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THE SENSES IN BASIC DESİGN EDUCATION
(Paper)

Topic: Basic Design Education in Interior Architecture

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Abstract

Throughout its history, mankind has designed material and spiritual needs. Some of these designs disappeared, some of them have survived to the present day. The changing economic order in the development and the change of the world, especially by the nineteenth century, has made it a part of the design and designer's professional life. The twentieth century with its ground-breaking scientific studies, evolving computer technology and digital technologies, which name the century we live in, quickly changed and increased what was expected from the design and the designer.

Today, while AI studies are still in progress, it is clear that designers have a significant share in the work to meet the needs we recur. This situation shows us that the approach of a designer's way of conceiving the world of the day to the design problem, field dominance, intellectual accumulation, education, and quality is crucial. Accordingly, one of the important conditions that allow such criteria to occur in a designer is that the designer's ability to reason with the five senses one has perceived outside of one's own and to reach a conclusion.

The five senses are the means by which one can reach the world outside. The most important talent of a designer is to analyse the data the designer has collected with the five senses according to the designer's own understanding and plasticizing the idea. In this paper, the conceptual projects carried out by TOBB Interior Architecture students in the scope of "Basic Design Studio" course of 2017-18 Spring semester were developed with a focus on five senses.

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The Senses in Basic Design Education

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Abstract

Throughout its history, mankind has designed material and spiritual needs. Some of these designs disappeared, some of them have survived to the present day. The changing economic order in the development and the change of the world, by the nineteenth century, has made the design and the designer a part of the professional life. The twentieth century with its ground-breaking scientific studies, developed computer technology, and digital technologies name after the century we live in, changed and raised the expectation from the design and the designer. Now, while the designer provides the needs of the local people and her/his period as long before, she/he also incurs the responsibility to offer the future needs of almost the world-wide population.

Today, while AI studies are still in progress, the designers have a significant share at the works to meet our needs. That shows us a designer's way of perception for today's world, her/his approach to the design problem, comprehensive knowledge of the field, intellectual background, education, and quality is crucial. So, one important condition ensures a designer has such criteria is the designer's ability to reason the outer world perceived with her/his five senses and to reach a conclusion.

The five senses are the means by which one can reach the outer world. The most important talent of a designer is to analyze the data collected with the five senses by her/his own apprehension and to plasticize the idea. In this paper, the conceptual projects carried out by TOBB Interior Architecture students within Basic Design Studio Course of 2017-18 Spring semester were developed by focusing on the five senses.

1. Introduction

Although different methods are used under different frameworks, in common, the first year studio of Interior Architecture [and Environmental Design] education can be defined as *the environment where the first exercises on the transformation of human experiences got with senses to a plastic perception in a volume that can be defined as a space*.

This environment was fictionalized under the name of *Basic Training* for the first time between 1919 and 1933 at the Bauhaus School operating in Germany to abolish the wall between the Applied Arts and the Fine Arts and to prepare a suitable environment for the interaction between those two fields. The aim here is to create a field of experience where the students can experience form, colour and material without a specific purpose, and where they are encouraged to produce their own subjective designs based on their own subjective perceptions [1]. That training based on the master-apprentice relationship aimed at creating a 'utilitarian' environment in which students can think with the aesthetics perception and build with the technology of their period.

Although today's educational approach created a completely different platform where new aesthetic senses are justified with the brand new technologies, in the last 100 years since the Bauhaus, the first year studio of design education motives the students to think on the basis of design under the name of *Basic Design* with similar concerns but different approaches as varied as the number of institutions. The main purpose of the course is to make the *students to question the principles that create the basis of the images created by the sensory experience in conscience* [2].

This questioning is the first stage for the students to learn 'a new language'. The form, the most basic indicator of language could be produced with the *design knowledge* which may exist together with technology and ideology. The thoughts are developed and carried out through language, and the spatial considerations could be shared through the design language. It is expected the student can develop a way of thinking and then transfer that way of thinking. The student must ensure the traceability of the design process she/he followed to create the design knowledge.

The main element that justifies the traceability of the process is gaining the awareness of the creation process by the student. Because the design language requires developing a way of thinking, the way of thinking requires creativity, and creativity requires interpretation. The interpretation ability defined as *'to explain an event as per another view'* [3] may be considered the attribution of meaning by human beings to their environment and to themselves in their environment as the most basic form of existence, and it is one of the most basic foundations of design education. This foundation has the same content as the concept of creativity defined as '*to set up the relations which have not been established before'* [4]. Namely, the creativity is a process of interpretation, not invention.

The interpretation depends on the perception, and the matter of perception is versatile. It is a state which is got through the senses, corresponding to the synthesis of sensory data, beyond the sensory impression. The process takes place by the transformation of the data got by the sensory receptors to sensation, and sensation to emotion and knowledge, and that is actually the definition of how the perception mechanism works in the simplest expression.

One theory of perception based on the view that perception is got through sensory experiences and the role of personal experiences is a factor in those experiences is the *Theory of Probabilistic Functionalism* developed by the Hungarian Psychologist E. Brunswik (1903-1955). Brunswik, because of the non-measurability of perception, defines the relationship of the organism with its environment as uncertain/probabilistic and suggests that the reality affects the senses, the senses affect the perception, and the perception affects the reality [5]. The new reality created by the perception that is carried out by sensing through an objective reality is now a subjective reality. So, the same space is a different field of the experience, a different centre of the emotion production for each user. Hence, the awareness of the role of senses in space design not only creates awareness about the perception of space, maybe more about the development of the design language.

The sensation through the senses is not only the tool of the mind like the language that can be considered the starting point of knowledge, but also the evaluation mechanism [6]. The thought develops and becomes reality through the language, spatial considerations also get a sharable quality through the design language.

This study focuses on the influence of the change and transformation of the individual's perception of the world in the last century on the Basic Design Studio, included in the first year of Interior Architecture education.

2. From the Machine Aesthetics to the Digital Technologies

Two important developments in the second half of the 18th century caused major changes in the world's course. The French Revolution took place between 1789 and 1799 showed political and social changes. The British Kingdom won the Battle of Plassey against the French on June 23, 1757 and took control of the Mughal Empire of Turkish Hun origin [7] and brought the Empire's treasury to Britain, increased the financial opportunities in the British Kingdom and enabled the successive carrying out of technical inventions.

The invention of the first steam engine which can be stated as the first one of the technical developments in 1763 by a Scotsman called James Watts is considered as the beginning of the Industrial Revolution. Thus, the beginning of the mechanization process has fundamentally changed the definition of production and consumption; naturally, the economy, law, society and state/political systems have undergone a process of rapid change. The scientific developments sped up in the 19th century has also brought along many new technical developments and those developments have involved in social life.

The mass production replaces the single production model of the artist/craftsman (master) of the past and leads to the emergence of the concept of a designer. The changing production makes it necessary to redefine the concepts such as 'art ', 'artist', 'artwork', 'art market' whose meaning changes with reproduction methods. Those redefinitions create new forms of perception such as the fact that an aristocrat used to appoint an artist to make his own portrait, and then she/he asks a photographer to take her/his photographs. On top, the taken photograph became to be reproduced as much as one wants.

An important suggestion put forward in terms of the fundamental concepts whose remembrances changed comes with the article called "*The Work of Art in the Age of Mechanical Reproduction*" (Das Kunstwerk im Zeitalter Seiner Technischen Repoduzierbarkeif) written by the German literary critic and thinker Walter Benjamin (1892-1940) in 1935 [8]. While '*art', 'artist'* and '*artwork'* continued their adventure in the 20th century with new meanings, the emerging concepts of industrialization such as '*designer'* and '*design*' – '*product design* made their own way.

While the scientific developments in the twentieth century, in mathematics, geometry and physics continued with rapid progress, the electronic technologies and computer systems developed with the great influence of two world wars and space studies create the basis of digital technologies to be developed in the post-1970s.

The story may begin with the development of the first microprocessor called Intel4004 by Intel Corporation in 1971. This development starts the age of microcomputers. The computers are now portable and everywhere. The packed electronic communication networks (the Internet) that connect the computer systems such as ARPANET, NPL, Merit Network, which were developed at the end of the 1960s, lead to the system of WWW (World Wide Web). The CERN (The European Organization for Nuclear Research) creates the basis of today's internet world by carrying out its own data flow and communication through the Internet (www) system developed for registration procedures. The digital recording, imaging systems, robotic technologies, cell phones, visual reality, 3D printers, e-shopping, e-games and similar developments create digital technologies and also play an important role in the development of nanotechnologies. In summary, digital technologies,

which play an important role in meeting the needs of today's world, are the main determinants of the 21st century.

Scientific, political, and social changes in the 19th century, the transformation of definitions of concepts like producer, production, consumer and consumption, and the digital developments in the second half of the 20th century require to redefine today's world. Now, digital space-time has been experienced in the real world.

3. Space and Space Feelings in Interior Architecture

It can be said the developments in mathematics, geometry and physics in the 19th century have revolutionized the perception of the world.

The French mathematician and philosopher René Descartes (1596-1650) made it possible to show the figures through the numerical systems and to make calculations with the analytical geometry developed because of the earlier works. This contributes to the study of Euclidean geometry along with other discoveries in the fields of mathematics and geometry. The work called 'Elements' comprised 13 notebooks attributed to Euclid, the mathematician who was thought to live in Alexandria between BC 323 and 283, includes the basic subjects of mathematics such as arithmetic, plane geometry, number theory, irrational numbers, the geometry of solids objects [12]. Five of the 10 axioms in the first book of the Elements are described as postulates. In particular, the fact that the 5th of these postulates is open to interpretation (which has no clear proof in the Euclid notebooks) by the end of the 18th century caused great developments in geometry in the 19th century.

The mathematicians called C.F. Gauss (1777-1855), N.I. Lobachevsky (1792-1856), J. Bolyai (1802-1860), B. Riemann (1826-1866) interpreted 5 postulates and identified different geometries (called elliptical and hyperbolic geometries) besides the geometry whose foundations were laid by Euclid. B. Mandelbrot (1924-2010) showed the subject, on which G. Cantor (1845-1918), G. Peano (1858-1932), D. Hilbert (1862-1943), W. Sierpiński (1882-1969) studied, as a whole for the first time and defined ***Fractal Geometry*** (B.B. Mandelbrot released the first publication on the subject with his article called "Fractal Geometry: What Is It, and What Does It Do?" in 1989.) Parallel to those studies, the works of H. Poincaré (1854-1912) created the basis for the development of ***Topological Geometry***.

In addition, many developments in science, particularly *Noether's Theorem*, in which the mathematician A.E. Noether (1882-1935) associated the *Conservation Law* with symmetry, and the physicist A. Einstein's (1879-1655) *Theory* of *Photoelectric Effect* and *Theory of Special - General Relativity*, offered a better understanding of the world and the universe in which it belongs, and provided insight on the geometries it has [13]. Now the different dimensions and the spaces belong to those dimensions have become the important subjects of the science and correspondingly the technology.

The developments in digital imaging technologies in the second half of the 20th century, besides the theoretical studies in mathematics, geometry and physics, pave the way for limited interpretations in plastic/visual arts. When the signals collected by the vehicles navigated through the signals sent to the space exploration crafts like Voyager at the speed of light reach the world, they turn into wonderful space photographs thanks to high digital imaging technologies.

All these mentioned developments will change the problem definition of today's people, particularly of modern day space designers who focus on problem-solving in space.

Form and Atmosphere

Geometry can be regarded as the equivalent of the so-called form in design and art, and even as the main generator. The change in the main generator of a structure will be reflected to the whole structure. The indicator of real space is the form; so, any kind of change in the language of form will lead to a change in the atmosphere's meaning that enables to understand the space and space perception.

The invention of the camera in the 19th century has caused a change in the meaning of the image. Previously, the image got with the art of painting, has become rapidly producible/duplicable with this invention. Both production techniques have different stain geometry, so, different aesthetic values.

The change of geometry in the embodying practice of thought can be easily followed in the art of painting. For example, the works of artists like P. Cézzanne (1839-1906), C. Monet (1840-1926), V. van Gogh (1853-1890), H. Matisse (1869-1954), H.E. Cross (1856-1910), V. Kandinsky (1866-1944), P. Klee (1879-1940), P.Picasso (1881-1973), J. Miro (1893-1983), P. Modrian (1872-1944), U.Boccioni (1882-1916), M. Duchamp (1887-1968), S. Dali (1904-1989) are the important examples of the mentioned 'new space perception.'

An architectural example of the atmosphere created by the form language, formed by the different geometries in the created spaces is the La Sagrada Familia cathedral, which A. Gaudi (1852-1926) began to build in 1882 and left unfinished due to his unexpected death. The building with traces of gothic style bridges between late medieval and modern times with the form language and atmosphere showed by its original geometry dominated by hyperbolic geometry.

The effects of non-Euclidean geometries in plastic arts in the early 20th century have been observed in architecture, interior design, industrial design etc. since the end of the 20th century. With the opportunities offered by digital technologies, the non-Euclidean geometry, which have an important role in carrying out the most proper designs for human nature, enables the creation of the complex systems that cannot be imagined before with fluid/amorphous form conceptions and computational design tools.

4. Design Education

All this change and transformation requires the questioning and redefinition of the education system. To justify this necessity, it was required to go back in time again. Only a few people had access to education before the 18th century, and it spread with the Industrial Revolution followed the French Revolution. The German linguist, philosopher, statesman Wilhelm von Humboldt (1767-1835), with his works on education and higher education laid the foundations of today's universities [9] [10].

During the 19th century, the change of economy increased the need for and diversity of qualified workers. To meet the needs of the industry, the education at all levels had become a necessity because the formation of designer cadres created by that period did not respond to new needs. Today, the content of the concepts of aesthetics and the art that had been included in education since ancient Greece has changed.

Even though the traditional approaches in the art and the technical education continued until the first quarter of the 20th century, the first course for design and designers was given Bauhaus School, Germany, in Humboldt's country under the name of *Basic Design*. So, with the process of the Industrial Revolution, the changing social structure, increasing needs and developing techniques took part in the art education.

The developed technical facilities, the variety of materials, the functionality, the simplicity (basic volumes) which reduces the labour cost and enables mass production are the main reasons for the new education model to be close to '*Design Education*', rather than *'Art Education*'. A momentum for this new approach, which made Bauhaus to be accepted as an ecole, not just as a school in a short time, is Russian Constructivism.

As the traditional education models did not suffice for the needs of their time and caused the birth of Bauhaus in its own context, along with the digital developments after the second half of the 20th century, the Bauhaus model has become insufficient for the needs of the 21st century and weakened. As the transformations experienced in the 19th century and in the process that followed were on the real plane, the digital world appeared on the stage.

Now the design space has to create its existence in a second space-time perception, and the Bauhaus approach does not support the design processes that can be associated with that perception. The questions faced by the designers in the changing world perception are new approaches which should be developed for the solution.

Today's designers have to develop more analytical approaches to the production processes of design knowledge in more scientific and technological knowledge bases. Because the design has shifted to a more interdisciplinary field than in the past.

The process of higher education, beginning with Humboldt, was shaped by specialization in a single area at the beginning of the 20th century. It can be said the specialization in a single area brings with it some kind of isolation. Today the information is cumulative and the solution proposal developed for the production of ideas in any field, no matter in the fields of social sciences, science or design, requires the use of information outside the field from different branches of the same discipline or from different disciplines. (Among the discussions on this topic, the book called "Mission of the University" (Misión de la Universidad) by José Ortega Y. Gasset'tin is noteworthy [11].) So, the process which is dealt with in a general framework, reveals the necessity of the re-evaluation of design and design education.

Until the end of the 20th century, the design education defined a rational, pragmatic and solution-oriented structure which could produce the space form based on the Ancient Period and came into presence with Euclidean Geometry in the most optimized way. But, the approaches in today's design education should create a different platform looking for the possibilities of the new form of language, in which new aesthetic perception patterns are justified and defined by new technologies.

Those new forms of perception in the design education are reflected in the design studios, which create the backbone of education through the reconsideration of both the *knowledge* of *production* and the *knowledge of design*.

The information of production refers to the tools used in the design education. That situation can be defined as transferability of the design through the virtual reality environments with the tools of digital representation like the CAD-CAM technologies, instead of the traditional representation tools like sketches, technical drawings, single/double/three-point perspective expressions and models.

The knowledge of production defines the expression process of the design, not the design process. The tools of the digital media should express a design approach; and design knowledge defines that approach. The change in the space perception triggered by the changes in the individual's perception of the world leads to the change in the design knowledge she/he produces. The technology will be considered as a means of production of thought, not as a means of expression.

This study aims to make a suggestion on the reflections of the changing paradigms of the 21st century in the design education with the knowledge of design, not the knowledge of production. So, the sample defined through the Interior Architecture and Environmental Design Training was defined through the students of the First Grade Design Studio who did not yet have the knowledge of production of the education program they attended.

5. Sense, Sensation and Emotion Production

From the Bauhaus School that produces the Emotion of the Space through the concepts like modularity and standardization, to the present day, which can produce the Space of Emotion through a multi-dimensional and dynamic space structure, the design education should have the ability to be as rational and intuitive at least as much as it was at the beginning of 20th century. Because, the mentioned multidimensionality will be related to the processes of perception through sensation and sensory mechanisms.

In this context, over a two-semester program carried out in TOBB University of Economics and Technology, Faculty of Architecture and Design, Interior Architecture [and Environmental Design] education, First Grade Basic Design Studio, the process, in which rational and intuitive approaches in the design process are evaluated together, is opened to discussion. It is aimed to create an experience space related to the construction of the emotion of the space with the process defined rationally, and the construction of the space of emotion with the process described intuitively. In the Academic Year of 2017-2018, in the First Grade Schedule, Basic Design courses one and two by Şaha ASLAN, Ferhan KIZILTEPE, and S. Selcan DÖKMEN AYKAŞ offered an opportunity for experiencing the rational process and the intuitive process, respectively.

The process followed in the Basic Design course one was the process of building a three-dimensional abstract space with a defined analysis study through a photo frame taken from the TOBB ETU Technology Centre, which also included the studio where the course was followed. The process of transformation had developed on the definitions of the gathering of form elements like the point, line, surface, the volume with the principles of formation.

The form language developed here was associated with a function in the next step. That function was a single or multi-directional sitting element which could be used in the public spaces, allowing over one person to use. In this context, the student had to transfer the design gene related to the design language she/he had developed to the sitting element; the first awareness of ergonomics and human anthropometry was also expected to be developed in that process.

The process followed in the Basic Design course two was defined by a flower chosen by 15 groups, each comprising two students who attended the Basic Design course one and were successful. The groups produced sensation by focusing on the different sensory mechanisms each time, through their flowers, which were defined as the starting point and had an objective reality, and formed a holistic story they plasticized in different ways. The aim here was the problem of transformation the

subjective experience gained through the senses into an objective knowledge because of a cognitive performance.

Unlike the rational process followed in the Basic Design course one, whose stages were defined, in the process followed through the flower it was avoided to make any definition about the way to follow. Some groups progressed through chemical data such as the toxicity or sedative effect of their flowers, while some groups began the story with the climatic characteristics of their flowers, and some groups with formal references of their flowers. The first channels in which the groups communicated to identify their flowers, how they received the flower, had created a special and subjective beginning.

That process advanced with periods of two weeks in a sequence in which a different sense receptor led at every turn following a preliminary research process related to the flower recognitions and identifications by the groups over themselves and/or all kinds of sources of printed, written, visual, etc. On the milestones in which each sense sources came into focus, an awareness related to that sense was created through the seminars held by inviting the experts in their field who produce knowledge over that sense. The aim was to trace the sensation created by the flower on a different sense focus at every turn. But the leading sense was treated in collaboration with the knowledge coming from other sense receptors at every turn. In each step of the process, the objective reality of the flower replaced with the new reality created by the student and the flower was subjected to a transformation process step by step. The flower gained a definition once again with each sense.

At the end of 8 hours/week/semester, 24 weeks defined in the program for both courses and content, students were asked to transfer the emotion they defined in Basic Design course two to the form they defined in Basic Design course one. The concept of FLOWER was expected to be associated with the form of the SITTING ELEMENT. The expected hybrid and reproduced form language can be defined as a Morphogenetic evolution in which the design gene, defined by Euclid Geometry, is transferred to Non-Euclidean Geometry.

Today, the assumption that the sense of sight is at the top of the hierarchy of the senses, followed by hearing, causes the other senses to remain at the background. The nature of the space, which stimulates all senses, creates a space of movement in which the students of interior architecture responsible for producing information through the space do not have the chance to ignore the senses in the background. The aim of this study was to create the awareness that each experience was experienced in a way that over one sensation was involved, and that each experience was gained in the leading role of one sense, with the help of other senses, and those roles were not stable.

No matter what sense the focus receptor uses, the senses were capable of being plasticized by the texture despite being produced in their own form characters [sound existed with sound, odour with odour, taste with taste], and they could be represented by the texture under the method of sharing of the message [with text and visuals]. This representation shows the qualified characteristics of the texture, emphasizing to what extent it plays an important role, how a strong a mediator in the transmission of emotions.

Another aim of this study was to investigate how the perceptions produced by other sensory mechanisms can be integrated into education rather than a dominant sense in the basic education of Interior Architecture students. Each study is a creative work in which new relationships that have

not been established before being established with flowers. Each emotion produced is a study that could watch the production process where the image of the flower, in which the traces of the flower were designed, including the concept of the flower, was produced although the intuition was at the forefront.

6. Conclusion

The knowledge of production societies create is based on the auxiliary tools used to produce. For example, the Stone Age, described as the oldest age in the world's history, covers a period in which the stone was processed and transformed into the tools like a knife, saw, axe, arrow and the requirements were met with those tools. The Bronze Age, where the stone was used together with the mineral, created a new area of thought with new materials. This way of thinking has led to the development of the spatial perception and the commerce, and the formation of cities and city-states. In retrospect, the change of a single material has led to a change with the effect of building cities.

From the stone age to the age of knowledge, the point where technology has come today causes the world perception to evolve in a different direction. The new principles of production have been transformed into new insights and new ways of seeing which can be defined by topics such as Interoperability, Virtualization, Self-Deciding Systems, Rapid Data Collection, Analyzing Capabilities, and Flexible Adaptation Systems. The thought, the cause/result of all those activities will be as consistent as it can justify/exemplify the action.

The new space perception defines the universe as a multi-dimensional interaction field and a dynamic pattern network rather than restricting it into a three-dimensional space and a linear time construct. The space refers to different spatial dimensions beyond its perceptible three-dimensionality. The perception has to move from the focus on the sight that has come into the prominence since the Renaissance and to pass to a multi-sensory system in the awareness of other senses.

The aim of this study was to give the students with the experience of cognition and emotion in two different processes tested focusing on rational and intuitive methods, and to raise awareness of that both processes were a process of interpretation even though the paths they followed were different, and it was successful in those terms. The experience has made a proposal to describe both the production of form and emotion.

In this context, how the skills and awareness gained will contribute to the students in the following years or in what ways they will weaken them will be observed and the method will develop itself with the positive and negative aspects.

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