat by placing thermal insulation on the exterior shell of the building.

5. To prevent evaporative freezing in the building shell in cold and mountainous climate, vapor barrier needs to be installed in the warm side of the building shell insulation [24].

6. Minimizing the number and area of openings and using materials with lower heat transfer coefficient for window frames.

7. Using night insulation for windows (night insulation is a thick screen that is pulled into the interior wall of windows during the night to prevent heat dissipation). Thick screens help reduce heat transfer by 4 to 8 percent, thus reducing energy consumption [25].

Building component	Function	Usage
Thick screen	1. Reducing the speed of indoor and outdoor heat exchange 2. Camouflage inside at night 3. Reducing natural light	For rooms used during cold nights

Source: Razjouyan [28]

8. Building shell should not cast a shadow on itself (progress and regression should not be in the plan)

9. Using plants in the greenhouse space and its combination with building facade to absorb the heat of the sun from the outer space into indoor space [26].

10. Adding a new layer of materials in the details around entrances and windows and reducing the penetration of cold air and lowering energy consumption [27].

11. The exterior facade of building in the cold climate should be covered with dark colors. Therefore, it will absorb more thermal energy [28]. The following table shows the percentage of the thermal absorption of various kinds of colors:

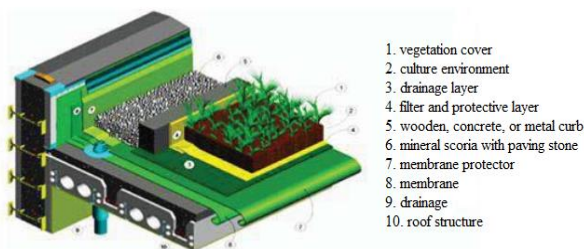
Color	The percentage of thermal absorption
Black	Percentage of thermal absorption capacity
Brown, green, and red	92%
Yellow	73%
Light beige and white	60%
Metalic (dark metallic)	40%
Metalic (bright metallic)	52%
Completely bright metallic	40%

Rouhani M, [30].

12. Using photovoltaic cells in building facade and roof and its combination with building structure is a method to provide sufficient heat in the building from solar energy [29] Observing the mentioned items will reduce energy loss by 29% in the walls, and 14% in the openings, thus reducing the consumption of fossil fuels [27].

### Green roof

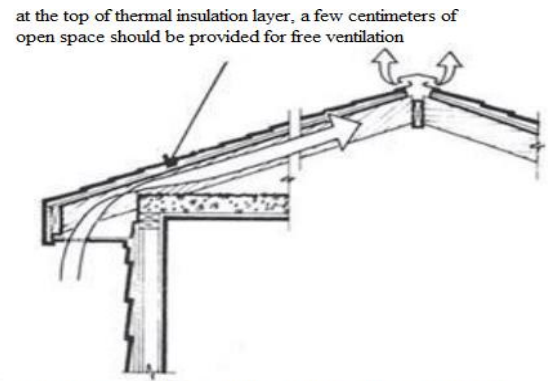
The contemporary method of roof greenery, known as green roof, represents a space where grass and plants are planted at a shallower depth of soil. Green roof is a space with a vegetation cover that is structurally combined with any man-made structure. The word 'roof' in this term is used to refer to any continuous surface whether with open or closed walls that has been designed for protecting residents [35]. Green roof system is a branch of sustainable architecture with many economical goals including increasing insulation by 25% and saving energy [26].



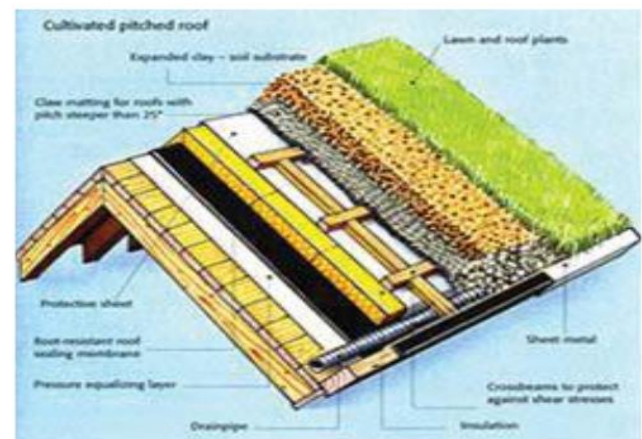
**Figure 7.** the constituting elements of green roof [30].

### Using the space under sloping roof as a storage space between indoor and outdoor air

The attic floor must be well insulated to prevent heat loss from the attic and also to prevent roof heating which melts snow. Due to the heat absorption from the south side of sloping roof, the temperature of this room is also increased which causes snow to melt on the north side of the roof and also creates an ice dam. This room should be properly ventilated to prevent this as well as perspiration. The protrusion of roof edge and holes under the arch are suitable for ventilation and for keeping attic space cool [12]. The thermal insulation of roof reduces heat loss by 26%, and so cuts down fossil fuels consumption [25].



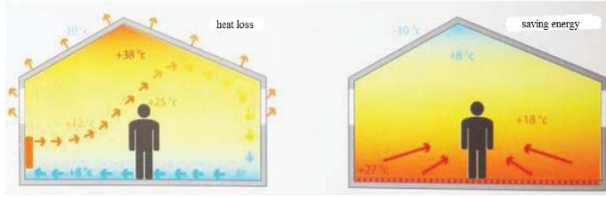
**Figure 8.** the ventilation and cooling of attic space by the protrusion of roof edge and holes under the arch [12].



**Figure 9.** The details of sloping green roof [22].

### Mechanical heating system

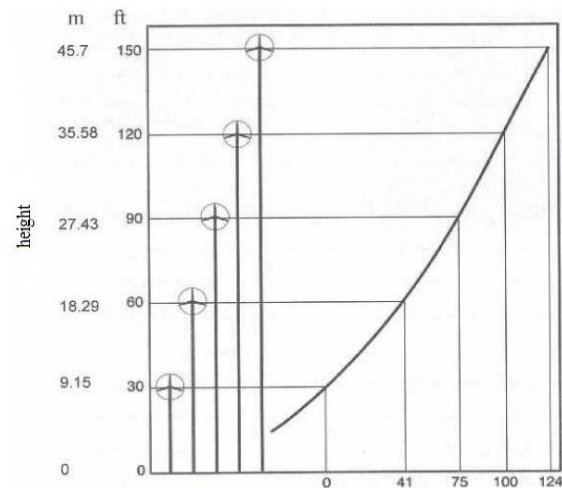
Underfloor heating system saves energy by 25% to 30% compared with conventional heating systems like radiator, or fan coil. The reasons for this are extremely large radiation levels (equal to the area of heated space), low water temperature circulating in underfloor heating system (between 35% to 50% °C), low heat exchange between floor and cold walls, even distribution of heat throughout the surface and space, and avoiding problems with radiator including its blackness, clogging, decay and finally problems related to repairing and maintaining it. Using this thermal method, warm weather in the environment will be very desirable and uniform because hot air is lighter than cold air and heat is always transferred from bottom to top. Thus, it would be better to heat the ambient air from lower level (floor) [29].



**Figure 10. proper and ideal mode in underfloor heating system and improper mode in radiator and fan coil heating systems**

### Wind energy

Using wind energy in high-rise buildings has higher efficiency than low buildings due to the considerable height of these constructions and the high speed and intensity of wind. Using this energy in the natural ventilation of high-rise buildings (atrium) and also in the generation of electricity by means of wind turbines, is among the strategies used in these buildings for sustainability [16].



**Chart 1.** The increased wind density in different heights. Source [30].

Climatic design arrangements	Descriptions	The level of reduced energy consumption
Landscape design arrangements	- Using plants next to the exterior walls of buildings	- the reduced consumption of heating by 25% and of cooling by 50%
Building design arrangements	- locating building deep in the ground - using vestibule in entrance - designing semi-protected areas outside building	- reduced heat loss by 35% - reduced heat loss by 15% through air permeation - reduced energy consumption by 20%
Building shell design arrangements	- using double-glazed windows - insulating the exterior walls of buildings - insulating roofs - green roof system - proper design of openings - indoor canopies	- reduced heat loss by 37% compared with single-glazed windows - reduced energy consumption by 29% - reduced energy consumption by 26% - increased insulation level by 25% - reduced energy consumption by 14% - reduced sunlight by 20% to 25% and reduced heat transfer by 4% to 8%
Mechanical heating systems design	- underfloor heating system	- reduced energy consumption by 30% compared with other mechanical systems

**Table 6.** Climatic design arrangements and proper mechanical system to reduce energy consumption. (the analysis and processing of the research by author)

### DATA ANALYSIS AND CONCLUSION

This study attempted to analyze the effective components of sustainable architecture in the design of high-rise buildings to reduce energy consumption in Tabriz so that it can deal with the effect of the above-mentioned models on reducing fossil fuels consumption and environment sustainability. The following table shows sustainability models in the design of high-rise buildings in cold and dry climate and the effect of these models on reducing fossil fuels consumption for heating buildings.

Thus, today, considering the air pollution in cities and environmental issues resulting from using non-renewable energy resources, the design of high-rise buildings should be reconsidered. Given the data mentioned in Table 6, it could be found that by observing sustainability models in the design of towering buildings in cold climate, we can:

- Do modeling for high-rise spaces to achieve climate-friendly architectural concepts
- Save energy for heating spaces by 66%
- Save energy for cooling spaces by 37.5%.

### Suggestions

The following suggestion are, thus, provided in addition to those mentioned in the above table, to re-examine high-rise buildings design and to save more energy in consuming fossil fuels for heating buildings in winter:

1. Using domestic, accessible, environmentally-friendly materials
2. Designing a narrow and elongated form of the building along the east-west axis



3. Designing openings in the southern facade of the building to use sunlight in winter
4. Blocking and insulating the windward and cold side of building in winter, and using coniferous trees against cold winds
5. Minimizing openings in eastern and western sides
6. Using south porches as canopies against sunlight in summer
7. Working out the depth of canopy given the angle of radiation of the sun in winter and summer
8. Using greenhouse space in the southern side of building
9. Locating main spaces like bedroom, living room, and dining room in the southern side

The presence of corridors in the northern side of the building as the intermediate space between main indoor and outdoor spaces.

## DECLARATIONS

### Authors' contribution

All the authors contributed equally to the work presented.

### Competing interests

The authors declare that there is no competing interests.

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# CONCEPTUAL ART IN TURKEY: CENGİZ ÇEKİL

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**ABSTRACT:** Conceptual Art emerged in the 1960s and displayed an entirely idiosyncratic structure as compared to those years' prevailing form pursuits. It involved the art object in an intellectual process rather than a structural process. This very understanding, which keeps its distance from art object and prioritizes the artists' ideas, enables the artists to express themselves by exploiting all kinds of materials. Similar tendencies became manifest in Turkey during the end of 1970s. Some Turkish artists returned back to the country after completing their studies abroad and with the occasion of biennials they became effective in the scene of conceptual art. Each of these artists produced individually important conceptual artworks, which represent their own time. This research is focused on Cengiz Çekil, who is an important representative of Conceptual Art in Turkey, the period when Conceptual Art emerged, its leading artists back then and their works. Furthermore, this paper includes the examination of Cengiz Çekil's works which carry the social and cultural traces of his time, his interviews, art perception and both his position and importance in today's Conceptual Art. Based on the existing examples the literature has been reviewed and the artist's works have been analysed. When it comes to Conceptual Art in Turkey, one of the first names that come to mind is Cengiz Çekil. For, by means of the unique mentality he demonstrates through his 'new' and astonishing style, he has been one of the most prominent artists in Turkish art history.

**KEYWORDS:** Cengiz Çekil, Conceptual Art, Sculpture, Installation.

## INTRODUCTION

Conceptual Art emerged in 1960s as a striking art style among others, which were concentrated on different artistic pursuits and trials. Nevertheless, long before, in 1913, Marcel Duchamp had already explored the readymade. By challenging his day's art communities through his unconventional and new artistic approach, Duchamp brought the art works' ideas, images, forms, aesthetical concerns and messages forward. In that period, anti-Minimalists had embarked and concentrated, in a similar vein, on the 'language' of the artworks in relation with art galleries, which are common venues for the artists and their works to manifest their specific ideas. The aim was to deliver an information through a visually well-conceived and strong 'installation'. All of these attempts, undertaken by artists who focused on the conceptual nature of artworks, triggered new and investigative declarations.

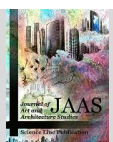
In parallel with this objective, the artists, who in terms of Modern Art are Conceptualists, attached great importance to printed texts, photographs etc. due to these materials potential to convey the artworks' messages directly and clearly to the audience [1].

American artist Joseph Kosuth stated that it is necessary to liberalise art, rather than imprisoning it

into concrete forms. Art has its own justifications and in order to give the human spirit the opportunity to reveal itself, the unique art perceptive is necessary. He also argued that Duchamp's Readymades changed the history of art completely by shifting significance from 'appearance' to 'concept' [1].

Conceptual Art examples started to emerge during the mid-1960s. However, much earlier, in 1952, John Cage asserted within his 'integrated sound field' that music includes all kinds of sounds, including any kind of sound that does not belong to music and even the absent sound. He observed that while sound has a pitch, loudness and duration, silence has only a duration. During the performance of his silent composition called Four Minutes Thirty Three Seconds (4'33), he was just present, neither doing anything nor producing a sound. Inspired from Robert Rauschenberg's 1951 dated works called 'White Paintings', Cage eliminated everything but the random noises of the environment and duration (common traits of both sound and silence). Cage's actual intention in this work was the individuality of the observer's experience [2].

As an art phenomenon of the 1960s, Conceptual Art is similar to Minimalism, however, it by-passes the content and represses the aesthetical elements of the art. This conscious contradiction, which arises



from Dadaist approach, paves the way for some stimulating paradoxes. When Conceptual Artworks come together with the audience, (especially in deliberate places like galleries), it soon starts to evoke traditional forms of art, since aesthetic expectation and imagination associate each other. On the other hand, brushing the aesthetics aside by following in Minimalism's footsteps does not mean that the artists need less time to generate their artworks compared to Renaissance artists' efforts. And then again, all creative processes require a certain and conscious performance [3].

The expression 'Conceptual Art' was invented in 1967 by Sol LeWitt to summarize these kind of works' intention: Rather than engaging the eye or feelings of the audience, Conceptual Artwork's *raison d'être* is to urge the viewers to think. Since "the idea becomes the machine that makes the art," planning and decisions should come before all else, which then relegates execution to the condition of "a perfunctory affair." LeWitt added that "ideas may (even) be stated with numbers, photographs, or words or any way the artist chooses, the form being unimportant" [1].

Critics accepted that LeWitt has always embraced an irrational, spiritual and mystical verbiage, and that his main intention by inventing 'Conceptual Art' is to subvert Minimalism. In his 1966 dated manifesto 'Sentences on Conceptual Art' he lended credence to critics by mooted that "conceptual artists are mystics rather than rationalists. They leap to conclusions that logic cannot reach" [4].

Conceptual Art focuses mostly on the artistic experience itself and this experience's theoretical elements, in such a way that referring to the object becomes unnecessary. In 1969, Vito Acconci for instance tracked individuals through the streets within his work called 'Following Piece', aiming to link the viewer to an anonymous experience (individual, viewer, photographer, Acconci) through the candid shots his photographer provided [2]. Acconci stated that he had been an inactive receiver of an individual's space and time. One of his chases ended after nine hours when the person he followed entered a theater showcasing the movie 'Paranoia' [2]. By eliminating the aesthetical object in Conceptual Art in the interest of manifesting his own idea, the artist has been able to experience a number of production methods.

American artist Joseph Kosuth is also one of the most important conceptual artists. He is a supporter of the movement, which tries to reidentify the constituents of an artwork. By questioning the

traditional art forms and the assumptions that accompany these forms, he uses his ideas and language as a material [5]. Arthur C. Danto calls Joseph Kosuth in his book 'After the End of Art' as one of the few people who during the 60s and 70s produced artworks that analyse the philosophy of art. In Kosuth's 'Art After Philosophy' published in 1969, he stated that art invites us to an intellectual thinking and its aim by doing so is not to recreate an artwork but instead to understand philosophically what art is [6].

Joseph Kosuth's "One and Three Chairs" is one of the most important examples of Conceptual Art. In this work, a chair stands alongside a photograph of a chair. And next to the actual chair there is a photograph of a verbal dictionary explanation of the word 'chair' hung on the wall. Eventually all of these three objects represent the chair, yet with different codes. Thus exhibiting these verbal, visual and representative codes of a single object together has been the smartest way to bring the connection and irrelevant connection between the 'referent' and the 'signifier' into question [1].



**Figure 1.** Joseph Kosuth, 'One and Three Chairs' 1965, folding chair, photograph of a folding chair, photograph of the lexical meaning of chair. Chair: 82×37.8×53 cm, folding chair's photograph: 91.5×61.1 cm, photograph of the chair's lexical meaning: 61×61.3 [7].

The Conceptual Art understanding of the 1960s and 1970s aimed to overcome the conventional expectation from art, which eventually is not obliged to produce aesthetically pleasurable forms. Some of the early Conceptual Artists adopted an understanding in which the artwork is useless, if it is not able to preoccupy the viewer. Conceptual Art is usually considered as 'mind's art'. Its representatives emphasized its cognitive value rather than its aesthetical value [8].



Although in this art circle technology seems not to be essential, the attribution to technology paved the way for the faith in artistic process. The main characteristic of contemporary art was not the design of the venue anymore, it was instead, the interactivity between viewer, artist, main topic and content. Since then, the description of an art object has been connected to its efficiency in using the venue. Both the limits of structural and artistic forms have become unclear; the artist preferred to exhibit her/himself (the image of self-consciousness) [9]. The artist's inner-position had never converted into such a direct material.

Yet another outstanding Conceptual Artist is Joseph Boyes. Apart from his interesting life story, participating in Fluxus and producing conceptual artworks by using ordinary matters like fat, felt, etc., transformed him into the most conspicuous artist of this movement. Beuys said: "I tried to separate the concept of plastic into three simple objects. But this is not solely limited with objects that are physically perceivable. The same thing applies to plastic materials which are invisible. I start using unspecified materials like fat and soil, and through a certain action, I reconstruct a new form from these" [10].



**Figure 2.** Fat Chair, 1964, Wooden Chair, Animal Fat [11]

Joseph Beuys' Fat Chair transformed two ordinary materials into an open-ended metaphor. In 1964 he exhibited this work in a glass case and let it undergo a natural process of decay until 1985. During this process the fat decomposed in such an extent that it evaporated and nearly disappeared. The main organic compounds he used in his artwork let the audience identify themselves with these materials and experience the temporality of life and

physical perishment of humans in the course of time [11]. The chair is consonant with human body and living style. Fat on the other hand, experiences radical transformation with a tint change in temperature and thus indicates the chaos. For Joseph Beuys everything is changing and the chaos triggered by this reality may have a remedial effect. Beuys has seen in the transformation of fat and continuous formal changes that almost remind the spiritual alteration potential of humans, an analog of spirituality [2].

Based on this artistical environment, period and approaches, this research paper investigates the moral of the period when Conceptual Art emerged and its leading artists and in this context, it examines Cengiz Çekil's, one of the most significant representatives of Conceptual Art in Turkey, works and art perception. And it is also aimed to lay emphasis on his conceptual works' place and significance in Turkey's contemporary art and herewith to contribute the related literature.

## CENGİZ ÇEKİL IN THE CONTEXT OF CONCEPTUAL ART

Conceptual Art appeared in Turkey as from the end of 70s and became prevalent within the art environment of 80s. As one of the leading artists of Turkish Conceptual Art, Cengiz Çekil created remarkable artworks in this field and has been an important representative of conceptual art, both in Turkey and abroad. He was born in Niğde-Bor in 1945. He graduated from Ankara Gazi Education Institute's Art Teaching department in 1968. Between 1970 and 1975 he completed his Sculpture/Modelling study in Paris, founded by the ministry. In 1978 he started working in Ege University's Faculty of Fine Arts department as research assistant. Çekil regarded the sculptures he produced in Paris as his first works [12]. He launched his first solo exhibition 'Réorganisation pour une Exposition' (*Reconfiguration for an Exhibition*) in Paris.

During one of his interviews with Necmi Sönmez, the artist stated that he was amazed by Beuys' and Duchamp's works, and that he had conceptualized his works under their influence. He asserted that they are the benchmarks of contemporary art and on all occasions he uttered his admiration for both of them [12].

'Direnç: Ölü Bir Somyanın Anısına' (*Resistance: in Memory of a Dead Mattress*), one of the artist's most known works (Figure 3) consists of a used, dumped, rusted bed, carrying on the middle an

amiant band and above this a resistance lying. He spread a piece of white fabric, a material that will become a frequently used material in his subsequent works, under this installation. This white fabric reminds a deathbed, a shroud, on which a dead body lies. This glowing hot resistance, dividing the bed in to two symmetrical pieces, symbolizes the ablaze resistance against death. The artist has never been unconcerned about the goings-on around him. This work, which he produced during the time he lived in Paris, refers at the same time to 'La résistance', the name of an anti-fascist resistance which emerged against the Nazi occupation in France during World War II. Çekil's efforts to exhibit more than one work together started with his exhibition at Beaux-art in Paris. In one of its small galleries designated for small-scale exhibitions he exhibited four of his works together: Iron Earth Copper Sky, Resistant Areas, The Heating Coil and Resistance in a Capillary Long Tube, Resistance: in Memory of a Dead Mattress [13].



**Figure 3.** Private Exhibition of a Group of Works at École des Beaux-Arts: Resistance: in Memory of a Dead Mattress (1974), Iron Earth Copper Sky (1975), Resistant Areas (1975), The Heating Coil and Resistance in a Capillary Long Tube (1975). From SALT Research's Cengiz Çekil Archive [14]

The conceptual artist may intend to fix the emphasis for materiality or may want to use it paradoxically. Whatever the intention is, an art approach of this nature requires the highest economy of materials. If an idea is better presented in two dimensions, a three dimensional application should be out of question. The ideas may be expressed through numbers, photographs, words or any other medium the artist prefers, the object/material stands beside the point [15]. In this context Cengiz Çekil generated his concepts without focusing on a particular material or dimension.

Another well-known work of the artist is "The Yellow Rubber" (Figure 4). The work consists of a canvas, lace and a hook. The lace and colour on the background of a 144 pieces of flipped canvases fall within the system of colours and shapes Çekil rebuilt, and display formal diversities. The wooden panel represents the Ottomans' civil architectural oriel windows, which protrude from the main walls of the buildings without letting the people in the house step outside. According to the artist, framing the work refers to a kind of introvertedness, motivated by the necessity of upholding the 'honour' of people living in the house. Both the rubber which is commonly used in house cleaning and laces installed as a second background highlight the correlation between femininity and middle-class family. On the flipped surfaces of the canvases there are colour tones akin to human skin and tones like yellow, purple, grey and beige which look like bruises caused by physical abuse. These components together are representing the domestic violence which happen in a domestic setting and are usually concealed [1]. Through these works the artist emphasizes the cultural conservatism in Turkey, questions the traditions and at the same time conveys his messages by exploiting conceptual art's freedom. And the immensity of materials he selected to create these artworks is utterly striking. As long as the artist's practice serves the concept, she/he is far more free in using different images and objects as compared to minimalists [16].



**Figure 4.** Yellow Rubber, 2013 [17]

In his exhibition "What Time Is It?" (Figure 5), he brought a series of his works together, which all concentrate on the same causal questions. This installation reminds of his work-series called 'Unlettered' (1975-1977) in which he used newspaper for the first time as a material. What Time Is It? displays for one week, newspaper sheets chosen from Hürriyet (a Turkish local paper), which

consistently produces life-dominant dynamics and indicators identified by mainstream media. On these sheets behind a glass frame stands a semi-transparent bold face ‘What Time Is It?’ question. Although it is hard to read the news behind this glass and letters, it is still visible. The abundance of images and words on the sheets points out the life’s preciousness and fragility by countless repetition of the same question which interrogates the meaning of daily routine [13].

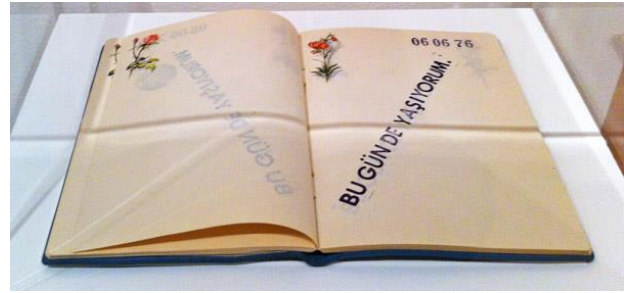


**Figure 5.** Cengiz Çekil, What Time Is It?, 2008  
112 pieces, each piece 56×75.7cm [18]

The artist stamped every night before sleeping on a diary he bought in 1976 these statement: “I Am Still Alive” (Figure 6) and wrote the date. Representing as a diary the individual world/cosmology, this work entered the permanent collection of MoMa in 2011. The diaries that chronologically historicise a person’s subjective adventure might be regarded as maps of the inner world. Through “I Am Still Alive”, Cengiz Çekil mythicise his inner world which has to squirm before the external world. The Left vs. Right movements in Turkey in 1980s, current political conflicts and the tension generated by domestic policy led up to 12 September 1980 upheavals. As standing in the middle of such an insecure environment he actually, instead of meaning that he is still alive, wants to say that he coincidentally did not die that day. He summarized a pure world which sprouts in the middle of an internal conflict in which living is possible simply by accident [19].

Concepts and language are tightly knit, therefore, conceptual art is a practice that uses material to verbalize the concepts. While music consists primarily of tone, conceptual art’s substance is language [16]. Thus Çekil’s ‘Diary’ is a significant example in the context of language’s potential to convey the notion.

The Japanese artist On Kawara’s postcards and telegrams he daily sent to his friends and colleagues bearing messages like “I GOT UP”, “I AM STILL ALIVE”, “I Went I Met” and Çekil’s Diary use similar languages to declare that they are still alive. While Kawara sent his messages to his friends, Çekil kept an abstract diary of the days he survived just for himself [13].



**Figure 6.** Cengiz Çekil “Diary”, 2011 [20]

In Çekil’s works, spatial concerns stay in the background. For the installations of the artist, the environment serves merely as a platform to convey his opinions.

Harald Szeemann’s famous exhibition “When Attitudes Become Form” (1969) has been a ground breaking curatorial application, manifesting the transformative nature of art language. Since the common trait of movements like Concept Art, Arte Povera, Fluxus etc. is that the artwork is merely a medium which conveys the energy, ideas and notions to the audience. Thereby, the artwork eludes materiality and experiences a transit journey. The materials Çekil has used in Paris reveal that they experienced the same transit journey with Szeemann’s, and at the same time that he files with Joseph Beuys [13]. What makes Çekil successful in this field is his approach to material. Converting the right material into an art object can only be a good artist’s achievement. The risk of appreciating the physicalism of a material on such a scale, lies behind its potential to become the notion of the artwork [16].

Cengiz Çekil’s first retrospective took place at Rampa in May-July 2010 and it has been the artist’s largest exhibition. Curated by Vasıf Kortun, this exhibition gathered all of the works the artist produced between 1974 and 2010 [14]. While participating a wide range of exhibitions at home and abroad, the artist served at the same as an academic and trained hundreds of students. The artist, who passed away on the 11th of November 2015, gained an important place in the history of Turkish Contemporary Art.



## CONCLUSION

This research quotes briefly the period when Conceptual Art emerged and the artistic environment in that period. Conceptual Art arose in 1960s and has been an effective art approach until the end of 1980s. Within this subject, leading artists of this movement and their works have been mentioned. As one of the most effective names of Conceptual Art in Turkey, Cengiz Çekil's art perception and works have been examined. Through his 45 years art career he never gravitated to the vanity and dynamics of the art community. His main objective has always been to witness the recent past and hand it down to the future through images. He has quite a few works which he has not been able to exhibit due to various reasons. Granted that his art is an intellectual process, he never regarded art as a materialistic medium. In order to truly realize the art practice he narrated his life experience from a boy by exploiting unconventional materials. Prof. Dr. Fevziye Eyigör, member of Atatürk University, mentioned within her article published in the journal 'Sanat Dünyamız' (*Our World of Art*) that Çekil has been regarded as the representative of the hidden history of 1970s current art and the 'Father of Contemporary Art' [21]. Cengiz Çekil soon comprehended the idea of Conceptual Art. During an interview with Necmi Sönmez he said that fleamarkets are like design museums and he provides the materials he needs from these markets. His work 'Diary', in which he included a big part of his life and ongoing since 1967, was selected for the permanent collection of MoMa, the most famous Modern Art Museum New York, shortly before his decease. These significant development is a testament to his international success. During the years he spent in Izmir both as an artist and as an academician, he trained a lot of artists and shared his perception of Conceptual Art with them. Cengiz Çekil is one the most significant and prominent artists in Turkish history of art.

## DECLARATIONS

### Authors' Contributions

F.N. Suyum is the lead author of the manuscript. She provided the background and the body of the work. C. Zöngür performed general overview, analytical interpretation of the work, developed the abstract and conclusion sections. Both the authors directly participated in analysis of this study, and have read and approved the final version submitted.

### Competing interests

The authors declare that they have no competing interests.

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Results and Discussion can be presented jointly.

Discussion and Conclusion can be presented jointly.

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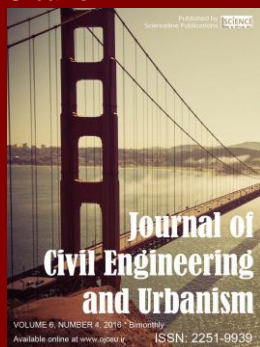
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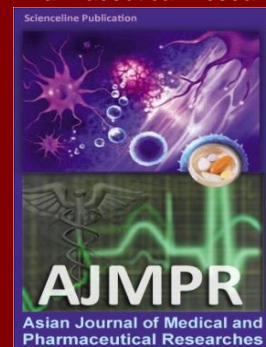
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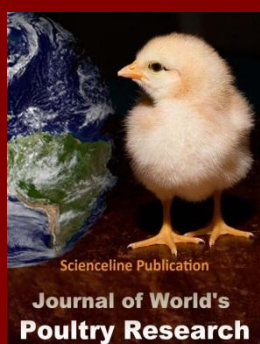
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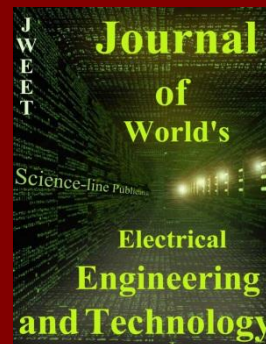
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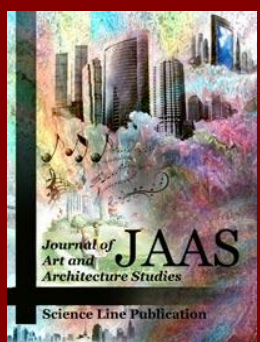
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