

A SHORT ESSAY ON THE MEANING OF DIFFERENTIATION IN DESIGN

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Abstract

In all types of design processes, design becomes possible when the designer develops an unusual attitude and/or perspective in his/her approach to the problem he/she is addressing. As we go back in history, while designers develop a language that becomes identical to themselves due to the differences they reveal in their design, it is seen that in the pages of history the designers appear with the phrase “great artist” before 20. century, and then “great designer.” The knowledge and cultural capital of the designer are the foundations of his/her creativity. Prof. Margaret Ann Boden from the Department of Informatics at the University of Sussex defines “creativity”, one of the key concepts here, in two different ways: “Psychological Creativity

(p-creativity)” and “Historical Creativity (h-creativity)” [1]. While in both forms creativity is a result, the questions of “How is data selected and defined?”, “How is data managed?”, “How and why is data established?” constitute three building blocks of the foundational reasoning of the adventure of creativity. It is obvious that with the answers to these questions, the designer makes his/her design different among its kind. So, could there be any approach that will create a difference in the design process and serve both forms of creativity?

In this paper, an attempt has been made to go after the above question and develop a proposal. In this study, the sample screening model was applied as a method of examination.

1. Design

It is without a doubt that designing is a significant aspect of ours, that we have designed since the first day of our civilization. The satisfaction of the needs such as economy (sheltering, dressing, food, health, etc.), security, justice has

always been what is prior in design and they continue to be so.

The field of design, which continues to vary in an accelerating manner with respect to the needs, wants, the accumulation of knowledge, and developing technologies, has reached a many-layered and complex structure. While many fields of design emerge under what we might call civilization, all fields of design (health, food, textile, education, and so on) form their order in accordance with their time and economical environment.

As the systems develop in the field of design, professionalization in the processes such as human resources, design/production, marketing, and so on, is required by the institutionalizing structure. While the industrial revolution in the 19th century and the changes in consumption and production, which followed alongside, were altering the economical system rapidly, they provided a significant phase concerning institutionalization and professionalization in the field of design. The following era of wars, the rapid scientific and technological progress that occurred between the second half of the 19th century and the first half of the 20th century has continued to affect the economical and, naturally so, design processes. In the current era the progress made both in science (along with the new fields of science) and in digital technologies have started to change the fields of economy and design, with as much force as was in the 19th century. Due to the digital technologies, the domain where the physical and the digital

world overlap caused a redefinition of the concepts and processes of production and consumption as well as they brought about novel fields of design. While solutions, which generally use the systems and methods that we have developed in the physical world, for the problems of design that arise from the process we enter into are being produced, meeting the high level of consumption is also being attempted¹.

The United Nations, in its report "World Population Prospects 2019, Highlights," reports that in 2019 the world population was approximately 7.7 billion [3]. The liberal economy that has started to globalize in the 19th century and the rapid increase in human population due to the advancing technology (the population that was 1 billion in 1800 reached 1,6 billion according to the data from 1900 [4]) indicated not only the increase of consumer population but also the increase of the capacity of production. This increase has caused the diversity of design and human tastes to come to the fore in the world of design. It is necessary to briefly touch upon the issues of "diversity of design" and "human taste" at the point reached in the examination made in this paper.

However, it would be helpful to discuss John Heskett's brief definition of the concept of "design" before proceeding to the issue of diversity in design. In his "DESIGN, A Very Short Introduction" Heskett defines "design" as follows: "[d]esign is to design a design to produce a design" and he explains:

"Yet every use of the word is grammatically correct. The first is a noun indicating a general concept of a field as a whole, as in: 'Design is important to the national economy'. The second is a verb, indicating action or process: 'She is commissioned to design a new kitchen blender'. The third is also a noun, meaning a concept or proposal: 'The design was presented to the client for approval'. The final use is again a noun, indicating a finished product of some kind, the concept made actual: 'The new VW Beetle revives a classic design.' Further confusion is caused by the wide spectrum of design practice and terminology... [5]"

Heskett's befitting definition and his elaboration of it correspond to Prof. Boden's definition of creativity and the distinction concerning the types of creativity. On the one hand, Heskett's "a new kitchen blender" refers to the expansion of the product range of an already existent product, the counterpart of this in Prof. Boden's text is what he calls "Psychological Creativity" (p-creativity). On the other hand, Heskett's "a classical design" is mirrored by Prof. Boden's "Historical Creativity" (h-creativity). While the former is directed at the development and expansion of the product range, the latter defines, what one might call with a recent expression, iconic designs².

Further, Pierre Bourdieu's handling of the issue of taste and consumption habits/dispositions with respect to the variables/factors of taste and aesthetics brings about a wide explanation of the relationship between production and consumption. At the same time,

Bourdieu's aforementioned analysis includes the main causes of the need for diversity in design and especially product development [6].

Bourdieu, under the section "The Variants of the Dominant Taste," in his book "La Distinction, critique sociale du jugement (Distinction: A Social Critique of the Judgment of Taste)" classifies the belonging of aesthetic choices to the ethical body that establishes lifestyles in terms of cultural capital. He classifies these classes as teachers (primary and secondary education, high school, and university teachers), higher educated ones (public sector administrators), aristocrats, and lastly the self-employed ones.

In accordance with their cultural capital, these classes' attaining and accumulation of their likes can only be parallel to their financial capital. To give an example from the same book, on the one hand, the first group chooses rural museums which are the cheapest and earnest ones, on the other hand, the group which consists of liberal professions chooses greater museums and galleries both in and out of the country. The collections that are exhibited in those museums, in turn, generally consist of the funds of the aristocratic class. The classification Bourdieu specifies shows that diversity and difference is a crucial criterion, which is also crucial to the field of design.

Thus, if we turn to the fundamental question of this piece, how can differentiation be rendered in design?

2. Differentiation

Generally, we might state that differentiation is "the action or process of differentiating or distinguishing between two or more things or people [7]." And differentiation figures in today's understanding of design as a crucial criterion.

The desire of a designer to differentiate in his/her designs (maybe we should say the obligation to do so) is evident in the change of the quantitative and qualitative representation (repraesentare) of painters and sculptors in the 19th century. It was when French innovator Joseph Nicéphore Niépce (1826 or 1827) took the first enduring photograph the fields especially painters occupied until that day, changed forever [8]. Until the camera was invented, the primary doing of the painters and sculptors was to document and record. While painting was showing the power and position of the emperors, kings, ambassadors, generals, ministers, princesses, aristocratic-bourgeois families, countries, and the power holders, they are now being photographed.

Painters left their position in the constitutions to photographers, and governments and palaces have started to hire photographers. With these changes, painters and sculptors were obliged to find a way to make a living and produce in the liberal economy of their time. This obligation quickly brought about art dealership and art brokerage.

The industrial revolution and the following capitalist system globalizing with an England becoming an empire in all respects as its center brought about the rise and spread of Victorian eclecticism in the fields of art and design. All kinds of precious goods, metals, and high art products were flowing to Great Britain from dozens of colonies all over the world ranging from British Honduras, Bahamas, Canada, Egypt, Kenya, South Africa, New Zealand, Fiji, Australia, Burma, or India. Different household items, furniture, fabrics, clothes, paintings, sculptures, plants, animals, etc. were offering a rich selection. For the artist, architect, designer of that day (interior decorators, fashion designers and industrial product designers), this diversity and richness provided a vast opportunity for differentiation in basic concepts such as color, texture, composition, form, or function. In this period when modern life practices started to emerge, people started to become free, make decisions about their lives, exist, and trust themselves in the institutionalized system. Thanks to the developing and spreading rail systems, public transportation, sea transportation, the ease of transportation and people's going to lands far from where they live have expanded their experiences. For architects, artists, designers who take these trips, this has greatly affected the potential to offer different products to their target audience that expand and vary through galleries, architectural offices, and similar brokerage institutions.

By and large, impressionism, the characteristic art movement of the 19th

century, turned from closed areas and limited regions to open areas and distinct regions and communities in its narration or depiction. In the same century, quickly developing science and technic resulted in the changing economy and, closely related to this, compelled people to rethink almost everything in depth. This, in turn, posed a great deal of pressure on people (in gothic, horror, and fiction literature this pressure and anxiety can be traced). It can be said that the Little Ice Age in the Northern Hemisphere ending in the middle of the century, was a positive event that developed outside of human decisions in this depressed century.

The Little Ice Age³ (LIA), between 535 and 536, started with the earth entering into a severe cooling period that would last for a long time, following a great natural disaster called the "Dust Veil Event" that affected Anatolia and Europe. In the continuation of earth events, as the inhabitants of the Northern Globe, we experienced the LIA between 1300-1850. Besides, with the Sunspot⁴ (within 11 years, the sun completes a solar cycle of calm and stormy activity) and the natural events that occurred between 1755 and 66, the LIA period was experienced from time to time with gradations⁵. These severe natural events that continued until the mid-19th century gave rise to cold weather, sicknesses, famine, migrations, and so on.

With the calming of the natural events, warming weather, and development of certain artifacts people started to go outdoors and nature more easily and spent longer time there. From music to

architecture, fashion to interior design, it was impossible for designs in many fields not to include the character of impressionism. Designed or not designed natural environment, daily practices in exterior, open spaces, cities, and human communities have become the necessary elements of the stories that impressionists tell in their making sense of what they see in the physical world. Thus, the artworks they created were compared to neither classical painting nor to the photograph, which we can define as the first technical image.

Their style was completely different. In the impressionists, form had lost its importance. The light and color (which are the continuation of each other. The change in the intensity and speed of sunlight falling on the Northern Hemisphere changes the quality of the natural light seen by the human being, and also changes the quality of color) they used was a representation of the light and color of open spaces of nature⁶. The free, light brush strokes that can be seen one by one were trying to express the time-varying light, shadow, and reflections.

While the brush marks become points in pointillists, who are among the impressionists, they expand and elongate in Cézanne. Artists, living the speed of the age, have tried to express the flow of time in their paintings and sculptures in opposition to the classical understanding that portrays a moment or the photograph that captures a moment.

Hence, the impressionists and the pointillists have differentiated from the artists, architects, and designers who

came before them with the stylistic details tried to be expressed above. In addition, this differentiation process should be read as an important phase of modern art.

2.1 The Differentiated One

Among the many artists who contributed to post-impressionism, Paul Gauguin is especially significant due to the stories he tells. It is evident that what differentiates the art of Gauguin is not only his painting style but also the geography, different people, and their lives that are being depicted. Gauguin, with a radical decision, leaves Paris in 1887 and travels to Panama and Martinique, a Caribbean Island. At the November of the same year, he then returns to Paris. Later, between 1891 and 1893 he makes his first visit to Tahiti. His second visit to Tahiti happens between 1895 and 1901, and in August 1901 he travels to Atuona (on the island of Hiva Oa, or La Dominica in the Marquesas group) and stays there until his death in 1903. The reason for such extraordinary choices in terms of the geographies he wants to visit is perhaps due to his father's decision to move to Peru when Gauguin was an infant, for his mother was from the Inca aristocratic family, and the Peruvian memories from his childhood. Regardless of the reason, Gauguin depicted all the diversity of the geography he entered during his travels to the South Seas, including the vegetation and animals he saw, the lives he witnessed and shared and the life practices he accompanied. Thus, he produced the most divergent pieces of European painting, which include a great differentiation in the

understanding of color, lighting, stain, and composition. His letter to Andre Fontainas in 1899, who reviewed his "Whence do we come? What are we? Where are we going?", contains remarkable explanations about his divergent status [14].

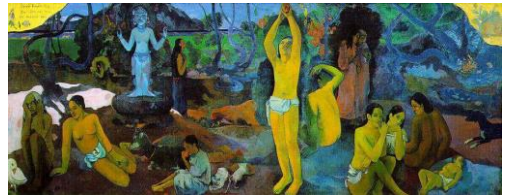


Image 1: P.Gauguin, "Where Do We Come From? What Are We Going?", 1897

Another artist who experienced something similar to Gauguin, with respect to travels, is Paul Klee.

Klee, unlike Gauguin, has chosen North Africa as his travel route. Among Klee's travels, which include a one month visit to Egypt in 1928, his two weeks in Tunisia with August Macke and painter Louis Moilliet in 1914 had a profound effect on his work. Differences in the living culture, art, architecture, geographical structure, and light that allows us to see, the geological structure of Tunisia, the speed of the light falling here, the quality of the material used for production, and so on, would have serious effects on an artist's opinion [15]. This, in turn, revealed a significant differentiation in Klee's post-travel studies concerning his understanding of abstraction (simplification), form language (regular quadrilaterals and triangles stand out),

and in his applications of color as well as theoretical studies [16].



Image 2: P. Klee, "Red and White Domes", 1914

On the other hand, pattern is an important tool in the forms designed by Klee. Pattern is an essential element of modular design, structures composed of complex or simple symmetrical pattern systems (structural solutions of Sinan's architecture are a unique example of modular design). Klee's modular patterns that are influenced by the art of architecture and ornamentation of Tunisia and its surroundings are tools for the artist to produce form and texture, as well as rhythm in his abstraction. Moreover, he used paper, glass, polished wood, or plastic and similar artificial materials in his search for materials for collage works so as to obtain the light and hence the colors of Tunisia that affected Klee. His use of artificial material alongside classical materials shows that he was following the novelties the industrial age has brought forth [15]. In brief, while Klee was interpreting both the differences he saw and experienced (such as light,

geography color, etc.) in the places he traveled and the opportunities produced by the science of his day with an artistic eye, he has succeeded in making a big difference in his works.



Image 3: P. Klee, "Static-Dynamic Gradation", 1923

It would not be wrong to say that Art and Craft, which overflowed from the borders of England and influenced Europe and North America for about 40 years (1880-1920), was a movement against the unqualified mass production of the Victorian Period. Accompanied by this movement, modern works, which bear the visual aesthetic values and other qualities of the handicrafts of the previous periods, were made. Adhering not only to artistic aesthetics but also to the principle of functionality in designs, has made an important contribution to the development of industrial design. They differentiated in their understanding of design, as if acting

with the approach of both an artist and a craftsman and led to the formation of the concept of 'designer'. William Morris, who stands out with his discourse against the production criteria in the economy of his period and one of the leading names of the Art and Craft movement, is a designer who has blended the approaches of these two professions well in his own design approach. On the other hand, one of the features of William Morris is his technical approach to design, which distinguishes his work from other studies. In addition to his own extraordinary understanding of design, another feature that makes a difference in Morris's work is the products he created by analyzing the elements of the movements he influenced such as Victorian eclecticism, Art Nouveau, ArtDeco style and medievalism and his own cultural romanticism. Here, besides the technical difference of Morris, he made a second difference by reinterpreting the elements he selected from the distant history of the geography to which he belongs [17].



Image 4: W. Morris, "Adjustable- Black Chair", 1870- 1890

At this point, it would be appropriate to refer to Alev Ebuzziya Siesbye, a ceramic artist and product designer who came after William Morris and resembles him in some ways.

Ceramic artist and glass designer A. Ebuzziya Siesbye is an artist who did not renounce the craftsmanship stage of ceramic art because she hand-builds ceramic pots.

The impact of his design language which he created by sifting out the values of the history of Istanbul, where he was born, can be seen in the form, pattern, and different color preferences of Ebuzziya Siesbye's designs.

The design language he developed still preserves its identity in industrial product designs. On the other hand, the balance, resistance, and speed Ebuzziya Siesbye's bowls have seem to be in motion according to Einstein's gravitational force rather than Newton's law of gravity. Among many other aspects of his design, this illusion created by the bowls contributes to the differentiation of designs of Ebuzziya Siesbye [18-19].

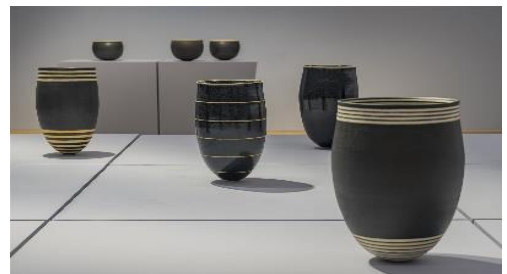


Image 5: A. Ebüzziya Siesbye, "Repetition", 2020

There are many designs that pertaining to architecture and interior design that show what type of approaches result in differentiation. In order to make the examples within the scope of this paper richer, it will be useful to mention a few architects notable for their architectural as well as interior and product designs.

Antoni Gaudi (Antoni Plàcid Guillem Gaudí i Cornet, 1852-1926), who can be considered as one of the first architects of modern architecture, is a Spanish architect who contributed to Catalan Modernism⁷ and became the pioneer of the Art Nouveau movement in Spain. All works of Gaudi, who bear the traces of the cultural roots of Spain and Catalonia in his architectural understanding, are worthy of attention. In addition to the architectural projects that come to mind primarily, such as Park Güell, the Palau Güell, the Casa Milà, the Casa Batlló or the Colònia Güell, with the orientalist, naturalist, neo-gothic lines, his furniture and interior designs, which bear the same lines, are also important works in terms of the history of design.

Gaudi's magnum opus Basilica de la Sagrada Familia (Templo Expiatorio de la Sagrada Familia), dominated by the styles of neo-gothic and Art Nouveau, is one of the works of Gaudi that portrays all the aspects of his different understanding of architecture. His tragic death during the design and construction processes of the Basilica de la Sagrada Familia was the beginning of the tragic story of the building and the discussions that have come to the present day. Basilica de la Sagrada, a Roman

Catholic cathedral, bears all the architectural aspects of the Catholic cathedrals, especially the ones that develop since the Middle Ages. The difference of the structure, which carries the traces of the late 19th century - early 20th century styles (John Ruskin, who influenced Antoni Gaudi, is an intellectual who also influenced the Art and Craft movement), lies in Gaudi's reinterpretation of the gothic style with his modern architectural understanding (Dali named this style as Mediterranean Gothic [20]).

In this interpretation, one should take his use of colored mosaic and terracotta into account while considering his facade design. Here, the geometrical approach Gaudi puts, when designing the form, is the most important factor that results in the major difference of his works. The architect, who studied geometry and engineering in his youth, provided the differentiation in the forms of his work with his non-Euclidean geometrical approach [21]. Instead of using the classically used Euclidean geometry to define the basic elements of the structure of Basilica de la Sagrada Familia, he used hyperbolic and Fractal geometries⁸. Euclidean geometry, which is central in the design of the architectural form, was a pattern of shapes that usually occur in human-made objects until Gaudi.

When he designed this pattern as a non-Euclidean pattern of geometric shapes, he brought about a different perspective to the form also for the designers who come after him.



Image 6: A. Gaudi, "La Sagrada Familia", (1882-...)

When we look at the history of architecture, after Antoni Gaudi, who put forward his works with a naturalist approach bearing the Art Nouveau and Art Deco style, it would be appropriate to look at the architecture of Frank Lloyd Wright (1867- 1959).

Gaudi's naturalist approach to architecture can easily be associated with the organic architectural approach of Frank Lloyd Wright, whose understanding of architecture being influenced by the same styles.

In his education that included some irregularities, Wright, who realized his mother's dream as an architect, received his Engineering education at the University of Wisconsin (Madison), being a regular student approximately for the first three years, and later as a visiting student for a year. He has completed some of the technical requirements for architecture with the music and painting

lessons his family prompted, his engineering education, and especially with the technical drawing and geometry lessons [22]. What constitutes the backbone of the architect's, one might call, self-taught architectural education are Silsbee Architectural Firm and later Adler & Sullivan Architectural Firm. Especially, the design styles of the period he was born into and the Art Deco approaches adopted by Adler & Sullivan Architectural Firm have had sharp influences on Wright's architectural style. In addition to these, we must add Wright's different geometrical approach in his architectural style. Further his travels to Japan for both business and traveling purposes had a great impact on Wright's understanding of architecture. He spent most of his time in Japan during the construction process of the project between 1915 and 1922, followed by a 5-week journey in 1905, then a short-term journey in 1913 for the preliminary study of the Imperial Hotel project.

The knowledge he attained in this period on Japanese culture and architecture has shown its effects on a wide range of designs, from his architectural designs to interior and furniture designs [23-24-25]. The Far East's approach to nature and its solutions in harmony with nature, as well as Wright's studies of classical Turkish architecture, with Mimar Sinan at its focus, have been highly synthesized in Wright's architectural understanding [26-27-28].

Horizontally spreading building masses in Japanese architecture are an important difference with the eaves seen on the graded roofs, as in Sinan's architecture.

This makes a difference with the modular partitions created in the building blocks, the organization of interior-exterior spaces between the masses, the Japanese influence in the environmental design, the interpretation of the fine details in the interior design in Japanese and Turkish architecture in interior designs. At the same time, these differences revealed by the rhythm created by the exterior light in the interior thanks to the arrangements of the windows opening to the exterior, and the design details and interpretations that point to a typical Mimar Sinan's design are also important. On the other hand, in the S. C. Johnson and Son Company Administration Building project carried out between 1936 and 1939, the scaled, intersecting, rectangular and circular volumes in the main mass, the semi-permeable pattern system formed on the ceiling due to the geometry and form of the carrier columns in the open office, are notable differences for an architectural design. The Solomon R. Guggenheim Museum project, which was carried out between 1943 and 1946, is an iconic design example in museum design with the radical geometry seen in its main body and its intelligent solutions for interior and exterior organization with this geometry. As a final example, in the Ralph Jester House project that took place between 1971-1972, it appears that he solved the main mass on the basis of a series of vertical cylinders (construct of structure and space in Sinan's architecture) [29].



Image 7: F. L. Wright, "Avery Coonley House", (1908- 1912)

In brief, what first catches the eye in Wright's understanding of architecture is his differentiated language of design that is generally developed through his analysis and synthesis of the modern or past elements taken from distant and different geographies. On the other hand, while until the 1930s Wright's designs are generally dominated by Euclidean lines and volumes (modernism), in his project S. C. Johnston and Son Company Administration Building his language of the form shows a slight tendency toward non-Euclidean geometry. The use of a different geometry in Wright's approach to form reaches its summit in his Solomon R. Guggenheim Museum.

A second name that cannot be dismissed in the issue of geometrical differentiation in design is Frank Owen Gehry (1929-...). In Gehry's architecture, one can observe influences of the cultural codes of the family he was born into, the traces of the local characteristics of the geographies he lived in, his childhood habits, his aesthetic sense developed due to the artworks he saw in the museums he visited since his childhood, and the way in which the silk, velvet and similar fabrics he admired were painted. When L. A. comes to mind, what contributes to the development of the peculiar language of the city is Gehry's

architecture, which can be seen as "Urban Junkyard." The use of residue and junk material in the Rauschenberg and Johns have been inspirational for Gehry [30-31]. In addition to his use of corrugated sheet, asbestos, artificial materials, galvanized sheet, poultry wire, and similar materials in his early works, including his own house, he has been successful in giving surprising meanings to ordinary materials due to his highly developed style concerning the relationship between material and form. Another aspect of the architect's relation to the material has been his use of interesting materials such as titanium and limestone as building materials due to the growth of projects and fundings [32]. For this reason, we can say that the difference in Gehry's architectural understanding first emerged from the materials he chose as building materials. Further, Gehry's zoological interest is present in the bulk of his designs. In Gaudi's architecture Gargoyles, an ornamental element of the gothic style, turn into ordinary animals such as pelicans, chickens, turtles, chameleons, and so on. In Gehry's architecture, however, while his Barcelona Fish is a carp that has deep affinities to his culture, the BP Bridge is completely a snake. Further, one can deeply observe the influences of his interest in the sea and sea culture in Walt Disney Concert Hall (2003) or IAC/InterActiveCorp West Coast Headquarters (2005), from the projects' main structure to the interior design. Gehry also utilizes the elements he has taken from classical Greek and Roman architecture by synthesizing them in his works such as Walt Disney Concert Hall, Dancing House (Nationale-

Nederlanden Building), and Guggenheim Museum Bilbao.

On the other hand, the knowledge he has gained and the researches he has conducted¹⁰ on Classical Turkish architecture, especially Topkapı Palace and Sinan architecture, may have shown their first effect (in his own words) in his Loyola Law School (1978) project [32].

In purchasing the CATIA 3D modeling software developed by Dassault Systemes for the French aviation industry in 1992 and turning to interactive designing programs, Gehry took his difference in the texture and form of his designs, which he accomplished by his use of material and ready-made approach, to a new level. The first project he designed with this software was his El Pez (the Fish) with a height of 45 meters. The development of the CATIA modeling program, which was purchased jointly with an Italian company called Permasteelisa, was initiated by the responsible unit in the office with the project "Der Neue Zollhof" - Dusseldorf (1998-1999). The digital design capacity offered by digital technologies such as visualization, simulation, calculation, and similar possibilities has provided a great difference in Gehry's understanding of design, especially in his form language. In addition, Gehry opened a field of digital design in architecture, with the CAD program developed in his office taking the CATIA as its example [32].



Image 8: F. O. Gehry, "Walt Disney Concert Hall", 2003

Gehry's approach to form in the problem of design is generally shaped on the basis of Euclidean polyhedra, volumes such as cylinders, cones, spheres with different bases and planes, which we can call basic volumes. In the creation of form, Gehry's interventions to basic volumes are non-Euclidean⁹. In these interventions, the volumes obtained by turning the edges of the polyhedra into concave and convex curves, rotating around a chosen axis, bending, stretching, contracting, or simply cutting and shifting after the general intervention were used with great balance. The sources of inspiration in his planar interventions are Bellini's impressive fabric folds and drapes, Clause Sluter's sculptures, or a sail filled with the wind. While he constructs these movements as horizontal large pieces in his titanium structures, his projects such as Der Neue Zollhof (1999) or 8 Spruce Street (2011) are interpreted vertically to define the volume of the building completely.

Zaha Hadid (1950-2016), who stands out among deconstructivist architects with his formal approach, differs greatly with his approach to geometry in terms of architecture, interior architecture, and product design. The architect of Iraqi

descent graduated from the American University of Beirut with a degree in Mathematics before studying architecture at the London Architectural Association. The advanced knowledge of mathematics and geometry she acquired before architecture is the main reason why Hadid was able to approach form using a non-Euclidean logic. In general, basic geometry elements such as point, line, and surface have formed the starting point of form designs (one of the factors that have an effect on this is digital technologies and CAD programs). Hadid established a topological relationship in a formal (geometric) sense between the basic elements she chose as the beginning of the design problem. As a result, Hadid achieved fluid volumes that are distinctive of her design. These volumes she reached are within the scope of Topological geometry. In short, Hadid started designing form/volume from scratch in her designs and took Topological geometry as the main generator of most of her designs. On the other hand, the difference in pattern systems she develops as a function or ornament in her designs bears the traces of the culture of the land she was born in, as well as her capabilities in mathematics and geometry.

2.2 The Differentiations

Luis Kahn (1901-1974), an American architect, interviews the students from Rice University School of Architecture in 1968 Spring. In this interview, he narrates the experiences of General Electric Company in their studies of designing a

spacecraft within the scope of space studies. In stating "Mr. Kahn, we want to Show you what a spacecraft will look like fifty years from now," the project manager and a group of scientists show sketches that contain precise details to Kahn and explain them. Impressed by the sketches that are composed with a precision befitting for an architect, Kahn shares his conviction: "It will not look like that." The officials approach the table and look at Kahn with full attention, "How do you know?" they ask. The answer of Kahn is clear:

"I said it was simple... If you know what a thing will look like fifty years from now, you can do it now. But you don't know, because the way that a thing will be fifty years from now is what it will be [33]."

Something that is unknown cannot be designed, design can only be possible with knowledge. That which is concrete, the knowledge that does not vary with respect to time and geography turns into design in being analyzed and synthesized with respect to the intellectual accumulation of the designer and the values he/she has. Thus, new knowledge paves the way for new fields of design. It is for this reason, by and large, that the novelties in science and technology bring forth the possibilities for "historical creativity." The designs that are the first instances of their kind are examples of historical creativity, and they occupy their place in history with their great differentiation.

Boden divides creativity into three forms. In these three forms, it contains an element of astonishment. The three forms

Boden refers to can be listed as follows: to design something unfamiliar by combining what is familiar, to discover something, or to transform something into something else [1]. These forms Boden specifies for creativity are also applicable in the field of design. When the question of what kind of approaches lead to these forms is being asked, the question concerning how differentiation in design is achieved also arises.

In the 1970s, German industrial designer Dieter Rams had been answered the question of what is good design by 10 principles. Rams listed his principles as follows:

1. Good design is innovative
2. Good design makes a product useful
3. Good design is aesthetic
4. Good design makes a product understandable
5. Good design is unobtrusive
6. Good design is honest
7. Good design is long-lasting
8. Good design is thorough down to the last detail
9. Good design is environmentally friendly
10. Good design is a little design as possible [34].

These criteria Rams has spoken of as an industrial designer are applicable to all the fields of design. The word "innovative" in the first criterion has the same meaning with Boden's three forms of creativity: impressive, surprising, unexpected, in brief, different. Hence, the answer to the question of "What choices result in differentiation in design?" also gives a proposal as to the origins of and reasons

for differentiation in design. When we analyze the differences of these works we have considered in the examples given above, it is apparent that these sources can be collected under a few items:

Knowledge: Knowledge-based selection and knowledge-based processing of the items chosen to be used while developing a solution to the problem of design, and the proposal the designer puts forward by the synthesis between his/her knowledge and experience would enable the designer to be differentiated from his/her peers.

Geometry: Everything has a shape or can be represented with a shape in both the physical world and the imaginary one. In defining the function, the set of shapes designed to solve a design problem defines the form visually. For this reason, the difference of geometric approaches in a design appears as an important source of differentiation of the design.

Going back in history: Every branch of human history is interwoven with cultural values produced for millennia, and it is natural for a designer to benefit from these values in his work. The interpretation of the designer, which is given on the values, knowledge and technology of the time of the designer, and on the elements one takes from the history of the field that is being studied, would also make the design different.

Geography: In a design process, a designer can utilize the former elements of his/her geography or the elements from the history of distant geographies. The

stronger the designer synthesizes these elements and defines a clear relationship between them, the more different can his/her solution be.

It is clear that combining one or more of the four items above, and reinterpreting and synthesizing them as a solution to the design problem would have a strong effect on the differentiation of the design.

3. Conclusion

Design can only be possible with knowledge. Halil İnalçık and İlber Ortaylı¹¹, two prominent historians, both state that a professional should be knowledgeable in language, history, and geography whatever one's profession is. To reach the origin of the knowledge that is to be used, to be knowledgeable about the state of the world that knowledge belongs to, and to know the geography it flourished would highly affect the success of a study.

Aktan Acar, an assistant professor in architecture, is outstanding in his work on Vitruvius and knowledge in the discipline of architecture.

"Contemporary architectural theories are not subordinated to the hierarchical articulation of human learning and knowledge that were used to be classified as seven liberal and mechanical arts until the scientific and intellectual revolutions of the 17th and 18th centuries. Before that, the origin and knowledge of architecture were being derived from metaphysics, in the form of cosmology, which was

covering mythology, philosophy, theology, proto-scientific observations, and experiments. At the eve of the 18th century, the former metaphysical paradigm of architectural theory has been replaced by the scientific doctrines. This change cannot be abstracted from the gradual transformation of western thought until the emergence of modern scientific thinking and the separation of arts, science, and philosophy [35].”

As can be understood from the excerpt above, in his "A Genuine Origin and Language for the Universal Principles of Architecture" he takes up the issues of knowledge, the origin of knowledge, the meaning knowledge bears, and its alterations or transformations.

In brief, while knowledge provides variation and richness for thought and design, it brings along differentiation in thought and design. In parallel to this, all kinds of technology, tool, and knowledge we use in the process of design change over time, and even concepts take on different meanings. This change has considerably accelerated with the change of paradigms and epochs we are now witnessing. And, as proof of this, the new digital environment is being incited by different changes every day, the concepts of time, space and speed are evolving faster than ever before.

On the other hand, while information serves the period we live in and is instrumental in the production of new designs (regardless of the environment, school, continent, or hegemony) the quality, timeliness, and accuracy of the

information are now much more important.

Much as the means of production of information, as well as the speed of it, are remarkable due to the communication speed of the digital age, they can lose their validity. Thus, in producing his/her designs, the designer should be able to form his/her differentiation on the values that he/she updates and verifies with regard to the knowledge of past and present values.

4. Notes

1. The capacity reached by global capitalism with the help of digital technologies is discussed exhaustively in Shoshana Zuboff's book "The Age of Surveillance Capitalism" [2]. It would also be appropriate to scrutinize this process we are in with the new practices (new design areas, new products, new consumption patterns) that we have begun to adopt due to the pandemic.

2. "What you might do – and what I think you should do in this situation - is make a distinction between 'psychological' creativity and 'historical' creativity (P-creativity and H-creativity, for short). P-creativity involves coming up with a surprising, valuable idea that's new to the person who comes up with it. It doesn't matter how many people have had that idea before. But if a new idea is H-creative, that means that (so far as we know) no one else has had it before: it has arisen for the first time in human history.

Clearly, H-creativity is a special case of P-creativity [1]."

3. The following resources can be looked at to obtain general information about the Little Ice Age (LIA): https://en.wikipedia.org/wiki/Little_Ice_Age, <https://www.thoughtco.com/dust-veil-environmental-disaster-in-europe-171628>, <https://www.nature.com/articles/s41598-018-19760-w>, <https://agupubs.onlinelibrary.wiley.com/doi/full/10.1029/2007GL032450>.

4. The following resources can be looked at to obtain general information about the sunspot and solar cycle: Wikipedia.org-Sunspots (<https://en.wikipedia.org/wiki/Sunspot>), NASA- The Sunspot Cycle (<https://solarscience.msfc.nasa.gov/SunspotCycle.shtml>), Climate NASA- What Is the Sun's Role in Climate Change? (<https://climate.nasa.gov/blog/2910/what-is-the-suns-role-in-climate-change/>), Springer- Ilya G. Usoskin, A History of Solar Activity Over Millennia (<https://link.springer.com/article/10.1007/s41116-017-0006-9>), NCBI- David H. Hathaway, The Solar Cycle (<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4841188/>).

5. The works of the artists of the Romantic Period may contain visual data that necessarily follow the traces of natural events experienced during the LIA-Sunspot period. Among the early impressionists, J.M. William Turner (The Eruption of Vesuvius, 1817), J. Christian Dahl (Eruption of Vesuvius, 1826),

Francisco Goya (The Third of May, 1808), and other Romantic Period artists painted the dramatic events and places of history. William Turner's "Buttermere Lake, with Part of Cromackwater, a Shower, 1798", C. David Friedrich's "Monk by the Sea, 1809" and other paintings that contain similar elements can be reviewed by considering the natural events that took place in the period in which they lived.

6. Paintings such as "Rain, Steam and Speed, 1844", "Slavers throwing overboard the Dead and Dying, 1840" by J. M. William Turner, who is known as the painter of light, are good examples in terms of explaining the ambiguity of form while painting light [10-11]. Also, Russian impressionists such as K. F. Yuon, S. E. Lednev-Schukin, uncle and nephew Shchedrins, S. Y. Zhukovsky and I. Y. Repin (Leo Tolstoy Takes a Rest in the Woods, 1891, <https://www.wikiart.org/en/ilya-repin/leo-tolstoy-in-the-forest-1891>), with depictions of the forest containing all seasons at the same time, or Nordic impressionists such as Dahl, L. A. Ring (Diset vinterdag i Vinderød, 1901, https://da.wikipedia.org/wiki/Fil:Diset_vinterdag_i_Vinder%C3%B8d,_1901,_olie_p%C3%A5_1%C3%A6rred,_77_x_118,5_cm,_Fuglsang_Kunstmuseum.jpg) and Hans Gude (Winter Afternoon, 1847, https://tr.m.wikipedia.org/wiki/Dosya:Hans_Gude--Vinterettermiddag--1847.jpg) depicting numerous varieties of white made remarkable differences.

7. For this subject, David Mackay's "Modern Architecture in Barcelona (1854-1939), 1985" and Salvador Gincr's "The

Social Structure of Catalonia" 1980 (reprinted 1984) can be found in the publications of The Anglo-Catalan Society.

8. Hyperbolic geometry is also called Lobachevskian or Bolyai- Lobachevskian geometry. It is a non- Euclidean geometry (M. Jay Greenberg, "Euclidean and Non-Euclidean Geometry; Development and History", 1960/ M. I. Dillon, "Geometry Through History: Euclidean, Hyperbolic and Projective Geometries", 2018). In 1975, a complete definition for Fractal Geometry was given by Benoît B. Mandelbrot (B. B. Mandelbrot, "The Fractal Geometry of Nature", 1982).

9. The largest list of Euclidean interventions in architectural basic volumes is included in "*Architecture, Form and Geometry*," written by architect Esen Onat in 1991.

10. It is known that Frank Gehry often came to Istanbul alone or with his students to study Classical Turkish Architecture and Mimar Sinan's architectural works. After 1999, Changa Restaurant, opened by Tarık Bayazıt and Savaş Ertunç as Turkey's first Fusion cuisine, becomes a haunt for Gehry. Another haunter of Bayazıt and Ertunç's restaurant, who contributed greatly to modern Turkish cuisine with their intellectual knowledge, was architect Zahar Hadid.

11. Prof. Halil İnalçık (https://en.wikipedia.org/wiki/Halil_%C4%B0nalçık), Prof. İlber Ortaylı

(https://en.wikipedia.org/wiki/%C4%B0lber_Ortaylı)

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5.1 List of Images

Image 1: <https://www.gauguin.org/where-do-we-come-from-what-are-we.jsp>, retrieved November 24, 2020.

Image 2: <https://www.wikiart.org/en/paul-blee/red-and-white-domes-1914>, retrieved November 24, 2020.

Image 3: <https://www.metmuseum.org/art/collection/search/484862>, retrieved November 24, 2020.

Image 4: A. Clutton-Brock, "William Morris", Parkstone Press, Ho Chi Minh City, 2007.

Image 5: http://www.arter.org.tr/en/on_repetition, retrieved November 24, 2020.

Image 6: <http://en.wikipedia.org/wiki/File:Sagfampassion.jpg>, retrieved November 24, 2020.

Image 7: <https://franklloydwright.org/frank-lloyd-wrights-avery-coonley-house-for-sale/>, retrieved November 30, 2020.

Image 8: https://www.getty.edu/visit/cal/events/ev_1806.html, retrieved November 30, 2020.