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Assoc. Prof. Nilay ÖZSAVAŞ ULUÇAY

About

The purpose of **IDA: International Design and Art Journal,** which started its publication life in 2019, is to ensure that scientific, original and academic studies are evaluated under scientific ethical rules and conveyed to the reader in a qualified environment. Within the scope of the journal, all interdisciplinary articles on design and art fields and related to these subjects can be sent for evaluation. **IDA: International Journal of Design and Art** is an international refereed journal.

Our journal publishes 2 issues per year and the language of the journal is English and Turkish. The blind-review system is used in the evaluation process, for further information please look at the "Evaluation Process". Article submitted for publication in the **IDA: International Design and Art Journal** should not be published elsewhere or waiting in line for publication. The author (s) agree to transfer the publication and copyright of the articles they submit for publication to **IDA: International Design and Art Journal,** and do not charge ant fees. All published articles are open to everyone with reference to journals and authors.

Hakkında

Yayın hayatına 2019 yılında başlayan **IDA: International Design and Art Journal** amacı, bilimsel, özgün ve akademik çalışmaların bilimsel etik kurallara uygun bir biçimde değerlendirilmesini ve nitelikli bir ortamda okuyucuya iletilmesini sağlamaktır. Dergi kapsamında, tasarım ve sanat konularıyla ve bu konular bağlamında yapılmış olan disiplinlerarası tüm makaleler değerlendirilmek üzere gönderilebilmektedir. **IDA: International Design and Art Journal** uluslararası hakemli bir dergidir.

Dergimiz yılda 2 sayı yayınlamaktadır ve derginin dili İngilizce ve Türkçe'dir. Dergimizde kör hakemlik sistemi uygulanmaktadır, değerlendirme süreci ile ilgili detaylı bilgiler "Değerlendirme Süreci" başlığında bulunmaktadır. **IDA: International Design and Art Journal**'a yayınlanmak üzere gönderilmiş olan makalelerin başka bir yerde yayınlanmış ya da yayın için sırada bekliyor olmaması gerekmektedir. Yazar/yazarlar yayınlanmak üzere gönderdikleri makalelerin yayın ve telif hakkını **IDA: International Design and Art Journal**'a devretmeyi ve ücret talep etmemeyi kabul eder. Yayınlanmış tüm makaleler dergi ve yazarlara atıf yapılmak suretiyle herkese açıktır.

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Preface

Dear Readers,

We are honored to announce to you that our journal, which aims to contribute to academia and science in the fields of design and art, has become even stronger with the expansion of its international editorial board and its inclusion in new indexes. Also, we are happy to announce our sixth issue as of June 2022. **IDA: International Design and Art Journal**, which we established voluntarily to contribute to the fields of design and art, achieves the purpose of evaluating scientific, original, and academic studies in accordance with ethical rules and conveying them to the reader in a qualified environment.

As the IDA Journal family, we are grateful to our esteemed Editorial and Advisory Board for supporting us during the preparation for publication and all evaluation processes, and to the authors who contributed to the fifth issue with their work. Also, I would like to thank the Section Editors and Reviewer Board who are a part of our increasing family and contributing to the evaluation process. I would also like to thank our Language Editors, Assistant Editors, and Technical Support Team for their contributions.

Editor-in-Chief
Assoc. Prof. Nilay ÖZSAVAŞ ULUÇAY

Önsöz

Değerli Okuyucular,

Tasarım ve sanat alanlarında akademiye ve bilime katkı sağlamak amacı ile yol aldığımız dergimizin uluslararası yayın kurulunu genişletmesi ve yeni indexlerde yer alması ile daha da güçlendiğini sizlere duyurmaktan mutluluk duyarız. Haziran 2022 itibari ile altıncı sayımızı yayınlamış olmanın mutluluğunu yaşıyoruz. Tasarım ve sanat alanlarına katkı sağlamak amacıyla gönüllülük esasına dayalı olarak kurduğumuz **IDA: International Design and Art Journal** gün geçtikçe bilimsel, özgün, akademik çalışmaların etik kurallara uygun bir biçimde değerlendirilmesi ve nitelikli bir ortamda okuyucuya iletilmesi hedeflerini başarıya ulaştırmaktadır.

Yayına hazırlık ve tüm değerlendirme süreçlerinde desteklerini esirgemeyen değerli Yayın ve Danışma Kurulu'muza ve çalışmaları ile dergimiz beşinci sayısına katkı sağlayan yazarlara IDA Journal ailesi olarak minnettarız. Hazırlık aşamasında bizlere yardımcı olan ve her gün artarak çoğalan ailemizin birer parçası olan Alan Editörü ve Hakem Kurulu'muza, Dil Editörlerimiz, Yardımcı Editörlerimiz ve Teknik Destek Ekibimize katkılarından dolayı teşekkürlerimi sunarım.

Baş Editör
Doç. Nilay ÖZSAVAŞ ULUÇAY

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Research Article

The revolution of design by programmable materials

Asst. Prof. Dr. Saliha Türkmenoğlu Berkan[1*]

[1]Gebze Technical University, Faculty of Architecture, Department of Industrial Design, Kocaeli, Turkey.
salihaberkan@gtu.edu.tr

*Corresponding Author

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Abstract
Global technological transformations revolutionize the design process both in conceptual and technical senses and add new meanings to the area of design. The design parameters of past eras are incomparable with today's design parameters. To define and forecast revolutions, Grinin and Grinin (2013) put forward the theories of production revolutions and production principles, to classify global technological transformations. Today, humankind experiences the primary modernization stage of cybernetic revolution and according to forecasts will pass to third 'stage of self-regulating systems' within the 2030s and 2040s.
In the light of the information acquired by the production revolutions and the theories of production principles and in the context of industrial design, one discussed within this study the programmable materials, which can be accepted as the pioneer of self-regulating systems. In programmable materials, 4D printing technology that began to be developed in mid-2010, was analyzed. The scenarios on the future of 4D printing and programmable materials were included and forecasts were put forward to assume how these scenarios will affect the design profession. This study emphasizes the necessity of adapting the industrial design profession to the contemporary by broadening its scope, and questioning and renewing the context of the profession, with the emphasis on digitalization being at the forefront.

Keywords: Programmable Materials, Design Process, Production Revolution, Production Principles, 4D Printing.

INTRODUCTION

Since the beginning of the 21st century, Industry 4.0, Covid-19 and the accompanying isolation process, technological developments in digitalization, the development of the metaverse and the importance of digitalization in every professional field constitute the main topics of the current discussions. The definition of the industrial design profession and the development of its scope within the changing and developing dynamics are also among the research subjects of this study. To understand how global technological developments will change the design and implementation processes, the methods of the field of futures studies may be used.

Grinin and Grinin (2015: 120) have put forward production revolutions and production principles theories to define and forecast revolutions by classifying global technological transformations. Researchers argue that the final stage of the cybernetic revolution we are experiencing today will be defined as "self-regulating systems" which will presumably start towards the 2030s and 2040s and will end in the 2060s – 2070s. While Industry 4.0 may be a precursor to "self-regulating systems", it is unlikely to be the last step. 4D printing (4DP) and smart materials, which have been working in the field of programmable materials (PM) since the mid-2010s, may be the new heralds of "self-organizing systems". With the transfer of programming skills to physical objects, 4DP gives the ability to material objects to change form and function in response to external stimuli (Campbell et al., 2014: 1). The development and availability of 4DP technology and materials marks the beginning of a new era in design and changes in both the scope of the material objects and the definition of the designer.

In this study, using the theories of production revolutions and production principles, the role of technologies like PM and 4DP, which can be considered as the pioneers of self-regulating systems, and also the materials in the design process and the future of design within the forecasts will be investigated.

METHOD

In order to probe the transformation of design within the development of new technologies and materials, production revolutions and production principles theories of Grinin and Grinin (2015) have been examined by using the literature analysis method. Integration of PM, 4DP and its predecessor 3DP technologies into the design process is again examined through literature analysis and design examples were revealed. The data obtained were analyzed and evaluated by using the content analysis method.

The Definition and Structural Model of Production Revolution Theory

According to Production Revolution theory (Grinin and Grinin, 2015: 120) whole history can be divided into four periods, based on the major technological breakthroughs: Hunter-Gatherer, Craft-Agrarian, Trade-Industrial and Scientific-Cybernetic periods (Figure 1). Each period identifies the transition to a fundamentally new production system. Grinin and Grinin (2013) define production revolution as "a radical turn in the world productive forces connected with the transition to the new principle of management not only in technologies but also in the interrelations of society and nature. The difference of a production revolution from various technical overturns is that it touches not only some separate essential branches but also the economy on the whole." (p. 101). According to the theory, Agrarian, Industrial and Cybernetic Revolutions had the most comprehensive and far-reaching consequences for the society.

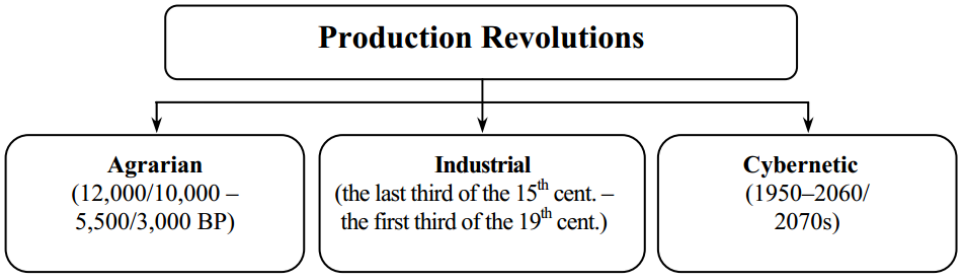

Figure 1. Production revolutions

Cybernetic Revolution have led to the emergence of information technologies, and in future will support the transition to use of self-regulating systems (Grinin and Grinin, 2015: 121). The theory proposes that each production revolution has an internal cycle and comprise of three phases: Initial Innovative Phase, Modernisation Phase and Final Innovative Phase (Grinin and Grinin, 2013: 101) (Figure 2).

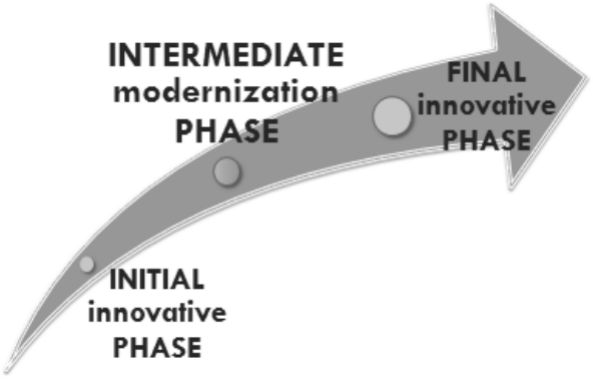

Figure 2. Phases of production revolutions

In the initial innovative phase, a new revolutionary production sector emerges. The second phase composes of diffusion, synthesis, and improvement of new technologies, based on the revolutionary production sector.

Finally new technologies mature to optimum features in the final innovative phase (Grinin and Grinin, 2015: 121).

The initial innovative phase of the Cybernetic Revolution comprises the years between 1950 and 1990s, especially in creation of electronic control facilities, communication, and information, besides the fields of automation, energy production, synthetic materials, space technologies, exploration of space and sea, and agriculture (Grinin and Grinin, 2016: 24). For the present, the humankind experiences the modernization phase of cybernetic revolution and according to forecasts will pass to final innovative phase, self-regulating systems, in the 2030s or 2040s (Grinin and Grinin, 2016: 25).

The Definition and Structural Model of Production Principle

Grinin and Grinin (2015) define the production principle as "a period of genesis, growth and maturity of new forms, systems and paradigms of organization of economic management, which surpass many times the former ones in major parameters" (p. 122). The production principle comprises of six stages, in which the three stages correspond to the phases of production revolution and the remaining three stages cover the development of the new production principle in the structural, systemic, and spatial sense (Grinin and Grinin, 2015: 122) (Table 1). The first phase is the beginning of production revolution, in which the new and not yet developed production principle emerges. The second phase is called as the primary modernization and comprises the period of strengthening the production principle. The production revolution completes in the third phase and the production principle acquires advanced characteristics. The production principle matures in the fourth phase and the wide geographical and sectoral use of new technologies triggers transformations in social and economic fields. In the fifth phase, the principle of production becomes widespread in the world, technologies are intensified, and opportunities are brought to the limit beyond which crisis features emerge. The sixth phase is called as non-system phenomena, or preparatory phase for the transition to a new production principle. The intensification of technology leads to emergence of non-system elements which prepare the birth of a new production principle (Grinin and Grinin, 2015: 123). The last three phases characterize mature features of the production principle.

Table 1. Production priciples' phases

Production Principle	**1st Phase**	**2nd Phase**	**3rd Phase**	**4th Phase**	**5th Phase**	**6th Phase**	**Total Production Principle**
Scientific-Cybernetic	1955-1995/2000	1995-2030/40	2030/40-2055/70	2055/70-2070/90	2070/90-2080/105	2080/2105-2090/2115	1955-2090/2115

The Scientific-Cybernetic production principle has started the second stage in the 1990s and will pass to the third stage between 2030 and 3040s. The third stage is called as the self-regulating system and will last until the 2070s (Figure 3).

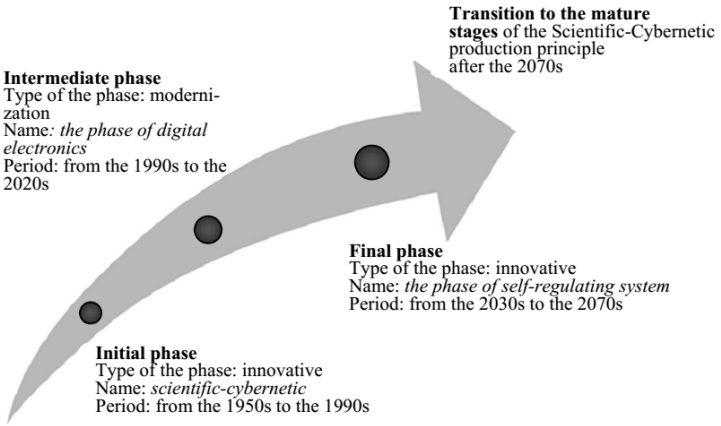

Figure 3. The phases of the Cybernetic Revolution

Self-regulating systems are the systems that operate with a small or non-human intervention and regulate themselves by responding in a pre-programmed and intelligent environment. The artificial Earth satellites or pilotless planes can be given as examples to self-regulating systems. According to Grinin and Grinin (2016: 45) a lot of self-regulating systems connected with biology and bionics, physiology and medicine, agriculture and environment will emerge during the final phase of the Cybernetic Revolution.

Programmable matter (PM), the science, engineering, and design of physical matter that has the ability to change form and/or function (shape, density, moduli, conductivity, color, etc.) in an intentional and programmable fashion can be given as examples to self-regulating systems (Campbell et al., 2014: 2). In the core meaning, computers that process pre-programmed information and diapers that can be pre-programmed to inflate according to the amount of fluid received are also programmable matters. Although programmable materials have been studied since the 1990s, the meaning and scope of the concept has changed since the mid-2010, by the rise of a new technologies like 4D printing.

3DP-Transition to 4DP

In order to better understand 4DP technology, it is necessary to examine its predecessor 3DP technology and its effects on design. In 1986 Charles Hull's patent (Hull, 1986) for a stereolithographic process marks the beginning of a new era. This patent marks the beginning of 3D printer technologies and the revolution that this technology has led in many sectors.

In 2017, the first architectural structure, The BOD (Building On Demand), was printed by the company COBOD with a 3D printer and a new era in building construction technology started (Figure 4).

Figure 4. The BOD (Building On Demand)

Again in 2017, the first residential building in Yaroslavl, Russia had been printed with a 3D construction printer by the company AMT-SPECAVIA (Figure 5).

Figure 5. The first residential building in Yaroslavl

In 2018, the company MX3D unveiled the world’s largest (the12-meter-long) stainless-steel 3D-printed bridge that took six months to print (Figure 6).

Figure 6. The MX3D algorithm bridge

4DP

A new disruptive technology, 4D printing, started to develop while 3D printer technology started to settle and became widespread. In addition to having the economic, environmental, geopolitical, and strategic effects of 3D printing, 4D printing (4DP) creates new expansions by transferring programming skills to physical objects. The fourth dimension in 4D printing refers to the ability for material objects to change form and function in response to external stimuli, whether a signal from a human or a reaction to changes in the environment (temperature, moisture, light, current, etc.) (Campbell et al., 2014: 1). The term of '4D Printing' was used for the first time by Skylar Tibbits during his 2013 TED talk, in which he presented self-assembling 3D-printed structures. Skylar Tibbits is a co-director and founder of the Self-Assembly Lab housed at MIT's International Design Center. The Self-Assembly Lab focuses on self-assemblies and programmable material technologies for novel manufacturing, products, and construction processes. The Self-Assembly Lab's 2D surface that self-transforms into a rigid surface cube without human intervention, can be given as an example to 4D printing technologies (Figure 7).

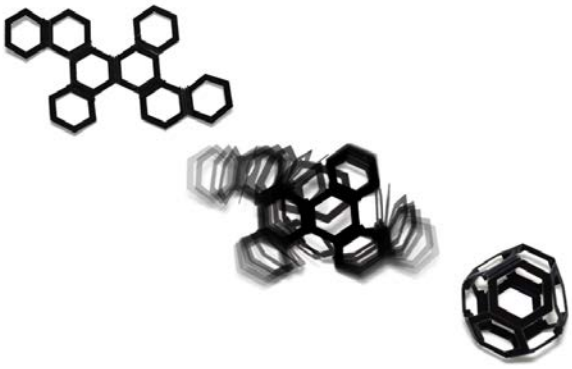

Figure 7. A 2D Surface that Self-Transforms into a Rigid Surface Cube

According to Campbell et al. (2014: 11) 4DP offers the potential of recyclability, unique actuation and sensing, and multiple functions/reconfigurations for products. 4DP brings movement and performance to physical objects by enabling them to shape-shift from one form to another consciously. Andreoletti and Rzezonka (2016: 13) suggest shifting the concept of "programmable" with "processual", and state that replacing the concept shifts the primary interest towards the alterability and the temporal qualities of materials. Besides, the concept of ""programmable" implies the code dictating to passive matter, "processual" defines a relationship between maker, syntax, user, form, and material as an open process of influencing agents" (Andreoletti and Rzezonka, 2016: 13).

4DP Materials

While the properties of existing materials had supported the development of 4DP technology, this new technology has also led to the creation of new materials. Although programmable materials are designed with

high performance in mind, they are as cost-effective and easy to manufacture as traditional materials and also more advantageous than traditional materials due to their disassembly and self-assembly features (Ramesh et al., 2018: 9). These programmable new materials are: self-transforming carbon fiber, printed wood grain, custom textile composites, hydrogel, shape memory polymer fibre and other rubbers/plastics.

Smart materials have many functions such as self-sensing, responsiveness, shape memory, self-repair, self-adaptability, and multifunctionality, and they can be classified into two basic categories: shape-memory materials and shape-changing materials.

Shape memory materials are capable of returning from the transient shape to its original shape when stimuli are applied. Shape memory materials include shape memory alloys, shape memory polymers, shape memory gels, shape memory ceramics, and other shape memory hybrid materials. Shape-changing materials are transformed in response to the stimuli, and when the stimuli are removed, they return to their permanent shape (Pei and Loh, 2018: 96). Pei and Loh (2018: 105) emphasize the importance of having a grasp of the transformational properties of smart materials and highlight one of the main challenges in the field of 4DP as programming the parts successfully in order to achieve the desired transformational change at a given location. Different smart materials have different transformational properties, and these properties require different programming inputs or stimulus. Some of these transformational properties can be listed as follows: one-way shape memory effect, two-way shape memory effect and three-way shape memory effect (Pei and Loh, 2018: 98).

In one-way shape memory effect, the object is permanently deformed when the external stimuli is applied. In order for the object to return to its original state, a programming phase is required (Pei and Loh, 2018: 99). Cooling of an object, that uses temperature as a stimulus in the 4th dimension, to return to its original state after being deformed, can be given as example (Figure 8).

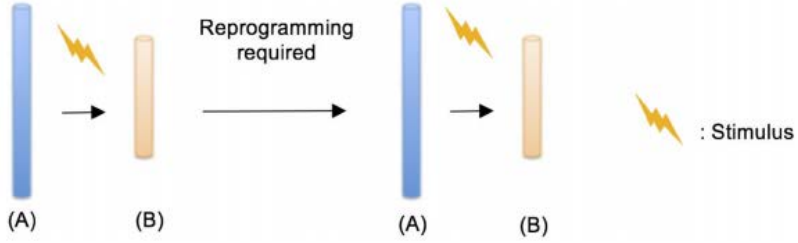

Figure 8. One-way shape memory effect

In two-way shape memory effect, the material is exposed to the stimulus, and it has the ability to remember two different shapes without the need for an external stimulus (Pei and Loh, 2018: 99) (Figure 9).

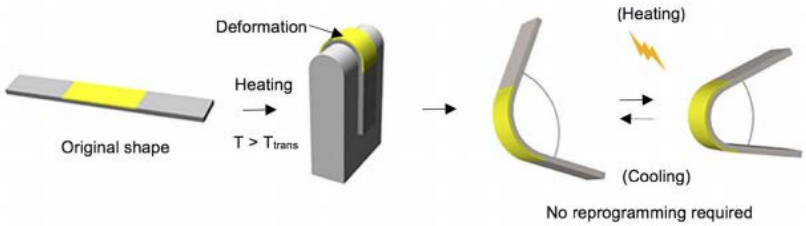

Figure 9. Two-way shape memory effect

In three-way shape memory effect, the material has an intermediate shape other than the original and temporary shapes. If there is more than one intermediate shape, then this condition is called as multiple shape memory effect. In addition to all these features, there are 4D heterogeneous materials composed by using multiple smart

materials together (Pei and Loh, 2018: 99) (Figure 10). These objects are designed by using different properties of various smart materials.

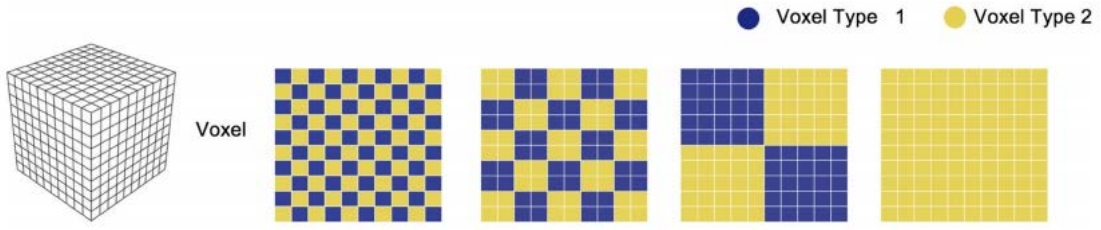

Figure 10. Heterogeneous 4D printed objects

Design Projects Supported by PM and 4DP

Programmable Table

The Programmable Table is a furniture designed with the 4D technology in cooperation with MIT's Self-Assembly Lab and Wood-Skin S.r.l., in order to solve volume problems in shipping and re-assembly stage. It has a flat structure in order to reduce the volume in the shipping process, and has the ability to reach its 3-dimensional form without the need for human power when it is removed from its packaging (Self-Assembly Lab, 2022) (Figure 11).

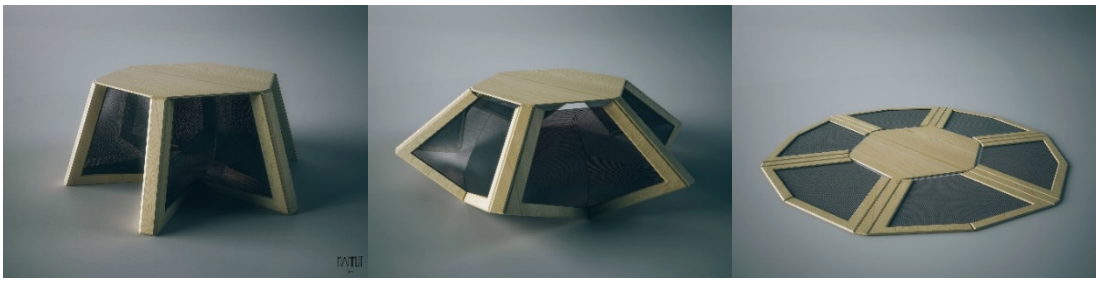

Figure 11. Programmable Table

Ultra Personalized 4D Printed Shoes

The ultra personalized 4D Printed Shoes are fully personalized printed high heel shoes in a period of two months for a single user (Nachtigall et al., 2018: 1). The shoes were designed with the advance of 4DP to fit the user while they move and change. The designers highlight the key design considerations as: aesthetics, comfort, robustness, balance, and temperature (Nachtigall et al., 2018: 2) (Figure 12).

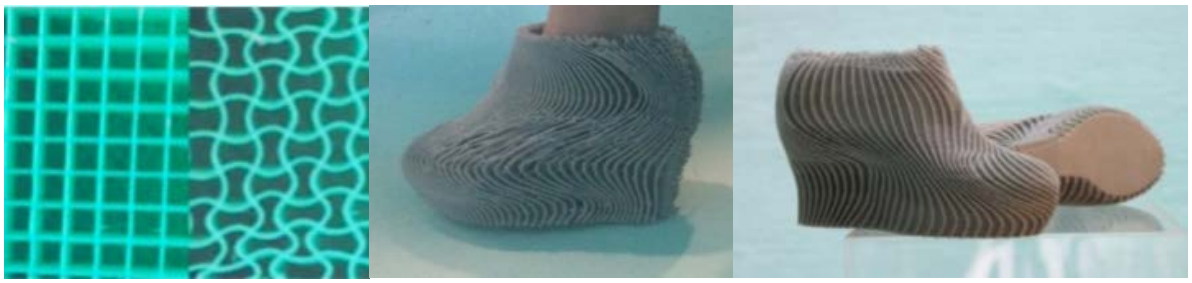

Figure 12. Flexible material sample and finished product

HygroSkin

The project HygroSkin – Meteorosensitive Pavilion was first shown in the exhibition ArchiLab 2013. HygroSkin is a climate-responsive architecture, in which the architectural skin autonomously opens and closes in response to surrounding humidity without requiring any kind of mechanical or electronic control. The modular planar plywood sheets response to weather and self-form to form conical surfaces (Menges, 2013) (Figure 13).

Figure 13. The project HygroSkin - Meteorosensitive Pavilion

Chrysalis Gemini

The project “Chrysalis Gemini” interrogates the human-material interaction by the development of programmable or smart materials. “Chrysalis Gemini” is a ceramic design with self-healing abilities. In the project, microencapsulated healing agents that are embedded into the structure of ceramic, react, and fill the gaps composed by a crack or a rupture (Andreoletti and Rzezonka, 2016: 8). As the designers aimed to create a sensorial memory, the food and drink contained after the healing process leave traces in the ceramic, by the advance of the agent to absorb flavour and colour (Figure 14).

Figure 14. Chrysalis Gemini

FINDINGS

With the development of the 3DP technology, opportunities have emerged in areas such as: prototyping in the design process, fast and on-site production opportunities, easy access to the object and personalization from the user's point of view. Felek (2019: 295) suggests that 3D printers can be used for post-disaster sheltering, especially in countries with housing shortages, in the production of buildings with geometry that cannot be produced with traditional methods, and even in order to create a life form outside the world. PM and 4DP technologies have broaden this development to a new perspective. As seen in the examples given in previous sections; ‘a self-forming furniture’ is able to avoid packaging, storage, and installation processes; or with a pair of ‘personalized’ shoes, the most suitable shoes for the user's feet can be designed to achieve the best performance; structures that can change their form by self-controlling humidity can be built; or sensorial memory can be built with self-healing materials. Apart from these examples, it is stated that projects such as

aircraft wings that change shape and aim for the best performance, pre-programmed tires with better road grip, roads and bridges that can adapt themselves according to load lifting conditions and weather can be realized.

The researchers state that these studies use very little of the advanced technology and the technology promises much more. Campbell et al. (2014: 4) state that in the future, voxels will replace today's production methods with the developing PM and 4DP technologies. Voxels are basically interpreted as the proteins that make up the biological life. Just as basic proteins provide for the formation of all kinds of biological life, voxels can also come together in various combinations to form various forms. It is envisaged that voxels will form our future physical object's world with different combinations, just as Legos come together to form new forms. The development of Voxel technology may be defining the maturity processes of the self-regulating systems phase. Today, there are some challenges for the voxel technology to reach maturity: design, material, adhesions between voxels, energy, electronics, programming, adaptability to different environments, assembly, standardizations, certifications, physical and cyber security, affordable manufacturing techniques, characterization, and recycling (Campbell et al., 2014: 8). Although all these topics concern the design profession, the main question is what competence should the designer have while designing with voxels.

CONCLUSION

Self-regulating systems are systems that operate with little or non-human intervention and regulate themselves by responding in a pre-programmed and intelligent environment. Regardless of the predictions made on PM and 4DP, Grinin and Grinin (2016: 45) state that many self-regulating systems related to biology and bionics, physiology and medicine, agriculture and environment will emerge in the final stage of the cybernetic revolution. It is stated that the biggest self-regulating system project, independent of objects, is biological, and therefore artificial intelligence, bio-technologies and nanotechnology fields will come to the fore in cybernetic revolution. As at the beginning of the article, "digitalization", which has been one of the most popular discussion topics of modern-days, is becoming the main focus again. Whether the subject is the Metaverse or the future self-regulating systems, the designer will not be able to meet the design needs of the future with today's design understanding, methods, and competencies. The name of the profession, which was transferred from industrial product design to industrial design, will be able to find a place for itself in the future, perhaps by pullulating with new contexts or perhaps by revolutionizing the profession.

Authors' Contributions

The author contributed to the study 100%.

Competing Interests

There is no potential conflict of interest.

Ethics Committee Declaration

Ethics committee declaration was not required for the study.

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Research Article

Experiencing the space with a phenomenological approach: A method proposal for relating the senses with representation and design

Asst. Prof. Dr. Işıl Özçam[1*]

[1]Mimar Sinan Fine Arts University, Faculty of Architecture, Department of Interior Architecture, İstanbul, Turkey.
isil.ozcam@msgsu.edu.tr

*Corresponding Author

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Abstract
Today, in design education, designers can focus on image production rather than the experience of the space and the tactile qualities of the materials used. The study which was held with reference to this situation, aims to develop holistic perception skills; to discuss the interactive roles of the senses in perception and representation; to raise awareness about the concepts of place, volume, space; and to use this awareness in design. Within the scope of the workshop conducted with the undergraduate students of Mimar Sinan Fine Arts University, Department of Interior Architecture, the participants were asked to do sensory reading exercises in the places they chose and then to represent their sensations and to use this data in the design of a city furniture. After the design process a survey was conducted to get feedback from the students. The results confirm that vision is the primary sense in perception; the fact that students focus on different senses in the space did not change this situation. In the stage of representation, the form and movement elements in the spaces were the most effective. The significant relationship between reflection and design phases showed that representation studies have positive effects on design processes and that such practices can be included more frequently in education programs.

Keywords: Design Education, Experiential Learning, Phenomenological Approach, Representation, Sensual Perception.

INTRODUCTION

Today, it is seen that the changes in many fields together with the technological developments also affect the design education. Furthermore, the processes such as inspiration, representation and thinking are mainly based on the sense of sight. In design education, without internalizing the necessary information with sensory awareness or understanding the realities of design, phenomenological structure and the relationships between all these concepts, students tend to focus solely on the visual phenomenon. Hand drawings and models which were the main methods in design and representation in the past and could also be considered as thinking tools are replaced by models made in the computer environment; besides, virtual reality and three-dimensional simulations give the impression that the design has come to life before it has been made. While the internet environment offers unlimited experience possibilities through virtual spaces, it carries risks of manipulating mental processes in addition to homogenizing and superficializing communication. Although the ease of access to many data and other factors stand out as advantages in the education process, the fact that these experiences are predominantly based on the senses of sight and hearing, causes holistic experiences in which the body takes part along with the other senses to remain relatively in the background.

However, architecture is a concept that can be perceived and explained by multiple senses; it connects people mentally, perceptually, and physically while also taking a place in their memory, emotional world and life and giving the experience of existence. Parallel to this, architecture and interior design are disciplines for planning livable atmospheres where practical, aesthetic, symbolic functions in addition to physical and sensory properties of materials are prioritized. Consciously or unconsciously, our body is in constant dialogue with the environment, and with this awareness, the designer should be able to make conscious decisions regarding the use and effects of elements such as the quality of the space, textural features, juxtapositions, contrasts, light,

color, and materials (Brown & Farrelly, 2012: 76). Pallasmaa (2019: 50), in his book Eyes of the Skin, mentioned that an architectural phenomenon is experienced as fully embodied with its material and spiritual presence since it contains many sensory experiences that interact and fuse with one another instead of mere sight or the classical five senses. Accordingly, the essence of existential space lies in the multisensory perception capacity that permeates the phenomenological understanding of architecture. "Our senses and our entire body directly construct, produce and store silent existential knowledge. The human body is a knowing being. Our entire being in the world is a sensuous and embodied mode of existence, and this feeling is the basis of existential knowledge" (Pallasmaa, 2009: 128). Rapaport (1987) stated that space is perceived in real terms from the moment it is defined by senses other than sight. Based on this point of view, Noel Arnaud made the comment "I am the space where I am" whereas Soygeniş (2006) emphasized that space appeals to the five senses of human beings and should be handled together with experiences.

In the literature review, various studies were found to increase sensory awareness in design education. In her method named "Sinking maps", Giampa (2012) directed students to use their senses actively and to create visual metaphors using their senses. Onur and Zorlu (2018: 89) organized multi-sensory awareness training workshops to increase awareness of the senses and draw attention to the relationship between the senses and design education. Kartal (2020: 35) used a method called "sensewalking" in defining the public space through sensory perception. Ayna and Domaniçli (2011: 4) organized a workshop to examine the space with its sensory dimensions and to reflect on the relationship that the body establishes with space through the senses.

With this study, first of all, students were asked to realize space as a phenomenological whole, to realize the space with the senses remaining in the background of spatial reality, then to represent their spatial experiences and to use their ideas in the design of a city furniture. At the end of the study, they evaluated their experiences through a questionnaire. The aim of the research is to draw attention to the senses other than sight and to present an improvable method proposal that exemplifies the use of sensations in imaginative thinking, idea development and design processes.

Phenomenology of Space

The perception of space from the perspective of sensory experience is an issue that came to the fore with the phenomenological approach that emerged at the beginning of the 20th century; indeed, after the 1980s, studies emphasizing the dynamic, holistic, mutual and intersensory dimensions of interaction with the world increased (Degen & Rose, 2012). Phenomenology literally means "the science of the phenomenon (logos)"; the phenomenon is what appears as it appears, or rather means "as it appears in all appearances". In the phenomenological sense, the world expresses relations or references between things; accordingly, the world is a context of references. We find ourselves in this context; we do not extract this context, but we give it its meaning (Lewis & Staehler, 2020). In his book called Phenomenology of Perception, which is a source on the subject, Merleau-Ponty has put forward arguments in which he examines the existence of human beings. The philosopher has sought to discover the true nature of our relationship with objects, with other people, and with the whole world, which depend on our perceptual experiences. Since perception enables the human being to access the world, then, as the author states, the world consists of "what we perceive" (Merleau-Ponty, 2012). Although there are many researches and opinions on phenomenology, the transfer of philosophy to architecture as a theoretical way has been realized with the important contributions of architectural theorists such as Christian Norberg-Schultz, Juhani Pallasmaa, Alberto Perez-Gomez and Kenneth Frampton (Armağan, 2011: 45).

The phenomenological approach which focuses on human experience deals with the subject-object relationship in a semantic, relative, and experiential context, and places with an understanding in which bodily movement and sensation come to the fore. With this perspective, as Pallasmaa (2019), who classifies space as physical and existential, indicates, existential space is shaped by the meaning and values of individuals or societies. With a similar perspective, Schulz focused on the concept of "experience" and described the transformation of "space" into "place" referring to the existential phenomenology approach of Heidegger. He associated the meaningful becoming of "place" with the concept of "genius loci", which is an old Roman term. He described space loaded with emotional meanings, which he defined as "place", as a concrete phenomenon in which light, colour, texture, shape and material integrate (Norberg-Schulz, 1971). According to Simon Unwin (2009), the

concept of “place” in architecture is equivalent to “meaning” in language. Phenomenological theorists rely on the reality of the senses and body in perception. Based on this approach, experience is knowledge itself (Merleau-Ponty, 2017).

Senses and Perception

As tools that enable us to perceive the stimuli of the outside world and establish the connection with the world and reality, senses are the information transmitted to the brain through organs that are the receptors of the body. Perception, on the other hand, can be defined as the process of obtaining information about the environment and giving meaning to objects and events by organizing and interpreting sensory data (Lang, 1987; Rapoport, 1987). Contrary to the classical understanding that categorizes the senses as five systems, most researchers today agree that the process of obtaining information includes more than the five basic senses such as sight, hearing, touch, smell and taste. For example, Steiner stated that we actually use at least 12 senses, listing them as touch, life, movement, balance, taste, smell, sight, hearing, temperature, speech (language), thinking and sense of self (Soesman, 1998). Although the dominant role of vision in perception processes is known, it has also been emphasized by many researchers that the senses do not operate separately, but as parts of a holistic experience, and that perception is not based on partial data from the senses, but on the structuring of the holistic relations between them with cognitive processes.

As the knowledge on the senses and perception increases, it is understood that our awareness of ourselves and the world is multidimensional, and that this awareness process emerges as a result of multi-sensory experiences. Experience is the interaction that takes place between a living person and his environment. Multi-sensory perception is a state of conscious awareness; in fact, it occurs through the interaction and cooperation of the sensory organs with the nervous system, body, emotion, mind, memory, consciousness and the subconscious. Based on the findings of the Gestalt psychology theory, Schneiders defined perception as the process of organizing an object, situation or event that is immediately presented to the consciousness of the individual into a meaningful whole. In other words, the individual perceives any object, situation or event that is a part of his life by transforming it from the partial data transmitted by the sensory organs into a holistic, structural meaning (Seylan, 2020: 69).

Our body is both an object among objects and also sees and touches them. Putting bodily existence at the center of his philosophy, Ponty emphasized that there is an osmotic relationship between the self and the world, that they penetrate each other, complement each other in addition to indicating simultaneity and interaction of the senses (Pallasma, quoting from Merleau-Ponty, 2019). Jeremy Till (1996) described architecture as the colors you hear with your ears, the sounds you see with your eyes, the spaces you touch with your palms, the taste of the space on your tongue, the fragrance of the dimensions, and the sap of the stone. Besides, he depicted that all the senses play important roles in architecture. Steven Holl, on the other hand, defined the body as the place of reference, memory, imagination and integration and stated, “The body is the phenomenal body inhabiting space and time”. The role of body and movement in the perception of space is also emphasized by Holl's concept of 'parallax'. Parallax is fluid-spatialism redefined on the basis of dynamic perceptions of the moving body. Considering the existence of the body and the spatial perceptions of the moving body, space reaches a fourth dimension depending on its fluidity (Holl, 2000).

Being surrounded by rich content, experience and sensations provides the brain with many sources to play with, which gives it originality in relating data. Hegarthy (2014: 54) states, “In order to be a successful creator, we must admire the world around us and its oddities and perplexities. The world is a constant source of inspiration, but we must absorb it with all our senses before we can hope to channel it into fresh ideas.” Past experiences, old information, memories, thoughts, beliefs, and emotions all play an important role at this point. Sensory data from the environment and old information are fused and are constantly being reconstructed in the brain. Leski (2017) mentions, all ideas arise from a constant connection with the world of the senses because thinking, seeing and all the senses are connected. Ittelson (1973) emphasized that sensations are perceived and internalized more accurately with the senses that play an active role in perception. Regarding the integral role of the senses in perception, Bachelard (1969) used the metaphor of “polyphony”, according to which the eye cooperates with the body and other senses. Each sensory value contains a different feature of the object to be perceived in itself (Pallasma, 2019). Dewey defined this unity of experience as “aesthetic experience” (All

senses are equally on the qui vive). Aesthetic experiences gained through the senses affect all rational areas and all behaviors related to them, forming the basis of human consciousness, imagination, intelligence, and judgment (Dewey, 2005: 43). These views which overlap with the sensuous philosophy approach show that a rich image repertoire, experience and sensory accumulation have positive effects on thinking and therefore creativity.

The Experience Factor in Learning

The positive role of experiential knowledge on learning processes in education is a phenomenon that stands out with the influence of phenomenological approach. Experience began to be included in design education programs in the 1970's with Knowles' attention to experience as an important part of defining adult learning, with Dewey's extensive writings underlining the importance of experience in education and with other relevant studies (Knowles, 1978; Dewey, 1938). In experiential learning, information is not transferred directly to the student, it is essential for the student to reach the information through his/her experiences and thus internalize it. Experiential learning has been defined by the Association of Experiential Education as "the process by which a student builds knowledge, skills and values directly from experience" (Clemons, 2006). This model in which the learner can be in direct contact with the targeted reality in applied learning environments such as workshops and field projects aims the individual to learn through experiences (Keeton, 1978). In experiential learning, the individual reaches knowledge through his own reality, exploration and experimentation, not by hearing and reading from the experiences of others; in this way, s/he tends to establish new relationships and syntheses through reflection while thinking about what s/he has acquired in the past. At this point, reflection theory is accepted by educators as one of the basic components of improving student learning (Schön, 1992).

The reflection theory, which is based on the work of Dewey (1910; 1916), is based on the constructivist perspective of human perception; accordingly, the designer builds his/her worldview and reflects it on his/her designs based on his/her experiences, beliefs and knowledge gained in the past. Based on the studies of Kolb and Jarvis, who have works on the subject, Hye-Su Kuk researched the effects of previous learning and reflection on adult learning in experiential learning. She interpreted people's past experiences as a source and "reflection" as a mediator between experience and learning. Accordingly, in Donald Schön's words, students develop their "reflection-in-action" skills; reflection plays a key role in the transition to learned experience (Schön, 1992). According to Hye-Su Kuk, "reflection" and "experience" should not be seen as different actions. Although every experience is not learning, every learning is a reflection and an experience in itself (Kuk & Holst, 2018). In fact, reflective learning and experiential learning are complementary concepts. Reflection plays a mediating role between experience and learning. Reflective learning means to gain experience after an experiential learning cycle (Kolb, 1984). Within this perspective, Dewey defined learning as coming face to face with reality, questioning, and expressing oneself. Similarly, Kolb (1984) and Piaget (1972) also stated that knowledge is gained as a result of the experiences carried from the environment and the ways of applying theoretical knowledge to practice, and that opportunities should be created for the student to make inventions and discoveries in education. The creative mind that can establish a network of relationships learns more easily.

While experiential knowledge increases the awareness and aesthetic sensitivity of designer candidates, it also contributes to creative thinking. Intuitive comprehension and relational-critical thinking skills of individuals who gain sensory awareness increase, and with this process, individuals experience a leap in perception (Hardin, 1994). These individuals gain unique ways of seeing and thinking; moreover, awareness emerges in them as a holistic attitude that includes intuitive understanding and critical thinking skills as a new way of seeing (Aydınlı, 2015: 14). In addition, it is seen that attention, creativity, concentration and emotional intelligence increase with awareness (Broderick, 1998). According to Hegarty (2014), who defines creativity as a process related to inputs rather than outputs, the basis of the phenomenon is how matter is perceived. In fact, every place is full of sources of inspiration. Everything that is experienced, seen, heard, touched, felt, tasted, smelled can help develop new ideas without being aware of it. As Brown & Farrelly (2012: 68) indicated, "designers can develop and control physical and psychological experiences to some extent by considering, for example, the feel of a door knob, its temperature or the weight of a door, the rhythm and speed of a space, i.e. the texture that affect the hands or the feet".

The Relationship of Representation and Perception

Representation can be defined as a physical or mental structure that represents another physical or mental structure (Linsey et al., 2008). Different techniques, forms and environments are used for certain purposes for representations which are also referred to as “external representations” (Baaki & Luo, 2017) or “design representations” (Huybrechts et al., 2012) in the literature. These representations which are prepared with traditional writing, drawing and production techniques or at different levels of abstraction in the computer environment are predominantly visual such as draft and technical drawing, model and prototype construction, concept mapping, video, photography, collage and computer modeling; in addition, they include verbal techniques such as freelance writing or mind mapping.

Design is representation and there is no non-representational design; hence, it is important for design students to become competent in different types of symbolic representations (Eastman, 2001). The ability to transfer thoughts to a different environment with techniques such as music, dance, poetry, language of cinema, photography, illustration, video, model, and installation is important for the development of creative thinking (Aydınlı et al., 2005). Schön (1985) explained that the most basic feature that distinguishes and customizes design education from other disciplines is that it is based on learning processes such as sketches and models. Such methods are interactive actions that allow the expression of images in the mind and the production of new images. It seems important to include practices that will help students improve their sensory awareness and representation skills in education programs, especially in today's world where the sense of sight becomes dominant by overtaking other senses.

With representation systems, images are coded through signs. Thus, they become concrete by being transformed into information-containing expressions and it is possible to convey ideas in this way. Ferdinand de Saussure defined graphic and linguistic systems as ways of expressing and giving form to an idea in the mind (Medway, 1994). According to Paivio, who states that the mind thinks with verbal and visual image codes, representations in one system can activate those in the other system. For example, pictures can be named and images can be associated with words (Atakan, 2014: 34). In addition, it is a question mark whether representation systems are used efficiently among students. Previous studies on the subject show that students are more likely to use visual representations (Goncalves et al., 2014). Images are the most frequently used representation method for designers to generate ideas (Jansson & Smith, 1991; Özçam, 2022).

Another important feature of representations is that they are reflective tools that establish communication with oneself, enabling them to question content and form both in the early and later stages of the design process (Schön, 1985). These internal dialogues facilitate the clarification of ideas, the discovery of deficiencies, and thoughts about situations, conditions, and solutions. Steven Holl, for example, draws a series of watercolor perspectives that aim to present the changing spatial experiences of the subject moving in space before determining the plan in his architectural works. With this reverse design strategy which is parallel to the concept of 'parallax' he proposes, he first creates three-dimensional architectural space representations and then two-dimensional plans. While investigating various spatial perceptions, he aims to reach the image formed in his mind; in other words, he tries to reach the architectural image through imaginative perceptual experiences (Holl, 2000) (Figure 1).

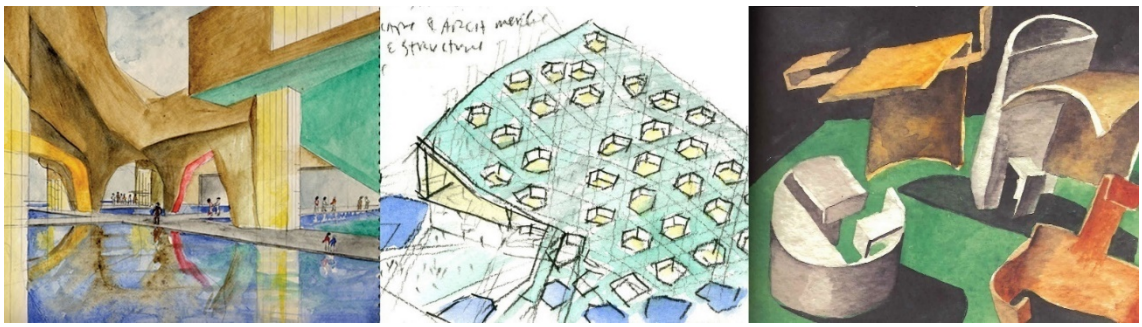


Figure 1. Watercolour sketches by Steven Holl

Regarding the perception and representation relationship, Hall (2000) interpreted 'Space is only perceived when a subject describes it' whereas Fish and Scrivener (1990) stated that thinking with external representations increases the capacity of the mind. Stables (2008) asserted that the mind processes images through external representations. The fact that representations are a conversation with oneself in design is a frequently mentioned function in cognitive and perceptual design theories and has been the subject of many studies to increase creativity (Goncalves et al., 2014; Huybrechts et al., 2012; McVey, 2008; Wang, 2012; Welch et al., 2000).

METHOD, PURPOSE AND WORKSHOP STAGES

The workshop which was organized in order to eliminate the deficiencies created by the eye-centered structure of design education in the perception and representation processes and to enable students to use their sensory awareness in the design process, was carried out in the 2018-2019 academic year with students between the ages of 20-25, studying in the undergraduate program of Mimar Sinan Fine Arts University, Department of Interior Architecture. The study was conducted with a total of 29 students, 69% (n=20) of which were female and 31% (n=9) of which were male. Experiential learning theory and Schön's reflection model were used to create a theoretical framework in the study which deals with the relationships established with different senses through observation, analysis and design processes. In this context, within the scope of the research which is based on the processes of experiencing and representing/reflecting the spaces chosen by the students, firstly, two student projects that exemplify the process were included. Then, the data obtained through the questionnaire were evaluated and answers were sought for the following questions:

- Which of their senses were the students mainly influenced by while doing their representation work?
- How did the representation processes progress?
- Which elements of the space have the students been heavily influenced by in their representation studies?
- How did the relations between perception and representation processes progress?
- What were the effects of these processes on the design phase?

At the beginning of the five-day-long “Sensory Reading and Design” workshop, the students were informed theoretically about the senses and perception, and they had detailed information about the project steps. On the first day, the students were asked to go to the places they chose, spend time there, and collect sensory information during this time. The functional and aesthetic features of the building were considered together with whether it is simple or complex; whether it refers to the past or to a certain culture, place, or period; whether it has a symbolic meaning; whether it is related to its surroundings or disconnected; its temperature, human movements, material properties and what it feels like to be inside. Photographs of the architectural structure and its surroundings were taken; sketches reflecting the atmosphere were made; traces of materials and textures were collected; and notes were taken.

On the second day of the workshop, students were asked to do verbal, visual (concept sheet, sculpture, assemblage, etc.), auditory (music, noise, etc.) or tactile (for example, with a material/texture) identification studies about their sensations and to generate ideas based on their genius loci of the places they visited. How motion can be represented, how the nearest and farthest sounds are perceived, how the transitivity and stratification of vision, hearing, perception can be reflected are considered in addition to the use of data such as form, color-tone, light-shadow, sound, echo, temperature, texture-material, movement-direction, dimensions, depth, transparency, and reflectivity in representation processes. It is expected that this conceptual infrastructure which will be used in the design phase will be a subjective and abstract interpretation of the space. The dimension of representing the ideas is important at the point of forming the main idea that will form the basis of the design. At this stage, the students are asked not to include a form or line about design in their representations. In this way, students had the chance to focus on definitions that directly reflect their senses, and made studies that represent their personal responses to the site.

On the third day of the workshop, students were asked to design a piece of city furniture based on the inspirations drawn from personal experiences, essences, engagements and memories of place. They determined

the functional, symbolic and aesthetic function levels of this furniture. On the last day of the workshop, students made presentations explaining their representation studies and projects. The form, material, color, structure and production details of the designs were discussed in the classroom environment. At the end of the presentations, students were asked to evaluate the workshop process through a questionnaire.

Two Student Works That Exemplify the Study Phase

In this section, two student projects that exemplify the study are presented. The first project with the representation and design visuals in Figure 2 is the Paşalimanı Flour Factory, which is estimated to have been built between 1863 and 1869 and was registered as a 1st degree old work in 1973. It is located in the Üsküdar district of Istanbul. This structure of industrial heritage with a neoclassical façade was described by the student as "a document that carries the production technologies and a historical process that it witnessed until the present day with its layers and that contains unlimited sensory diversity". In addition, the student conveyed her experience of space with these words:

> *When I entered the idle building, the permeability of the structure made me feel the need to reaffirm its boundaries. The natural and artificial traces in its texture appeared before me as the elements that made the secret of its history mysterious. Even though the material was stone, I felt as bare inside the building as being behind a glass.*

Doing a representation that included verbal and visual elements based on her experience, the student reflected the silhouettes in her image, her impressions, and her feelings. With the texture samples she collected from the field, she made a work that has not only a visual but also a tactile aspect by sticking sand and soil pieces on the sheet. Besides, she expressed her thoughts with the words "Whoever discovers this secret leaves a permanent work to the world". The concept setup which deals with different traces and intersections related to space and time is reflected in the design with the logic of vertically placed layers; indeed, the emphasis of nudity is intended to be given with transparent plexiglass material. Layers lined up one after the other and bearing the traces of the historical structure on them offer different perspectives from various angles. Seeing the back of the structure with the vertical angle of the plates has been associated with concepts such as transparency, existence-extinction, permanence-temporality, and past-present. No sitting function is planned on the sculptural structure where dynamic identity constructs can be created with alternative projection images; however, people can sit on the platform where the statue is located, highlighted by the hidden lighting. In this respect, it can be said that the study prioritizes symbolic and aesthetic functions.

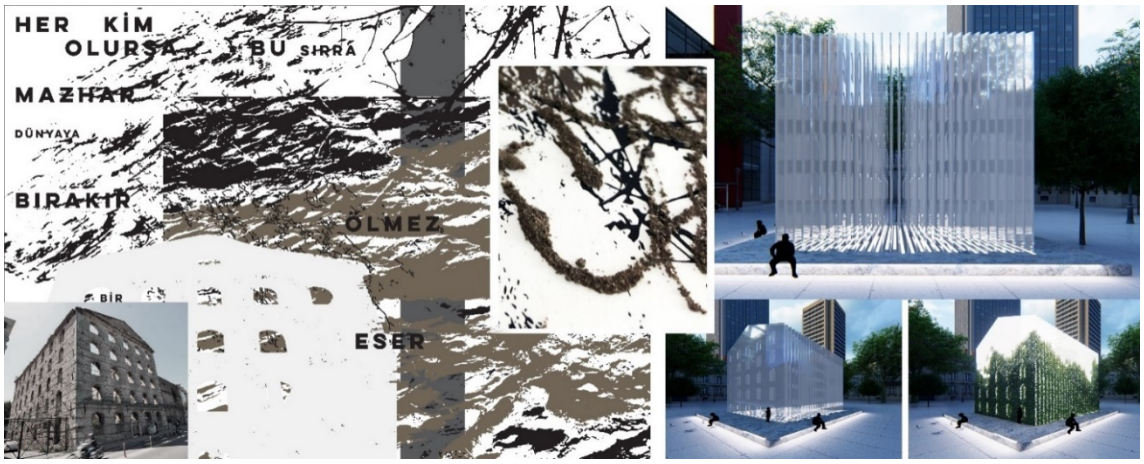


Figure 2. Representation and design studies for Paşalimanı Flour Factory

The second project which exemplifies the working process is the Panayia Avangelistria Greek Orthodox Church in İstanbul Dolapdere, whose construction was dated back to 1893 and which was declared a 2nd degree urban site in 1979. The structure which is based on its relations with the region it is located at in the sensory reading and representation processes was defined by the student with the words 'while reflecting the traces of history, it adapted to its environment over time and created a harmonious contrast'. Symbolic elements reflecting the relations with faith, visuals related to the surrounding chaos and geometric lines

referring to the architectural structure were used in the representation map of the building which stands out with its monumental features surrounded by chaos and the flea market located nearby. Parallel to this, symbolic features came to the fore again during the design phase, and the concepts of centrality, containment, and contrast were emphasized. In the design, stability and timelessness are emphasized with the red seat in the middle, and the dynamism of life is emphasized with the wooden structure surrounding the seat. Emphasizing the impact of architecture on the environment and the echo of life on architecture with a sculptural structure and making a model of his work, the student named his design 'echo' in connection with these thoughts (Figure 3).

Figure 3. Visual representation and design studies for Panayia Avangelistria Greek Orthodox Church

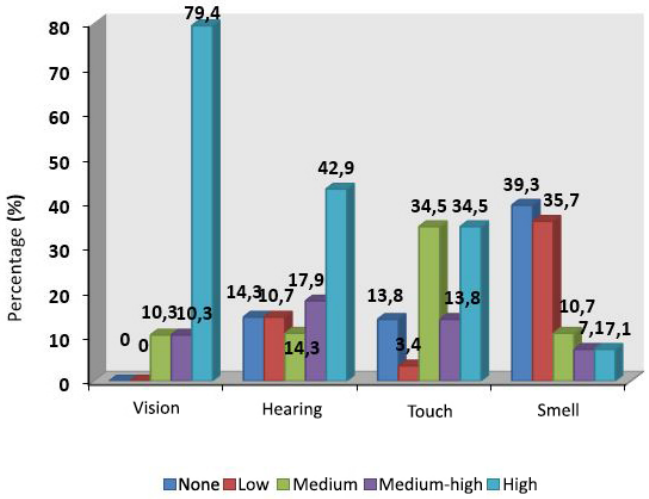
Collection and Analysis of Quantitative Data

In the survey conducted at the end of the study, the students were asked to evaluate the senses that they realized to give priority while experiencing the places they chose and then to evaluate the components of the space that stood out in their representation work. In addition, some questions were asked about the efficiency of the study. It was assumed that the intervals were equal, and the score interval was calculated as 0.80 for the arithmetic means (Score Interval= (Highest Value-Lowest Value)/5= (5-4)/5=4/5=0.80. All the information analyzed in the study was obtained from the survey data. The NCSS (Number Cruncher Statistical System) program was used for statistical analysis. Descriptive statistical methods (mean, standard deviation, median, frequency, percentage, minimum, maximum) were used while evaluating the study data. The conformity of the quantitative data to the normal distribution was tested with the Shapiro-Wilk test and graphical examinations. Spearman correlation analysis was used to evaluate the relationships between quantitative variables, and statistical significance was accepted as $p<0.05$.

Data Analysis Results

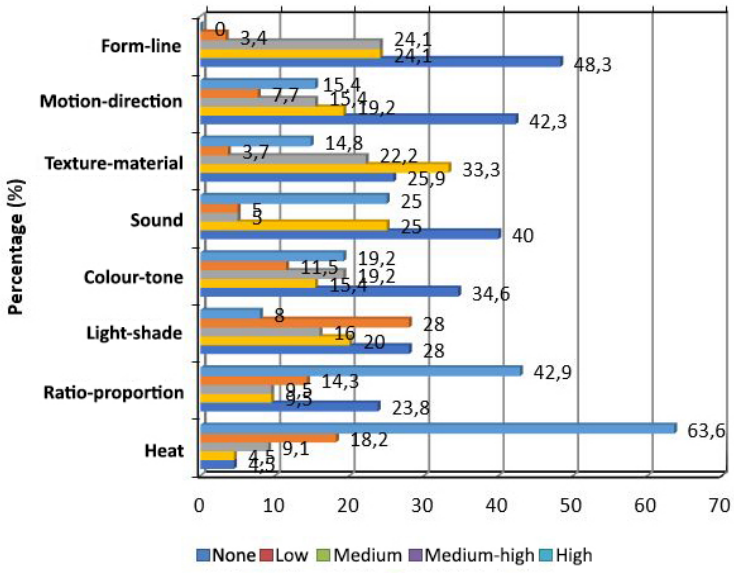
In this section, the results of the data analysis are presented. Primarily, students were asked to evaluate which senses they used predominantly in their spatial experience, and which components of the space they primarily focused on in the sensory reading study. Then, they were asked to evaluate sensory reading, representation and design processes in terms of efficiency. As a consequence, the resulting data were analyzed with Spearman correlation and frequency analysis. When the predominant senses while perceiving the space are examined; the first priority is observed to be vision (Mean±Sd =4.69±0.66); the second priority is observed to be hearing (Mean±Sd = 3.60±1.52), the third is the sense of touch (Mean±Sd =3.52±1.38) and the last is the sense of smell (Mean±Sd =2.07±1.21) (Table 1). When the sensory representation studies are examined, it was seen that the first priority is taking photographs; the second priority is making collages; the third priority is collecting material/texture examples; the fourth priority is making hand sketches; the fifth priority is finding a music that represents the thoughts; the sixth priority is making models; the seventh priority is computer modeling; the eighth priority is finding ready-made images from the internet; the ninth priority is preparing videos; and the last priority is making assemblages.

Table 1. Distribution of primary senses in space perception



When the spatial elements that come to the fore in the emotional representation study are examined; the first priority was form-line, the second priority was motion-direction, the third priority was texture-material, the fourth priority was sound, the fifth priority was color-tone, the sixth priority was light-shadow, the seventh priority was ratio-proportion, and the last priority was heat factor (Table 2).

Table 2. Distribution of the components of space in sensory representation work



In the sensory representation study, the students were asked to evaluate the steps in the process, and the most productive process was “transferring the concepts accessed via the sensory representation study to the design”. Then came the processes of “transferring the data obtained from the observed space with sensory representation work”, and finally “transferring the data obtained from the space verbally” (Table 3).

Table 3. Efficiency analysis of periods in sensory representation study

	None	Low	Medium	Medium High	High	
	n (%)	n (%)	n (%)	n (%)	n (%)	Av±Ss
Ability to transfer data obtained from observed space verbally	0 (0,0)	1 (3,7)	12 (44,4)	6 (22,2)	8 (29,6)	3,78±0,93

Ability to transfer data obtained from observed space via sensory representation	0 (0,0)	0 (0,0)	4 (21,1)	9 (47,4)	6 (31,6)	4,11±0,74
Ability to transfer concepts accessed in sensory representation work to design	0 (0,0)	0 (0,0)	6 (23,1)	9 (34,6)	11 (42,3)	4,19±0,80

When the relations between the levels of data transformation were evaluated, a moderate correlation with a positive direction of 0.520 was found to be statistically significant between the levels of transferring the sensory representation study and transferring the concepts to the design (r=0.520; p=0.033; p<0.05) (Table 4).

Table 4. Analysis of relations among the periods

Sense used in space perception		Level of verbal transmission	Transmission through sensory representation study
Ability to transfer via sensory representation study	n	17	
	r	0,255	
	p	0,324	
Ability to transfer accessed concepts to design	n	24	17
	r	0,113	0,520
	p	0,599	0,033*

r=Spearman's Corelation Coefficient *p<0,05

DISCUSSION

In this section, it is aimed to examine the prominent factors in students' perception of space, and the survey results regarding the workshop process are presented. It has been observed that students focus on their senses of sight and hearing during the stage of experiencing the space; indeed, the fact that focusing on different senses in the space has not changed the role of seeing, which is the primary sense. This situation has been a problematic dilemma that they faced during the discussion and mental studies that took place during the workshop process. Besides, the results are in line with previous research findings that seeing is the primary sense in perception and representation (Goncalves et al., 2014, Jansson & Smith, 1991, Ayna & Domaniçli, 2011). Another finding is that design students mostly prefer to be limited to visual representation in the order they are used to, and do not tend to tactile, verbal, auditory or other types of representations. These results show that it would be beneficial to include more studies with senses other than vision and with different representation systems in design education.

In the representation works of the students, the primary data regarding the spatial experiences were form and line, which were followed by motion and direction in space. This result shows that dynamic components such as movement and direction are also elements that can be studied in representation and reflection studies. When the students were asked to evaluate the steps in the process within the scope of the study, it was seen that the most efficient step was "transferring the concepts reached in the sensory representation study to the design". It is thought that the representation studies carried out at the point of transferring the concept to the design are effective. Again, the positive moderate relationship between the levels of "transferring through sensory representation work" and "transferring concepts to design", which are among the research findings, also confirms this situation. As a result of the verbal evaluations of the students whose perspectives on the senses have changed, it has been determined that all this sensory awareness is a powerful source of inspiration for the design process. It is thought that the workshop process has allowed students to internalize the design not only visually, but also multisensually, with their sensory awareness.

In studies such as these which are based on process-oriented design pedagogy, inter-process relations are "findings" rather than results. Each attempt is tested and actively experienced in the cyclical stages of previous experience, thought, and reflection (Yorgancıoğlu & Seyman Güray, 2018). There is a new production at every step and each production can open new windows. For this reason, it is important that the design process itself offers a learning environment rather than making a one-dimensional evaluation of the outputs of the method

used in the study. Rather than producing a solution to an existing problem, the aim of the workshop is for the students to experience, in Donald Schön's (1992) words, "to have a reflective communication with the material presented by a certain situation". Experienced representation and design steps trigger conceptual and relational thinking styles and appear as repetitive, dialogical, creative and critical as well as transformative processes in which the student is actively engaged in the process. When these dimensions are examined, the steps, themes and outputs of the workshop's achievements can be summarized in Table 5.

Table 5. Stages, content and gains during the project

	Content	Gains
Space experience	• Observing senses and perceptions • Experiencing the environmental, cultural and temporal characteristics of the space • Focusing on internal processes	• Gaining awareness of different senses • Developing aesthetic sensitivity • Developing concentration
Representation stage	• Recording and transferring experience gained as a result of observation • Being able to make definitions and reflecting them • Creating the conceptual infrastructure • Establishing relationships among different representations	• Conceptual and relational thinking • Ability to express and demonstrate the concept in the most effective way • Ability to reflect oneself verbally and visually • Ability to decide among ideas • Ability to ask new questions • Flexible and fluent thinking • Emotional expression
Design stage	• Designing furniture within the framework of representation definitions • Using the data collected as a result of the experience gained in the design process • Thinking about the design method, symbolic, aesthetic and practical functions of design • Establishing the definition-form relationship • Making visualization studies related to design	• Reflecting the concepts on design • Ability to think flexibly • Ability to think in two and three dimensions • Ability to present the design effectively

CONCLUSION

Design education is an interdisciplinary process for gaining cognitive, sensory and psychomotor skills. Capabilities such as originality in perception, interpretation and representation, flexibility, relational, intuitive, imaginative, productive and extraordinary thinking in design are among the features that students want to gain. However, today, with the effect of the eye-centered paradigm, students focus on the visual without internalizing the design with sensory awareness, without comprehending all the realities, phenomenological structure of design and the relationships between all these concepts. While the strong structure of visual images carry design to a single-centered point, this situation carries risks in not realizing the holistic nature of the design, manipulating mental processes and homogenizing communication. For this reason, alternative studies focusing on cognitive awareness, sense and perception gain importance during design education.

In the workshop, which was held with interior architecture students, the participants were asked to do sensory reading exercises in the places they chose and then to represent their sensations and to use this data in the design of a city furniture. During the study, students conceptualized, interpreted and used the data in design by gaining awareness of what they perceived. At the end of the workshop a survey was made; the results showed that vision is the primary sense in perception. In the stage of representation, form and movement elements in spaces were the most effective. The significant relationship between reflection and design phases showed that representation studies have positive effects on design processes. Realization of sensory values other than vision and understanding the unity and polyphony of the senses are values that improve the perception and design skills of the designer candidates. Based on this point of view, it can be said that inclusion

of practices to develop sensory and cognitive awareness in design education is a subject that should be especially emphasized in today's visual world. Supporting the vision-centered structure of design education with studies based on alternative senses, focusing on materials, sounds, textures, movement in unconventional ways, and experiences like hands-on activities can help students develop their understanding, interpretation, vision and thinking styles, and help them turn into individuals with strong sensory awareness, advanced imagination capacities, capable of mental expansions, and sensitive to the environment. Diversifying such studies and making them widespread throughout the training programs can provide more effective results.

Phenomenology approach, emphasizing the importance of human being and their sensations in the perception of space strengthens the human-oriented position of design practice. Candidates who are responsive to the environment, can develop better solutions for the problems in the future.

Authors' Contributions

There is a single author in this paper who contributed 100%.

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Competing Interests

There is no potential conflict of interest.

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Figure References

Figure 1: Keskeys, P. (2005). How Steven Holl uses watercolor paintings to create amazing architecture. *Architizer.* https://architizer.com/blog/practice/tools/how-architecture-is-born-steven-holl-2 (18.03.2022).

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Research Article

A place-based crime prevention through urban design: The case of Sahibata Neighborhood in Konya

Matiullah Faizy[1], Asst. Prof. Dr. Kadriye (Deniz) Topçu[2*]

[1]Konya Technical University, Faculty of Architecture & Design, Department of Urban and Regional Planning, Konya, Turkey.
matifaizy@gmail.com

[2]Konya Technical University, Faculty of Architecture & Design, Department of Urban and Regional Planning, Konya, Turkey.
ktopcu@ktun.edu.tr

*Corresponding Author
** This study is prepared from the thesis titled "Kentsel tasarım aracılığı ile suçun önlemesine yönelik bir araştırma; Sahibata mahallesi (Konya) örneği" which was accepted as the Master Thesis of the Department of Urban and Regional Planning at Konya Technical University Graduate Education Institute in 2019.

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Abstract
People have the right to live in a safe environment free from crime and fear of crime with the most basic social needs. Although the subject has many different dimensions, this study evaluates it from a spatial perspective. The main aim of the study is to determine whether urban design is effective in reducing crime and fear of crime in urban spaces. For this purpose, firstly, place-based theories were investigated and a total of 12 effective design factors in producing safer spaces were revealed. Secondly, these factors were tested by visual observations and a total of 109 surveys with the users of the Sahibata neighborhood which has the highest crime rate in the city. While the visual observations were interpreted by photographs, the derived survey data were interpreted by using frequency and crosstab analysis. In conclusion, besides producing some spatial strategies such as revitalizing the lost spaces, increasing the lighting level, providing activity generators, variety of functions, decreasing the acts of vandalism signs and providing legibility and belonging clues in the sample area, it was emphasized that urban design is effective in minimizing crime and fear of crime, but it cannot be a single tool and it is necessary to evaluate the issue in the long term in all its other dimensions.

Keywords: Crime, Crime Prevention through Urban Design (CPTED), Fear of Crime, Sahibata Neighborhood, Urban Design.

INTRODUCTION

Crime, in urban areas has reached the highest levels in many cities of the world and affects the health of the people, their lifestyles, and the quality of life of the cities in a negative way (Moser, 2004: 2). Therefore, concepts such as *crime*, *fear of crime*, and *security of the city*, which make cities unsafe places to live in, cause unstable city developments, social, economic, and political discourses are the most prevalent urban and social problems on the agenda of the whole world (Frevel & Rogers, 2016: 134). These issues have been emerging because of rapid urbanization and population increase and have become one of the inevitable realities of life for the societies of all developing countries, in addition to crucial social issues among the other urban issues such as housing, traffic, environmental problems, etc.

According to Maslow's hierarchy of needs, the second important human need is safety after physiological needs such as water, food, rest, and warmth (Maslow, 1943: 370). From this point, the safety need can be thought of as the most important human need socially. As stated in the European Declaration of Urban Rights, crime prevention is seen as a right, beyond the necessity of the people living in the city. According to this

declaration, residents living in European settlements firstly have the right to live in a safe and secure city, free from crime, violence and illegal events (Düzgün, 2007: 6). Therefore, the creation of a safer urban environment has become a crucial social issue (Moon et al., 2014: 288) and should be on the agenda of authorized persons and institutions. At this point, urban planners & and designers should be aware of possible future crime risks caused by the physical environment and take precautions against them (Montoya, 2015: 399).

The concept of crime also has biological, psychological, sociological, economic, spatial, and criminological dimensions. Each of these scientific areas defines crime from their own perspective. According to biologically descriptive researchers, crime is defined as a behavioral disorder that occurs in biological and genetic groups with fewer populations in society compared to the general population. As for psychological definitions, crime refers to the psychology of the living environment in which a person lives and the psychological condition of life because of the influence of the collective response. Socio-cultural sciences define human criminal behavior as deviant behavior in society. In terms of criminology that defines crime according to the types of perpetrations**,** the act that constitutes a crime is an individual activity carried out by the part of the body on its own initiative and all the acts performed by the body acting in a deviating manner (Erdoğan, 2007: 18). Although it has many perspectives to examine, this study focuses on the effects of the design and physical organization of the space on the production of a possible crime. While investigating this, the study also partially refers to the social dimension of the sample area.

A considerable amount of research effort has been made to understand criminality, especially on the offender and, has taken place on the reasons that lead people to become criminals, such as poverty, social disadvantage, and so on. Conversely, the less effort has been directed towards “situational crime prevention” (Clarke, 1980: 137, 1997), or “place-based crime occurrence” which is oriented to modify the immediate conditions in which crimes are committed (Tilley, 2010; Montoya, 2015: 399). In this study, the physical conditions and design of a space will be considered to understand its role in the possible crime occurrence. And the “crime” refers not only to the phenomenon of the crime itself but also to the fear it creates (*fear of crime*).

Fear of crime, in its most general definition, can be defined as the feeling of fear and insecurity that a person feels in danger of their individual security. This fear especially arises from the fears such as being attacked and extorted in urban areas and it affects individuals' perceptions of spaces and is one of the important factors in defining a space as unsafe (Ataç, 2008: 18, Wekerle & Whitzman, 1995).

From this point, the objectives of the study are to discuss the followings.

- Do the “physical conditions of a place” and “the design of a place” encourage crime and cause fear of crime? Do they effective in reducing crime risks in urban areas? If so,
- What are the successful physical attributes of urban spaces for helping to reduce crime and fear of crime occurring in urban spaces? What are the composed of spatial design factors that affect crime occurrence and cause/prevent fear of crime?

To reach these objectives, at the first stage of the study, comprehensive literature research related to the theories that integrate place with the crime was made. In the second stage of the study, the derived urban design criteria from the theoretical basis interpreted within the sample area, Sahibata neighborhood (Konya), by using observations, visual analysis, household survey with the users of the area, maps, and photographs. It was not possible to conduct an analysis of all the districts of the city due to the wide scope, therefore the main crime agglomeration district of the city -*Sahibata Neighborhood*- was selected to be analyzed. This study underlines the necessity of considering the issues of “crime” and “fear of crime”, which are mostly discussed on the triggering role of sociological and economic contexts, in physical/spatial context. At the same time, getting the opinions of the people living in the Sahibata neighborhood together with visual evaluations, is an indication that this study handled the issue with a participatory approach. In this context it is an original study because it is one of the rare studies that try to analyze the crime issue based on 'place' with a participatory aspect in the relevant literature.

Place-Based Crime Prevention Theories

There are many explanations in the literature for the development of offenders, but it is still needed an explanation for criminal events in selected certain target places. Why some target places are attractive, and

others are repellent? Below we describe how crime and place come together in theories and how they have been applied to crime prevention (Eck & Weisburd, 2015: 4).

The crime theories in the past were interested in the measures after crime occurrence such as penalty, punishment, correction, and treatment. But, since the 20th century, the concern has moved to the crime prevention. Crime prevention theories have been unfolded in various ways to create a safer city against crime through improving urban space (Moon et al., 2014: 290). In this framework, the studies which link the built environment and crime, a comprehensive perspective on the use of space in crime prevention has only been on the agenda since the 1960s. After these years, the focus of crime theories is not on the conditions of the offender, but rather on the use of space to prevent crime. The view that "opportunities in the physical environment are the main cause of crime" is the main motivation behind urban design studies to prevent crime. Another aim of these studies is not only to prevent the crime but also to prevent the anxiety or the fear of the crime related to the existence of the crime (Hillier & Rooksby, 2005; Apak et al., 2002: 66, Düzgün, 2007: 7).

The breaking point of linking built environment and crime was Jane Jacob's study. It was the first influential work to suggest that "active street life" could cut down the opportunities for crime. She focused on the role of "eyes on the street" to maintain social control. Jacobs's study was simple; people, not the police, are the guardians of the public space (Linden, 2007: 141, Adel et al., 2016: 926). Almost all the theories about urban design and crime prevention have been based on this idea (Hillier & Rooksby, 2005). She found that "natural surveillance" was essential for the feeling of safety and that could be achieved by increasing the number of people using a particular area through encouraging a diversity of uses and creating opportunities for positive social interactions (Jacobs, 1961). The "eyes on the street" theory (Jacobs, 1961) states that the systematic zoning of areas reduces the surveillance potential. Thus, civic, institutional, and commercial activity should be embedded in neighborhoods and districts, not isolated in remote, single-use complexes. This theory is the basis for the "activity support concept" of crime prevention through environmental design (CPTED). Activity support involves the generation of activity by ordinary citizens to discourage criminal action and, more specifically, the placing of "safe" activities to serve as magnets for ordinary citizens who may act to discourage the presence of criminals (Cozens et al., 2005: 337). The activity support concept has been translated by many into simply the encouragement of "mixed land use". However, it does not aim to encourage activity in general but instead to identify "safe" activities and locate them where these are likely to have a positive impact (Montoya, 2015: 409). Other researchers have reported similar findings like busier streets with mixed land use patterns, range of activities and some pedestrian movements have reduced levels of recorded crime and contribute to a safer, more vital public realm (Poyner & Webb, 1991; Petterson, 1997: 190; Hillier & Shu, 1999: 37, Zelinka and Brennan, 2000; Montoya, 2015: 402).

As the result of the research, in the following process of Jane Jacobs' study, theories explaining the relationship between crime and urban space design can be sorted as (1) Crime Prevention through Environmental Design (CPTED), (2) Defensible Space, (3) Space Index Analysis (space syntax), (4) Broken Windows Theory and (5) Trace Theory. In addition to these theories, various underpinning crime prevention theories and concepts are relevant in the field of place-based crime prevention, such as social disorganization, rational choice, routine activity, anchor point, crime pattern, directional bias, critical crime intensity zone, crime habitats (Montoya, 2015: 409). Since these theories are thought to disrupt all subject integrity, they have not been evaluated within the scope of the study. The theories given below and explained in more detail are included in the study as they explain place-based crime theories through urban design.

Crime Prevention through Environmental Design (CPTED)

This theory which links the built environment with "crime" and the "fear of crime" concepts was first introduced in Jeffery's work (1971) which did not contain physical solutions and provide actual standards for what the physical environment should resemble to reduce crime and fear of crime and to promote quality of life. It was largely conceptual. The final currently accepted version of this theory was developed by Timothy Crowe (2000) who describes CPTED as follows: "with proper design and effective use of the built environment, a decrease in crime and fear of crime or an increase in the sense of security of people and an increase in living standards can be observed". Thus, the goals of CPTED are to increase public safety and to

promote a sense of physical security through the physical design and planning of the built environment (Ziegler, 2007: 11).

CPTED principles attempt to reduce the opportunities for crime by making crime riskier. At the core of CPTED as a crime fighting strategy is the creation *of a sense of ownership and control of space* to manipulate the environment to dissuade offenders from committing crimes while at the same time making sure criminals would easily be detected and arrested should they even decide to commit an offense (Hillier & Rooksby, 2005; Düzgün, 2007: 7).

According to the theory, there are four most dominant principles of preventing crime & fear of crime; *(1) Natural Surveillance (2) Access Control, (3) Territoriality and (4) Maintenance* (Geason & Wilson, 1989; Saville & Cleveland, 2003: 8; Cozens, 2002: 132, Owusu et al., 2015: 255, De Biasi, 2017: 126).

“Natural surveillance” promotes an individual's ability to have clear views of his or her surroundings (Crowe, 2000). This kind of surveillance requires the design of buildings to allow occupants and community members to have a continuous observation of both public and private spaces within communities. For providing natural surveillance and the transparency of the area, the number and location of the windows, the door entrances of the building from the street (Newman, 1973), the number and level of proper lighting elements (Lab, 2000), the presence of obstructive landscape elements (fences, walls, hedges, trees, shrubs) are very important (Jeffery, 1971; Crowe, 2000; Owusu et al., 2015: 256). Ultimately, this ability minimizes the availability of hiding places that offenders can use in wait of an innocent bystander.

Similar to natural surveillance, “access control” measures include clearly delimiting points of entry and exits of buildings as well as placing walls/fences, lighting and landscape in a careful manner in order to limit easy access to buildings or control flows of people to and from buildings. It refers to the ability to control inbound and outbound to restrict access to illegitimate users. It can also be considered as a set of efforts and measures that increase the effort of the potential criminal and raise the awareness of the high risk, and make the target difficult (Lab, 2000). At this point, it is generally mentioned that the door entrances should be on the street to increase the natural surveillance opportunities and that the neighbors and families should use the same common entrance. In this way, residents can get to know each other and thus distinguish the stranger. This can be achieved with designs that allow frequent encounters in urban spaces (Newman, 1973; Lab, 2000).

At this point, natural access control measures include the use of a single and easily identifiable point of entry and exit from buildings, secure doors and windows, the presence of fences and walls surrounding the area, limiting the number of entrances, limiting escape routes, and eliminating design features that allow access to roofs can be the examples of measures that make crime more difficult and provide higher security (Owusu et al., 2015: 255; Lab, 2000). “Target hardening” measures can also be related to controlling access to particular places, which may involve the treatment and securing of doors, windows, and alarms (Ziegler, 2007: 13). It is often thought to be the first solution for the residents and designers because it reduces the vulnerability of a potential target (building) physically (Owusu et al., 2015: 255).

According to Kruger (2005), when CPTED is applied at the community level it encourages a sense of ownership of and responsibility for community space by employing mechanisms that allow residents to identify with the space (Owusu et al., 2015: 255). It is called “natural territorial reinforcement” *or* “territoriality”. This concept aims to promote a sense of ownership and facilitate proprietary concern. Personalization design elements, such as artwork and landscaping are often used to achieve these goals. Features such as fences, landscape design and signage also help define the difference between private and public property. Territorial features promote an image of an environment that is being cared for and protected. This image signals to offenders that criminal behavior will not go undetected or unpunished (Crowe, 2000; Cozens et al., 2005: 331; Sutton et al., 2008: 75; Clancey et al., 2012: 9; De Biasi, 2017: 126). “Maintenance” is an especially important standard to uphold, and without it, territoriality, surveillance, and access control are critically jeopardized. It also helps create an attractive public space that is perceived to be under the care of an individual or a group of individuals (De Biasi, 2017: 127). These above design standards, implemented together as a package, can collectively influence an individual's perception of the environment (De Biasi, 2017: 127).

Defensible Space

CPTED was further developed by the concept of "defensible space" as posited by Oscar Newman (1973). Newman (1973) argued that an area is safer when people feel a sense of ownership and responsibility for that part of a community (Adel et al., 2016: 934). He argued that it was possible to design physical environments to decrease opportunities for crime and fear of crime by affecting the behavior of offenders and non-offenders (Newman, 1973; De Biasi, 2017: 126). According to Newman, "defensible space" refers to a living physical environment that can protect the families, neighbors of the people living in the area, and where the sense of ownership of the area is very intense (Lab, 2000). Based on this approach, beyond the self-protection of the individual, there is the ability of the society to protect her/him (Newman, 1973; Schneider and Kitchen, 2007).

Newman found that "minimized common areas", "maximized private ownership" and "minimized permeability" *(the ease of entry to and exit from the neighborhood)* are the attributes for the safest residential areas, neighborhoods (Newman, 1973). He states that people perceive space as being either private, semiprivate, semipublic, or public and their expectations and levels of involvement in caring and protecting it vary across these types. Therefore, "territoriality" is seen as the appropriation of space by legitimate users to discourage the presence of illegitimate users (Cozens et al., 2005: 331). This appropriation takes the form of caretaking, feelings of ownership, or monitoring of activities (Brunson et al., 2001: 630; Montoya, 2015: 402). Newman pointed out (1973) that under the territoriality principle of defensible space, it is important to distinguish four elements to secure unsafe spaces: public space, semi-public space, private space and semi-private space. Feeling this distinction will increase natural surveillance and crime can be prevented by people's awareness of their responsibility in the public sphere.

Space Index Analysis (Space Syntax)

In 1984, Hillier & Hanson introduced the theory of space syntax based on the concept of "social logic of space". This theory supports the idea that spatial configuration is associated with patterns of social interaction and therefore may affect crime rates (Erdoğan, 2007: 29). According to this theory, a good spatial layout generates automatic movement which increases the probability of interactions by unplanned encounters. The increased social interactions then increase the risk for a criminal to get caught and hence prevent him from committing the crime (Dhimn, 2006; Adel et al., 2016: 927).

It reveals that the isolation of the users of the space from other people and the patterns of dead-end streets do not prevent crime. Therefore, the integrated urban texture and creating more socially active spaces are important design precautions for safer environments. Apart from increasing the capacity of those living in a region to control their spaces, it aims to increase the control potential of the space without ignoring even those who are not from that space but just "passing by" (Düzgün, 2007: 7).

Broken Windows Theory

According to this theory, which draws attention to the role played by "physical disorder" in the formation of crime; if there is a building with some windows broken in a neighborhood and these windows are not repaired, it is inevitable for some people to break other windows in the building. As a matter of fact, the broken window in the building creates a negative sense of ownership, uncontrolled feeling in the building and encourages people to commit a crime. Such small crimes can then invite larger crimes. Since human beings want to feel belonging to the space they live in, they always tend to design and organize it. The sense of belonging or ownership has a very important role in human interaction and can only be achieved through continuous maintenance of the area.

Physical disorder includes environmental features that reflect neighborhood dilapidation such as graffiti, trash, and other debris (Skogan, 1992). This theory advocates that places that cause feelings of unattended, uncontrolled, neglected, dysfunctional and uninterested spaces (*poorly lit streets, abandoned buildings that have not been repaired for a long time, vehicle parking places without control, lost spaces etc*.) can produce crime (Doğan & Sevinç, 2011: 43). Therefore, "maintenance" is an especially important standard to uphold, and without it, territoriality, surveillance, and access control are critically jeopardized. It also helps create an attractive public space that is perceived to be under the care of an individual or a group of individuals (De Biasi, 2017: 127).

Trace Theory

Based on Kevin Lynch's work on the perception of the space, the trace theory he put forward in the 1960s tries to explain the occurrence of the crime by examining the “paths” and “nodes” used by the citizens which are the most active areas in the city that allow crime to be committed (Lynch, 1960). This theory can also be integrated with the ‘fear of crime’ in terms of perception and image. The individual is a part of the city and has a memory and image of the city that he/she has created in line with his/her own habits while living there. When the image is considered as the trace left by an urban space in one's mind, it can be said that people make their judgments about the urban space whether it is safe, unsafe, or scary based on these images.

Lynch (1960) identified the urban elements necessary for a city to leave a mark in one's mind as paths, nodes, districts, edges, and landmarks. These 5 elements are urban elements that prevent from getting lost and give confidence to the person. The absence/inadequacy of these elements can lead to the person losing his way or direction in an urban space and feeling not safe. Thus, this situation can trigger the fear of crime (Lynch, 1960). Therefore, if the area is defined, understandable and has elements that facilitate finding directions (defined nodes, landmarks, edges, streets, districts, address plates and numbering) has an important effect on reducing the fear of crime.

According to the *place-based crime* theories cited above, it is understood that “crime” and “fear of crime” can be reduced by some spatial design tools (Bannister & Fyfe, 2001: 812). And, crime opportunities can be reduced through environmental design and the issue that urban design reduces the fear of crime and crime emerges as a fact accepted by many researchers (Schneider & Kitchen, 2007). In the light of the information obtained from the explanations of all these theories, the following set of criteria has been determined to be evaluated within the scope of this study (Table 1).

Table 1. Urban design criteria for providing safer environments

Theories			Urban design criteria
CPTED	Defensible Space	**1. Surveillance**	1. Natural-mechanical lighting level
			2.Transparency of the buildings & separators
			3.Elements that blocking the view
			4. Mixed use, variety of functions, activity supporting places
		2. Access control	5.Target hardening and building entrances
		3. Territoriality	6.The presence of representations of belonging, sense of ownership in the area
			7. The openness of the borders (public-private-semi-public-semi-private areas)
	Broken Windows Theory	**4. Maintenance**	8. Physical disorder of the streets (vandal movements, trashes, elements that prevent walking etc.) and maintenance level
			9.Presence of lost spaces (dysfunctional, neglected areas)
Trace Theory		**5. Easy wayfinding, imageability**	10. Addresses and numbering, guiding plates
			11. Perceivability, legibility and the image of the area
Space Index Analysis		**6. Spatial Layout**	12. Permeability of the streets

METHODS

Besides literature research on the subject, maps, photographs obtained from the relevant institutions, visual observations, and the questionnaire application in the field with the users constitute the methods of the study. The visual observations include the interpretation of the determined urban design criteria in the sample area (Table 1). The authors made observations in the field in May 2019 at different time periods (morning, afternoon, and evening), took some observation notes and records and visualized some of the criteria with photographs. To be specific to the study area and be able to offer specific solutions to the ‘place’, in addition to the visual observations, a questionnaire was administered to a total of 109 people living in the sample area using a random sampling technique to measure user opinions. This number corresponds to approximately 2% of the population of the neighborhood. According to 2017 data, the population of the study area is 5228 people (Anonymous, 2019). The questions were prepared based on the determined urban design criteria above (Table

1). The derived data of the questionnaire application were evaluated by using frequency and crosstab analysis through the SPSS program.

The Case Study: Sahibata Neighborhood

In this study, Konya city-wide crime intensity map prepared by Konya Metropolitan Municipality, City Information System unit was taken as reference in the selection of sample area. It was chosen among the hot spots where the crime is the most intense in this map. According to the map, it is observed that the crime has increased in the city's central areas, especially where the historical and commercial areas are concentrated. Interviews were made with the *muhtars* (*neighborhood headsmen*) to choose the sample area among the hot spots[1]**.** As a result of these interviews, it was observed that the area with the highest crime rate in Konya city center was Sahibata Neighborhood.

Sahibata Neighborhood is one of the central neighborhoods of the city, located within the borders of Meram district of Konya province. Situated in the south and southwest of Konya city center and Alâeddin Hill, the neighborhood covers an area of 21 ha in total. The quarter, which is known to be one of the oldest and historical neighborhoods of Konya, is a transition zone between many areas of the city. Konya Alâeddin Hill, which is located in the northeast of the study area, was designated as a "1st Degree Archaeological, Natural and Historical Site", and because the areas around the hill between the inner and outer borders were declared as 3rd Degree Archaeological Site Area, the Sahibata Neighborhood, which was chosen as the sample area, also has the status of "3rd Degree Archaeological Site" (Figure 1), as it is located in the cited area. Alâeddin Hill, which constitutes the historical core of Konya, is a mound that yields finds dating back to the Bronze Age (4500-2000 BC). The significance of reduction of the currently observed crime rates in the sample area, which is situated so close to such an importance place, or development of proposals and spatial strategies for the solution of this issue cannot be denied. This neighborhood, which has a grid form, is known as Konya's first planned and regular quarter (Anonymous, 2019; Figure 1).

a b

Figure 1. The location of the study area in the city center (a) and its bird's eye view (b)

FINDINGS

Results of the Visual Observations

The first feeling that people want to have when they enter an urban space is the sense of security. The reassurance of the physical environment supports the person to use that environment and perform their activities. If it does not give confidence, that environment will become unused, away from the livability, and this may trigger the increase of lost places in the physical environment. For this reason, the determined urban

[1]The crime analysis and academic approach is restricted because Konya Police Department and Konya Municipality do not release the real crime data despite official correspondence for reasons of privacy and private property rights. Therefore, the method of interviewing with the *muhtar*s (neighborhood headsmen) was preferred in the sample area selection of the study.

design criteria (Table 1) was analyzed by using physical environment data. According to the visual observations of the selected neighborhood, the findings were as the followings.

Surveillance

Natural-mechanical lighting level: The adjacent and orderly buildings in the area are mostly 3 to 4 floors and the street widths vary between 4-5 meters. According to the calculations made in the grid-shaped neighborhood, the street width and building height ratio is approximately 1/2. This ratio shows that this neighborhood is not claustrophobic and disturbing in terms of urban design, and the feeling of being trapped is weak (Ashihara, 1983). It can receive enough natural light during the daytime (Figure 2).

Figure 2. Natural lighting level during the daytime

The height of the lighting elements in the sample area is 6-8 m. and they are placed approximately 7.5 m from each other in the area. This situation causes the area not to be adequately illuminated. In some places it is completely dark due to the absence of lighting elements. Many of the existing ones are dysfunctional. Since there is no lighting control in the area and the problem lamps are not repaired, the area turns into an unsafe environment at night. The photograph below is showing the darkness of the area in the evening hours in May 2019 (Figure 3).

Figure 3. The darkness of the area in the evening hours

Transparency of buildings & separators: It is seen that there are windows that allow natural surveillance throughout the study area. However, it is necessary to draw attention to the presence of the deaf facades and lack of on-street entrances in some places.

There is high, aesthetically neglected, mass-effected walls in some places, generally around the vacant lots, within the study area. These walls may cause psychologically negative impressions in people's mind as they cannot see beyond these and thus can trigger the fear of crime (Figure 4).

Figure 4. Deaf facades blocking the natural surveillance

Elements that blocking the view: There are no trees/bushes used on the streets, so there are no hidden corners in the area to prevent sight.

Mixed use, variety of functions, activity supporting places: The small commercial units within the interior of the area are usually very old shops, and some of them are vacant. There are no parks and playgrounds or any actively used areas except for a few coffee shops (only for the men) and a casino in the area. Besides the closed and empty commercial units, the lack of gathering and activity places are together creating the lack of mobility, which weakens the feeling of security. The users of the coffeehouse (kahvehane) are the only people who activate that area during the day, but at night, the casino can increase the feeling of insecurity. The casino located in the middle of the neighborhood creates an uncomfortable feeling for people both in terms of security and noise. This cannot be considered as ‘safe’ activity for the people to gather (Figure 5).

There is no common place in the study area where children can play, and other groups can spend time even around the public buildings. In addition to the lack of open and green spaces within the area, positive effects such as children's playing sounds, bird sounds, water sounds, sounds that people make while chatting cannot be felt in the area. These kinds of shortcomings may not be an obstacle in terms of seeing and to be seen but may create a negative effect on the psychology of the people living in the area or the people walking through it.

Figure 5. Examples from small commercial units within the area

Access Control

Target hardening and building entrances: As a precautionary measure against crime in the area, only iron railings on the windows of some ground floors can be shown. The entrance doors of the buildings are open in many points of the area, and it is not seen that locks and similar measures have not been taken (Figure 6). These situations can encourage criminals. Most of the main building entrances are on the street which can be seen as a positive effect for providing safer environments.

Figure 6. Entrance door and window examples

Territoriality

The presence of representations of belonging, sense of ownership: No spatial data has been obtained on this subject. Besides, throwing trash on the streets (in some cases from the windows of some buildings), knowing that the lighting is weak, but lack of reaction to it, failure to check those coming from outside, parking cars on both sides of the street, keeping silent to acts of vandalism, and not paying attention to the structures are the examples that prove there is no sense of belonging or ownership, and no territoriality hints in the neighborhood.

The openness of the borders: Public and private areas are not clearly separated within the area. The public spaces are generally adjacent to the buildings or the border between them is almost negligible. Since the boundaries of public buildings from private areas are not apparent, their distinctive character cannot be perceived well, and they usually disappear among private areas (Figure 7).

Figure 7. Examples for the boundaries between public and private space

Maintenance

Physical disorder of the streets and maintenance level: There is no visually attractive design element or public art object in the sample area. It is an area lacking even the visual appeal that open and green spaces add to the environment. There are ruined and neglected buildings almost in every part of the area. When street designs are considered, the visual/aesthetic and functional aspects of the streets are not satisfactory for encouraging people to walk through. Although there are garbage bins in the streets, people's throwing garbage to the streets rids the streets of visual appeal and makes the area unsafe. Therefore, the streets, which are one of the important public spaces, are only a transition space within the neighborhood.

There are no sidewalks in many parts of the area. The streets are not encouraging to take walks due to the obstacles on the sidewalks such as electric poles, electric boxes, trash bins, parking vehicles. Since the sidewalks are very narrow (0.5m.), many people walk in the middle of the street. This is a matter that threatens the security of life of people.

The narrow streets, the vehicles parked in front of the buildings which sometimes cause discussions and quarrels between people show the needs for parking lots in terms of the image it gives. To solve this problem, some empty parcels have become parking lots. Since the area is in the city center, the inner streets of the area are generally used as parking lots by the foreigners. This situation is also conducive to crime and fear of crime (Figure 8).

Vandalism acts are frequently encountered in almost every street of the neighborhood. Writings/graffiti on the walls and damaging public-private properties are the indicators of this negligence. The windows of some empty, dysfunctional structures in the area were broken. It does not offer a reassuring environment for a person who first enters this area (Figure 9).

Figure 8. Examples showing the psychical disorder of the sample area

Figure 9. Vandalism acts in the area

Presence of lost spaces: The spaces defined by the back sides of the houses and the courtyards can be given as the examples of lost spaces in the neighborhood. There are isolated spaces, empty plots, and ruined structures among the buildings in the area. If the existence of such areas continues, these areas can attract the dwelling of the people with high crime potential. Such areas cause the feeling of insecurity and may pose a danger to the families living in the neighborhood (Figure 10).

Figure 10. Examples for the lost spaces within the sample area

Easy wayfinding / Imageability

Addresses and numbering: In some parts of the area, there are enough sign and address indicators. This will enable people to find their direction easily. However, in some parts there are no indicators. (e.g., there is no sign indicating where the police station is located).

Perceivability, legibility and image of the area: Most of the buildings in the study area are of the same type and in a gridal texture. So, this situation makes it difficult for the people to find their way and direction easily,

especially for the individuals coming to the area for the first time. Some historical buildings that can be an important landmark have been hidden within the area and therefore they are generally far from the perceivability.

Spatial Layout

Permeability of the streets: The spatial layout of this neighborhood which is the first planned and regular district of Konya city is based on a grid form. There is no cul-de-sac formation within the neighborhood (Figure 1). This shows us that the permeability level of the streets is very high.

In addition to all these visual observations, according to the interviews with Konya Meram District Police Department; the police patrol and control the area in many parts at different times of the day and night. And there is a branch of Konya Public Security Directorate in the inner parts of the neighborhood, and there are private or public security camera systems at some points in the area.

Results of Social Environment Research

According to the information obtained from the interviews with the neighborhood headman and the residents of the area, residents of the neighborhood frequently experience disagreements between them. Most of these conflicts are about not being able to adapt to life in apartment buildings (*i.e., the shaking of tablecloths/carpets from the balcony, making noises, 20 people staying in small flats of 1 + 1 etc.*). Especially since immigrants came and settled in this neighborhood, it has been common to see many people (*sometimes 20 people*) staying in small flats. As mentioned before, a questionnaire application was conducted with a total of 109 users using the random sampling technique to obtain the opinions of those living in the area on the subject. The section below gives the results of this application.

Since the social-cultural analysis of the users living in the area constitutes a very important data in the settlements where crime is committed, the first part of the survey questions consists of searching of the user profile. By means of the questionnaire, the situations that the residents of the neighborhood experienced regarding security and crime, and the things they felt or knew about the place were questioned. The user profile of the survey application is given below (Table 2).

Table 2. User profile of the questionnaire application

Gender				**Number**			**Percentage (%)**	
	Male			82			75.2	
	Female			27			24.8	
Marital Status	Single			30			27.5	
	Married			79			72.5	
Age		20-30	31-40	41-50	51-60	61 and above	Total	
	Number	38	30	22	12	7	109	
	%	34.9	27.5	20.2	11.0	6.4	100	
Education		Illiterate	Literate	Elementary	Middle School	High School	University	MSc or Doctorate	Total
	Number	4	9	18	23	30	22	3	109
	(%)	3.7	8.3	16.5	21.1	27.5	20.2	2.8	100
Occupation		Laborer	Civil servant	Self employed	Retired	Student	House wife	Other	Total
	Number	27	15	24	8	8	15	11	109
	(%)	24.8	13.8	22.0	7.3	7.3	13.8	10.2	100
Income		1600 TL or more		1601-3500 TL		3501-5000 TL		5001-7000 TL	Total
	Number	13		54		39		3	109
	(%)	11.9		49.5		35.8		2.8	100
Housing Ownership				Number			Percentage (%)		
	Owner			60			55.0		
	Tenant			49			45.0		
	Total			109			100		

79.8 % of those who participated in the survey consisted of people who came from Konya's surrounding districts and villages and settled in this neighborhood. 20.2 % of the users (22 people) came from outside the province of Konya. Even though rurality sometimes positively affects neighborhood relations, some problems can be observed in the study area arising from urbanization.

According to the results regarding the duration of living in the neighborhood, 19.3 % of the participants (21 people) stated that they lived in this neighborhood for a period of 1-5 years, and 11 % (12 people) for 26 years or more. The long duration of living in the neighborhood can create an effect that can reduce the risk of crime in terms of ownership of the area and the development of a sense of belonging. As can be understood from Table 3, approximately 40 % of the users have been living here for a maximum of 10 years, and approximately 20% for a maximum of 5 years (Table 3).

Table 3. The users' duration of living in the neighborhood

Duration	**Number**	**Percentage (%)**
1-5	21	19.3
6-10	22	20.2
11-15	27	24.8
16-20	13	11.9
21-25	12	11
26 years or longer	12	11
Total	109	100

Approximately 40 % of the respondents stated that they lived in this area for economic concerns. The fact that the area is in the city center and close to workplaces is among the other reasons for living in the area. We can see that the ratio decreases considerably when it comes to neighborhood relations and a sense of belonging to the area (Table 4).

Table 4. The users**'** reasons for living in the neighborhood

Reasons	**Number**	**Percentage (%)**
Suitable for my economic situation	43	39.4
Close to my work / school	27	24.8
Located in the center of the city	27	24.8
Because I feel like I belong here	8	7.3
I have good neighborly relations	1	0.9
Other	3	2.8
Total	109	100

In the next stage, the participants were asked to state three things they liked and disliked in the neighborhood. The table below shows the first three characteristics obtained after a classification of the answers given (Table 5).

Table 5. Features that users liked and disliked in the neighborhood

Liked Features		Disliked Features	
Everything is within walking distance, easy to access	%80	Absence of parking lots	%94
Easy transportation opportunity	%78	An outsider's parking in the neighborhood	%87
Affordable rent price	%64	Presence of people from different ethnic groups	%85
Located in the city center	%55	Darkness at night	%77
Close to work	%54	Cars parked in front of one's house, cars being everywhere	%76
I know everyone	%54	Annoying levels of noise	%74
Narrow roads, no traffic	%47	Increase in crime	%73
Low-rise housing	%46	High number of people living in a house	%65
My own house	%32	Disposal of waste in the streets	%64
Presence of patrol	%23	Presence of vacant buildings and spaces	%63
Quiet	%22	Presence of casino	%62
Neighborhood relations	%21	Buildings are old and neglected	%56
		Lack of neighborhood relations	%56
		Lack of playgrounds for children	%54
		Lack of green spaces	%46

	Narrow streets	%45
	The people living in the neighborhood	%45
	Backyards of houses have become garbage dumping grounds	%35
	Change in the neighborhood environment compared with the past	%35
	Nasty and disturbing stares	%34
	Lack of social activities	%34

According to the results, the characteristics of the neighborhood disliked by the respondents seem to outweigh the ones liked by them. The lack of parking lots in the neighborhood is the most disliked feature. People other than those living in the area come to the city center and park their cars on the streets in the neighborhood and therefore foreigners are everywhere in the neighborhood, which is seen as a huge problem. Another issue that the participants do not like and are uneasy about is that people from different ethnic backgrounds have recently started to live in the neighborhood. For this reason, they stated that the neighborhood relations in the area were weakened. When other disliked features are considered, it is seen that most of them are related to the lack of social activities and active places. The casino in the neighborhood is among the features that disturb and are disliked by people at night (Table 5).

Another issue that was tried to be understood within the scope of the survey was related to the crimes in the neighborhood. Therefore, to the best of the users' knowledge, it was questioned what kind of crimes were committed more frequently in the study area. According to the results, the most common type of crime is burglary (36.7 %- 40 people), followed by pickpocketing with a rate of 15.6 % (17 people) (Table 6). Participants associate this situation with the high number of foreigners entering and exiting the neighborhood due to its proximity to the city center and therefore they do not feel safe.

Table 6. Distribution of types of crimes committed in the neighborhood according to user accounts

	Number	**Percentage (%)**
Burglary	40	36.7
Theft at workplace	9	8.3
Theft from automobile	8	7.3
Auto theft	4	3.7
Purse-snatching	15	13.8
Pickpocketing	17	15.6
Mugging	2	1.8
Drug trafficking	1	.9
Other	13	11.9
Total	109	100.0

In the next step, day and night security situation of the neighborhood was examined. For this purpose, the users were asked "If we ask you to evaluate the environment you live in (places within walking distance) in terms of safety during day and night hours, how would you define it?". While 19.3 % of the participants (21 people) think that the neighborhood is a safe place during the day, this rate drops to 1.8 % (2 people) when night safety is questioned. The results obtained can be seen in the table below (Table 7).

Table 7. Users' day and night sense of safety at the neighborhood

	NIGHT		**DAY**	
	Number	Percentage (%)	Number	Percentage (%)
I think it is a pretty safe place.	2	1.8	21	19.3
I'm not sure; sometimes it feels safe, sometimes it is unsafe	46	42.2	60	55.0
It's an absolutely unsafe place	50	45.9	19	17.4
I have no idea	11	10.1	9	8.3
Total	109	100.0	109	100.0

To determine whether there was a user who was subjected to a crime in the study area, a question was asked to the participants in this regard, and if there was, what crime and where they experienced it. 14.7% of the participants (16 people) were subjected to a crime (Table 8). In other words, it can be said that approximately 15 out of every 100 people were subjected to a crime. This is a very high rate. The types of crimes suffered by those who were subjected to crimes include theft, sexual harassment, individual maltreatment, and parking lot fights. These crimes were usually committed in the inner parts of the neighborhood.

Table 8. The users' status of being subjected to crime and the types of crimes they were subjected to

	Number	**Percentage (%)**
Yes	16	14.7
No	93	85.3
Total	109	100.0

Type of crime	**Number**	**Percentage (%)**
Burglary	40	36.7
Theft at workplace	9	8.3
Theft from automobile	8	7.3
Automobile theft	4	3.7
Purse-snatching	15	13.8
Pickpocketing	17	15.6
Mugging	2	1.8
Drug trafficking	1	0.9
Other	13	11.9
Total	109	100.0

The opinions of men and women about safety in the neighborhood both at home and while walking on the street were questioned in the questionnaire application and the results are given in the tables below. As can be understood from the tables, it is observed that the feeling of insecurity is more dominant in this neighborhood, whether at home or on the street, and women are more exposed to this situation than men (Table 9, Table 10).

Table 9. The relationship between feeling safe at home day and night and gender

Gender	**Feeling safe when alone at home at night**						Total	
	I feel safe		**Sometimes I feel safe, sometimes not**		**I feel unsafe**			
	Number	Percentage (%)	Number	Percentage (%)	Number	Percentage (%)	Number	Percentage (%)
Male	35	42.6	40	48.7	7	8.5	82	100
Female	0	0	12	44.4	15	55.5	27	100
Total	35		52		22		109	

Table 10. The relationship between feeling safe on the street day and night and gender

Gender	**Feeling safe when walking on the street**				**Total**	
	YES		**NO**			
	Number	Percentage (%)	Number	Percentage (%)	Number	Percentage (%)
Male	66	80.4	16	19.6	82	100
Female	9	33.3	18	66.6	27	100
Total	75		34		109	

GENERAL EVALUATION AND CONCLUSION

Reasons such as rapid urbanization, globalization, the phenomenon of modernism and accompanying problems like migration, unemployment, poverty, deprivation, class and spatial segregation, inequalities in income distribution, ethnic-class differences, decrease in social control, and the emergence of places that can provide opportunities for crime caused by deterioration in the urban environment cause cities to turn into places of crime. Based on this, it is seen that the phenomenon of crime is too complex to be reduced to a single cause. This study mainly approached the subject in its spatial dimension, by presenting spatial solutions of preventing crime and fear of crime. As a result of the research conducted, it is seen that successful crime prevention efforts

in a spatial sense will encourage a safer environment by increasing the attitudes and behaviors that help people feel safe.

Sahibata Neighborhood, which was chosen as the study area, is located in the city center of Konya and has an important position due to its proximity to the historical core of the city. The high crime rate of such an area in the city is negative in terms of the image and identity of the city. Therefore, the present study seems important in that it will at least help planners and designers understand what can be done physically in this regard. It cannot be said that Sahibata Neighborhood yields very positive results as a consequence of the evaluation of the design factors that are effective in preventing crime through visual evaluations made within the scope of the study. Indeed, the lighting in the area is not at a level that will create a sense of security at night. It is especially important to illuminate the areas identified as lost places within the scope of the study.

There are dysfunctional, unused, abandoned, and vacant buildings and lost spaces at many points in the area. Considering that such lost spaces are places that encourage crime, the necessity of re-functioning and regaining them to the city becomes more evident. There is not enough variety of functions in the neighborhood that will ensure vitality, and hence natural surveillance. There are no areas that can be used actively such as an open-green space or a children's garden that will promote communication between people, enable them to chat and get to know each other. At this point, the lost places should be evaluated. It will also be a positive step in terms of the security of the place. Consequently, the spaces that have been regained to the city can be activity generators and the sense of security can be increased. There is no visible element that can refer to the space in terms of the legibility and perceivability of the space. Structures and spaces that can provide this feature at present have remained hidden corners, out of sight, between the vehicles and apartment buildings parked on the street. In a sense, the fact that they have remained concealed may lend a positive characteristic to the place, but they do not provide users with a sense of security. The fact that each building is similar to the other, that the neighborhood is located in a grid form and direction signs can be barely perceived also triggers this situation.

Another example of neglect and lack of control in the neighborhood is the acts of vandalism witnessed in the area. Graffiti written on the walls and situations such as damage to private or public property are the best indicators of this. Many such examples are encountered in the area. As stated in the Broken Windows Theory, the repair and control of the space are important interventions that will prevent the criminals from committing crimes. There are non-transparent areas that are obscure and surrounded by deaf facades, where there is no entrance, and natural surveillance cannot be provided. The existence of such places makes it easier for criminals to commit an offense. In this framework, the high walls built by private properties to ensure their own security threaten the security in the public space. Designing such separators in a transparent way (such as having windows, having fences that allow seeing through instead of high walls), and coloring very high deaf facades with artistic details can be interventions that increase the feeling of safety for the user.

Neighborhood relations can be evaluated as weak in the neighborhood due to the presence of people who do not know each other, who migrated to the area recently, who have different ethnic origins, and due to the absence of places that would enable people living in them to come together. At this point, it seems beneficial to create activity generators and areas that can be used by people of all ages. This can also be an opportunity to bring people from different cultures together and increase the sense of ownership of the space. The vitality of a space also means that that space is in use and successful. When the neighborhood is considered in this sense, it is observed that there are no useful or attractive structures or streets that will encourage walking and exploring. Since there is no place that supports walking, stopping to rest and watching, this neighborhood is generally used as a transition area. According to the observations made, there is no spatial indication of belonging to the area and a sense of ownership. The fact that the area is in a state of constant neglect, heaps of garbage are thrown in front of the doors, there are no users demanding that the broken lighting appliances be repaired, insensitivity is rampant, and there is no reaction to the graffiti painted on the walls are indicators that this area is not an area owned by many. For, the sense of belonging and ownership leads an environment to be clean, and people to be sensitive it.

The variety of functions and the level of mixed use are very limited in this neighborhood. There is no function in the area other than housing and partially commercial functions. For this reason, it is seen that it is a rather

isolated place in the city center, and it has become an area where individuals coming downtown meet their parking needs. This situation manifests itself in the occupation of the sidewalks in the study reserved for pedestrians by vehicles area. Thus, it becomes easier for "foreigners" to enter the area continuously. Besides its negative qualities, the neighborhood also possesses some favorable features. For example, it does not have very high-rise buildings. Due to the balance of road width-building height ratio, there are no dark areas during the daytime. The presence of a police station and patrol teams in the neighborhood are also positive features.

The factors mentioned above are factors that should be considered as a tool in combating urban crimes, from upper scale planning decisions to urban design scale. It is one of the issues to be avoided that the majority of the neighborhood is reserved for residential areas, that is, zoning with a single function. Naturally, non-spatial problems should not be ignored, either regarding crime. Making the urban space the priority of the user profile living there, embracing the public space, creating a feeling of belonging, having considerations like aesthetics etc. may take a long process. However, it seems that some of the current problems of the neighborhood can be solved in the short term in terms of urban design. The suggestions for solution proposed within the scope of the study are actually of the type that can be solved with minor physical interventions. However, it is clear that the issue cannot be solved completely on a spatial scale, that it can be solved only to a certain extent through urban design, and that the issue has dimensions that need to be considered in the long term in social and economic contexts. Improving environmental factors will reduce the potential for crime in the space and the fear of crime felt in the space (Van Den Berg et al., 2006), but it will be insufficient to deal with problems alone. Therefore, it is necessary to act with a holistic approach in the fight against urban deterioration. It is thought that minor changes to be made with the correct use of the design factors discussed in the Sahibata Neighborhood can create a synergy and an effect in the neighborhood and allow people to feel belonging to the space even more in the new environment. This will, in turn, affect the entire city life and contribute to the creation of new, more livable urban spaces.

In conclusion, while Sahibata Neighborhood was one of the favorite neighborhoods in the city of Konya in the past with its well-planned urban design and strong neighborhood relations, it has started to show signs of gradually becoming a decaying area today with the aging of the physical elements and infrastructure. If the design interventions discussed within the scope of the study can be implemented in a timely manner, and if the area can be handled by taking just an improvement decision without declaring it as an “urban transformation” area, this neighborhood will be a much more successful neighborhood in terms of sustainability and livability. As mentioned above, preventing crime and the perception of crime in an urban space will not be possible only with the correct use of the design features of the physical space. It is an undeniable fact that the subject has political, sociological, and psychological dimensions such as unemployment, poverty, class discrimination, cultural differences, political factors, apart from physical space design. If future studies add these dimensions to spatial evaluations, more holistic results can be achieved. In addition, in this study, there were limitations in taking data due to some security measurements. Thus, the subject was examined with headman interviews, user perception and visual observations. It is thought that this study is a positive step for the future, especially for the Sahibata neighborhood and we believe that in future studies, clearer analyzes can be made with the active participation of security units.

Authors' Contributions

The authors contributed equally to the study.

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Competing Interests

There is no potential conflict of interest.

Ethics Committee Declaration

This study does not require ethics committee approval.

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Figure References

Figure 1a: Google Earth View. https://earth.google.com/web/ (01.05.2019).

Figure 1b: Anonymous. (2019). *Konya imar planı raporu.* Konya.

Figure 2-10: Faizy, M. (2019). *A research on crime prevention through urban design; The case of Sahibata neighbourhood (Konya)* [Master Thesis, Konya Technical University, Graduate School of Natural and Applied Sciences, Konya].

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Research Article

Kentsel yalıtılmışlık üzerine anlam arayışları

Quest for meaning upon urban isolation

Asst. Prof. Dr. Bengi Yurtsever[1*]

[1]Muğla Sıtkı Koçman University, Faculty of Architecture, Department of Architecture, Muğla, Turkey.
bengiyurtsever@mu.edu.tr

*Corresponding Author

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Özet
Kentlerin canlılığının, içinde bulunan birey ve onun eylemlerinden kazanıldığı düşünüldüğünde söz konusu "canlı" olma durumuna ilişkin anlamın dönüşmekte olduğunu söylemek mümkündür. Bu anlam dönüşümünün başlangıcı yeni değildir. Ancak günümüzde eriştiği konum itibari ile bir kırılma süreci yaşanmaktadır. Kırılma; içe dönük, kendi hâlinde, duyulmayan hatta gündelik hayatın aktifliği nedeniyle kimi zaman duyulamayan bir biçimde gerçekleşebilmektedir. Her anlamda abartılmış ve gerçek dışı bir ölçek içerisinde yer edinmeye çalışan birey, kimi zaman kendini kentten yalıtarak özgür alanını oluşturmak istemekte; kimi zaman ise bu aşkın ölçeğe karşı, yine benzer özgürlük arayışı içinde, kendini ifade etmeye çalışmaktadır. Ölçekler arası iletişim kaybı ile bireysel, mekânsal, kültürel ve toplumsal bağlamda karşılaşılabilmektedir. Kent-birey döngüsünde yaşanan karşılıklı iletişimsizlik durumu, kent içinin boş kütleler bütünü olmasına neden olabilmekte; kentin canlılığı da bu anlamda kendisini sorgulatabilmektedir. Bu döngüde birey de kentin canlı ya da cansız olma durumundan etkilenmektedir. Çalışma kapsamında bu ana yaklaşım doğrultusunda bir eleştirel okuma, durum çalışması deseni çerçevesinde hazırlanmıştır. İletişimsizliğin özündeki "yalıtmak" ve bununla ilişkili olarak "yalıtılmak" eylemlerini çözümleyebilmenin, kenti, mekânı, bireyi anlamlandırmada zorunlu bir gereksinime dönüştüğü düşünülmektedir. Araştırma bu eylemlerin kamusal mekândaki yansımaları üzerinden geliştirilerek sınırlandırılmıştır. Yeni anlamların oluşumuna yönelik potansiyel durumlar, bu temelde kent üzerinden tartışılmıştır. Bu bütüncül durum içerisinde mekân üretimine yönelik olarak oluşan kendine özgü dilin, psikolojiden sosyolojiye birçok disiplinde tartışılabileceği düşünülmektedir.
Anahtar Kelimeler: Anlam, Yalıtılmışlık, Kamusal Mekân, Aidiyet, Kentleşme.

Abstract
Considering that the individuals and their actions account for the vitality of cities, it is possible to argue that the meaning of being "alive" is transforming. The beginning of this transformation of meaning is not new. However, there is a breaking process in view of the position it has reached. The breaking can occur in an introverted, and sometimes inaudible way due to the activeness of daily life. Trying to take a place in an exaggerated and unrealistic scale in every sense, the individual wants sometimes to isolate him/herself from the city and create his/her free space; sometimes he/she tries to express him/herself against this transcendent scale, again in search of freedom. This kind of an inter-scale communication loss can be encountered within individual, spatial, cultural and also social contexts. The mutual lack of communication within the city-individual cycle is able to transform the interior of the city to become a whole of empty masses. So, the vitality of the city should also be questioned in this sense. In this cycle, the individual is also affected by whether the city is alive or not-alive. Within the scope of the study, a critical reading has been prepared within the framework of a case study pattern in line with this main approach. It is thought that being able to analyze the actions of "isolating" and "being isolated" in the essence of non-communication has turned into a mandatory requirement in making sense of the city, space and individual. The research has been limited by developing the reflections of these actions occurred in the public spaces. Potential situations for the formation of new meanings are discussed over the city on this basis. In this holistic situation, it is thought that the unique language formed for the production of space can be discussed in many disciplines from psychology to sociology.
Keywords: Meaning, Isolation, Public Space, Belonging, Urbanization.

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GİRİŞ

Mimarlığa ilişkin tanımlamalar geçmişten günümüze incelendiğinde, mimari üretimin her detayının gündelik yaşam ile bütünleştirilmeye çalışıldığı gözlemlenmektedir. Hegel'in "mimarlık ana sanattır", Frank Lloyd Wright'ın "mimarlık biçim hâline gelmiş yaşamdır" ve Jacques Derrida'nın "mimarlık ürünü bir iletişim nesnesi olup iletişim işlevi taşır. Mimarlık bir anlatım biçimidir" olarak vurguladığı mimarlık tanımlamaları, farklı disiplinlerde de yansıma bulan bir temel görüş oluşturmaktadır (akt. Hasol, 2019: 19). Görüldüğü üzere ölçeği fark etmeksizin bir mimarlık ürünü, bireyin iletişimde olduğu her alana yayılmış bir etkileşim çeperini de beraberinde olgunlaştırmaktadır. Etkileşime "yer" bağlamında dâhil olan kentsel ölçekteki her tür değişim ve dönüşüm yaşantıya; o da bireye yansımaktadır. Değişimin hızı bu etkileşim dilinin farkında olunmayan dinamik bir yapıda olmasını sağlamaktadır.

Dönemsel gereksinimler doğrultusunda mimarlığın tanımlanma ekseni muğlaklaşmış, mimarlık disiplinlerarası birçok alanda yorumlanabilir olmuştur. Söz konusu "yaşam ile iç içe olma" durumu, bu disiplinlerarası etkileşimi daha yoğun bir şekilde göz önünde bulundurmayı beraberinde getirmektedir. Yaşamın içerisinde yer edinip kendini temsil edebilmek, bir paylaşım ve iletişimi gerekli kılmaktadır. Varlıkbilim alanındaki çalışmalar ile birlikte de irdelendiğinde; mimarlık, özünde bir düzen biçiminden daha çok bir iletişim biçimi olarak tanımlanmaktadır (Güney ve Yürekli, 2004: 32). Bağlamı içerisinde farklı alternatifler ile gerçekleştirilebilecek bir paylaşım ortamı, bu iletişim dilinin zenginleşmesine katkı koyabilecektir. Ancak güncel "insan" ölçeği; paylaşmanın, iletişimin ve tartışmanın potansiyelini gündelik yaşama, kente ve kent mekânlarına yansıtabilmekte zorlanmaktadır. Bireye yüklenen tanımlar ve rutinler onu öz ölçeğinden uzaklaştırarak, alışkın olmadığı bir alana sürüklemektedir. Eş zamanlı yanıtlar alınabilmesinin önüne geçen bu ölçek problemi, iletişimsizlikle beraber buna bağlı olarak gelişen yeni kent dilini de beraberinde getirmektedir.

Atilla Yücel'e (1999) göre mekân, mimarlık, şehir ve yapılar kendilerinin ötesinde toplum, iktidar, kullanım, zevk, ekonomi, sınıfsal ilişkiler, soyut kavramlar, semboller gibi birçok şeyi temsil etmektedir. Buradaki öz, aslında temsil etme eylemi olarak nitelendirilebilir. Mimarlık zaten düşünceleri temsil etme eylemini içinde barındırırken, kent de bu temsiliyeti çok yönlü olarak tasarlanan-tasarlayan-tasarım üçgeninde ve bunların döngüsünde sürdürmektedir. Bu durum Barthes'in (2016) Göstergebilimsel Serüven'de sözünü ettiği gibi gösterilen-gösteren-gösterge döngüsüne de gönderme yapabilir. De Saussure (1998) ise dili dizge bir göstergeler sistemi olarak tanımlamaktadır. Mimarlığın da bir temsil biçimi olarak yorumlandığı noktada kentler gösterge olarak ortaya çıkmaktadır. Dil, bu temsil biçimi içerisinde kendine bir yer edinmektedir. Tasarım sürecinde hepsi birbirinden etkilendiği gibi, kendi etraflarındaki çeper de bu durumdan çok yönlü olarak etkilenmektedir. Kurulan anlam, bağlam ve tasarım örüntüsünde kullanılan dile ek olarak bunun dönüşümü ile birlikte kent-birey ve kent-toplum ilişkisini yorumlayabilmek mümkündür.

Potansiyel arayışının yanında karşılaşmaların niteliğinin ve bağlamının tartışmalı olduğu durumlarda, kent kendine yönelik eleştiri kapısını kapatmakta; müdahale olanağını sunmamaktadır. Bu durum mesleğin kendi misyonundan, eğitim ve uygulama ortamına kadar tek yönlü bir "kabullenilmişlik" düzeni oluşturmaktadır. Kabulleniş hâli, sorgulamayı göz ardı ederek mimarlığın, yaşantının, kentin tek yönlü bir yaklaşım içerisinde kendini gerçekleştirmesine ortam hazırlamaktadır. Castoriadis'in (akt. Bauman, 2005: 72) de belirttiği üzere içinde yaşanılan toplumda hatalı olan durum, bu ortamın sorgulanmasının bırakılmış olmasıdır. Gündelik yaşama ilişkin göstergeleri bu bağlamda daha farklı bir gözden analiz etmeye çalışmak, söz konusu düzende alternatif olarak nasıl bir alan oluşturulabileceğine yönelik bir dilin ortaya çıkmasını sağlayabilecektir.

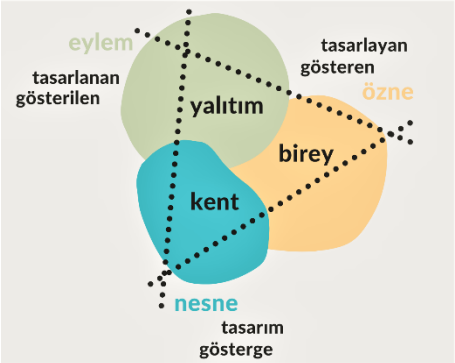
ÇALIŞMAYA YAKLAŞIM

Çalışma kapsamında kabullenilmişlik hâli ile gelen bir yalıtılmışlık üzerine kurgulanan ve buna özgü kendi dilini oluşturan bir kent anlayışı üzerine eleştirel okuma yapılmıştır. Durum çalışması nitel araştırma deseni ekseninde ele alınan çalışmanın sonunda tartışılan "yalıtılmış" olma hâli, çeşitli kavramlar ve temalar ile potansiyel durumu üzerinden açıklanmıştır.

Durum çalışması, durumların ve buna bağlı temaların tanımlandığı, birbirleri ile ilişkilendirildiği bir araştırma biçimi olarak tanımlanabilir. Merriam (2013) durum çalışmasını, sınırlı bir örüntünün, kendi içerisinde

derinlemesine betimlenmesi ve irdelenmesi olarak tanımlamaktadır. Davey'e (2009) göre ise durum çalışması, bir neden-sonuç-süreç ilişkisinde olduğu gibi, durumun neden o şekilde gerçekleştiği, ne gibi durumları ortaya çıkardığı ve gelecekte ne gibi durumlara ortam hazırlayabileceğine yönelik bir araştırma biçimidir. Soruna ilişkin net yanıtlar bulmaktan öte, durumun çeşitli açılımlarının yapılması ve kavramlar aracılığı ile belli bir farkındalık oluşturmak amaçlanmaktadır.

Barthes'in (2016) göstergebilim üzerine yapmış olduğu üç ayaklı döngüsünden çalışmanın omurgasını oluşturma aşamasında yararlanılmıştır. Kendi içerisinde eylem-özne-nesne olarak gruplandırılabilecek döngü, çalışma kapsamında buna dâhil edilebilecek yalıtım-birey-kent döngüsü ile iletişimsizlik ortamının tanımlanmasında bir altlık olarak kullanılmıştır (Görsel 1).



Görsel 1. Çalışmanın omurgası

Tüm bu ilişkiler ağı, bireyi kentte potansiyellerin aranışı ya da kabulleniş arasında bir seçim yapmaya zorunlu bırakmaktadır. Buna bağlı olarak araştırmada üzerinde durulan ana temalar; birey, kent, kentsel mekân ve bu mekânda gündelik yaşamını sürdüren bireyin kurmaya çalıştığı dil olarak belirlenmiştir. İçerikte bu durum mekânsal bağlamda ele alınırken yalıtmak ve yalıtılmak eylemleri ön plana çıkmıştır. Çalışma kapsamında kent, kentli, birey, toplum, zıtlık, yalıtılma, yabancılaşma, anlam, iletişim, yer, aidiyet gibi kavramlar üzerinde durulurken; araştırma Sennett, Bauman, Arendt, Helle, Lefebvre, Harvey, Auge'nin görüşleri ekseninde kurgulanmıştır.

KENTE DÂHİL OLUŞ

Sosyal bilimciler kenti, kentlilerin karşılıklı etkileşimlerinden oluşan ve canlılığını bu şekilde sürdüren bir ilişkiler ağı olarak tanımlamaktadır (Helle, 1996: 71). Kent canlı bir ağ olarak tanımlanırken, yalnızlaşarak özünde terk edilmiş bir konuma taşındığı gözlemlenmektedir. Bunun topluma yansıması noktasında birçok sorun ortaya çıkabilmektedir. Gündelik yaşamın aşkın bir kent ölçeğinde geçiyor olması bireyi psikolojik açıdan etkilemektedir. Bu ilişkiler ağını oldukça geniş bir çapta düşünmek mümkündür. Dokunduğu her noktada farklı bir açık bulup sızabilen bir nitelikte olduğu söylenebilir. Bu sızmalar kimi durumda bir potansiyel sunabilirken kimi durumda da sahte bir jargon ile bireyi kendine çekerek yanıltabilmektedir.

Harvey'e (2013) göre şehir müşterek bir yaşantı üretilen mekândır. "Yaşantı" sözcüğü bir süreci anlatmakla beraber, bunun ortak bir aradalıklar üzerine bir zaman dilimiyle somutlaşan bir konumda bulunma anı kent mekânlarını oluşturmaktadır. Ancak kullanıcılar bu mekânlarda bulunmaktan her zaman aynı şekilde memnuniyet duymayabilmekte; anlamlandırmakta zorlanabilmektedirler.

Sennett (akt. Bilgir, 2015: 268, 270) çalışmalarını kent, çalışma sosyolojisi ve Modernlik eleştirisi etrafında şekillendirmiştir. Modernliğin yeni bir toplum yarattığı eşik dönemini de 18. yüzyıl sonu ve 19. yüzyıl başı olarak belirtmektedir. Aynı dönemler, mimarlık açısından da yeni malzemelerin, tekniklerin, arayışların ve yeni kent mekânlarına gereksinimin arttığı bir kırılma noktası düşünüldüğünde de geçerlidir. Makine çağı olarak görülen dönemden başlayarak süslemenin suç olarak görüldüğü ve birçok ölçekte tamamen homojen bir dil elde edilmeye çalışılan bir mimarlık üretimi bu kırılma sürecinde kendini göstermektedir. Ancak Bauman'ın (2005: 113) belirtmiş olduğu gibi günümüz kentleri homojen bir uzam değil; nitelik olarak farklı alanların bir arada olduğu bir yerdir.

Özellikle 1950-60'lardan sonra gelen kusursuz kalıcılığa, homojenliğe ve saflığa olan tepkisel durum, yerinde bir sorun tespiti olarak belirse de bir tepki niteliğindeki alternatiflerinin gelişimi, bir noktadan sonra anlam sorununu beraberinde getirmiştir. Saf evrensel olanın aranışı, yerini "yerin ruhu"nu aramaya bırakmıştır. Bu yoğun keşif süreci bir süre sonra kendi muğlak alanını oluşturmuştur. Türdeş olma durumunun getirdiği durağanlık ve katı bir şekilde çöküp kalma hâli, tam bir karşıtlık ifadesiyle yerini geçiciliğe bırakmıştır. Gelip geçicilik yerin, durumun, anın gerekliliklerine göre şekillenmeyi öngörse de bireyin buna katılımı gündelik yaşam içerisinde eş hızda gerçekleşemeyebilmektedir. Bu noktada bireyin çözümlemesi gereken bir aidiyet problemi ortaya çıkmaktadır.

Günümüzde mekânların kullanımının gelip-geçicilik üzerine kurulduğu görülmektedir. İsteksizlik, gönülsüzlük tüm karmaşa ve tereddütü ile gerek eylemlerde gerek kent mekânlarında kendini göstermektedir. Buradaki sıkıntılı durumlar, müşterek olma hâlinin bir zorunluluktan kaynaklanıyor olmasıdır. Dolayısıyla doğal bir şekilde, kendiliğinden denilebilecek bir akışta bu yaşantı gerçekleşememektedir. Birbiri ile etkileşim içerisinde olan bu akışta, müşterek olma hâlinden tamamıyla uzaklaşma gereksinimi, kentin bir parçası olan yapılı çevreye, bireye ve buna bağlı üretimlere yansımaktadır.

Kent, kırdan ve sanayiden gelen unsurları bir araya getirmektedir. Bir anlamda rutinde belki de birbiri ile çok ilişkisi olamayacak eylemler kentte toplanmaktadır. Kent, türdeşlikten uzak olarak zıtlıklarla kendini canlı tutmaktadır. Ancak günümüzde "yaşanmış olan", kendisini bir sonraki aşamalara taşıyamamaktadır. Kente ilişkin bileşenler tanımlanmaya başlandığı an pratikle söylem arasında uçurumlar olduğu dikkat çekmektedir. Söylem, neredeyse hiç yaşanmamışçasına bir ortam aktarmaktadır. Deneyimin derinliğinden uzaktır ve kendini aktarmaktan çekinir konumdadır. Dolayısıyla gerçeklikle tanımı arasında kopukluklar bulunmaktadır. Kente ilişkin pratikler herhangi bir kavramdan öte doğrudan bireyin deneyimi üzerine kurulmaktadır. Ancak Lefebvre'nin (2013: 51-54) de belirttiği gibi bu pratik deneyimler de tüm sembollerin ve anlamların bir şekilde satılmak ve tüketilmek üzere üretildiğini göstermektedir.

Alım-satım ve tüketime dayalı yaşam biçiminin görünürlüğü sadece maddi ortam ile sınırlı kalmamaktadır. Tüketilmişlik hissi bireysel anlamda günümüzün en büyük psikolojik sorunlarından biridir. Bauman'a (2005: 61, 111, 114) göre çağdaş kentlerde yaşamını sürdüren birçok kişi zorunlu bir bireyselleşmeye doğru sürüklenmektedir. Uygulanabilir bir "kaçınma psikolojisi" olmaksızın kendi başlarına bir düzen kurmak durumunda kalmaktadırlar. Günümüz modern toplumu, sözde bir kamusal mekân etrafında bir "toplum" oluşturma çabasında olsa da bir o kadar da tekilleşmeye de ortam hazırlamaktadır. Postmodern belirsizliğin getirdiği muğlak durum, insanların kaygılı olmasına neden olmaktadır. Kişinin geleceği ile ilgili ne istediğini ne beklediğini bilemez duruma gelmesi de kentte yaşamanın bir sonucu hâline gelmiştir. Sennett'e (2013: 19, 32) göre de günümüzde hiçbir kent uygarlığının yaşamadığı bir hareket kolaylığı içinde bulunulmasına rağmen bu hareket, bireyde kaygı yaratan bir unsur hâline gelmiştir. Kamusal bir alanda özgürce varlığını sürdürebilme hakkı elinden alınan birey kaygılı bir karakter ortaya koymaktadır. Ek olarak gündelik yaşamın koşullarının, bireyi bir "kişilik arayışı" konumuna da taşıdığını belirtmektedir. Olan bitene yetişememek, anı yakalayamamak, gündemden, güncelden kopmak gibi durumların hepsi bireysel anlamda tatminsiz bir yaşam sürdürülmesine neden olmaktadır. Kentsel mekânın bu yöndeki anlatısı; görsel algının ön planda oluşuyla biçimlenen anıtsallık, temsil, kimlik, kamusallık gibi mekâna ilişkin tanımlara ek olarak metinsel/dilsel mesajlarla da anlam ve bağlamını güncellemektedir (Arslan ve Uludağ, 2020). Kent bu durumda kendi içinde fiziksel duvarlarını örerken, birey de bundan etkilenmekte ve kendini iletişim kurmak yönünde kapatmaktadır. Kentli birey artık hem tüketilmişlik hem de yalnızlık içerisinde gündelik hayatına devam etmektedir. Günümüz kentlerinin dili de bu şekilde özetlenebilmektedir: Yalıtılmışlık.

Yalıtımın kelime anlamı, bir nesneyi ya da durumu, başka nesne ya da duruma karşı korumak, ondan ayırmak olarak tanımlanabilmektedir. Sennett'e (2013: 30) göre "yalıtım" üç anlamda kullanılabilir. Birincisi, çevre ve statü itibarı ile kurulu çevreden ilişkilerin kesilmesi; ikincisi, kişinin kendi özel alanını oluşturdukça çevresinin bir anlam olabileceğini düşünmemesi ve üçüncü olarak da kamusal alanda kişinin başkaları karşısındaki görünürlüğünden kaynaklanan bir iletişim kopukluğudur. Bunların hepsi yalıtım ve yalıtılma döngüsünün birer aşaması olarak da yorumlanabilir.

Yalıtma ya da yalıtılma teması ilk bakışta yalnızca metropol ya da büyük şehirler üzerinden gerçekleşen bir eylem gibi algılansa da aslında her tür yerleşke ölçeğinde kendini gösterebilmektedir. Kendi içerisinde etki

alanına bağlı olarak görünürlüğü ve bağlantılı olduğu durumlar farklılaşsa da söz konusu yalıtma, birçok ölçekte bir endişe hâline gelmiştir. Çalışmada bu ölçek konusu üzerinde yoğunlaşılmamış, doğrudan gerçekleşen eyleme odaklanılmıştır. Eyleme yönelik bileşenler irdelendiğinde potansiyel durumların her ölçekte kendine yer edinebileceği düşünülmektedir. Bu bağlamda "kent içinde birey" ve bu bireyin eylemlerini etkileyen ve ondan etkilenen "kent içinde mekân" özelinde olguya yönelik yorumlamalar yapılmıştır.

Kent İçinde Birey: Kentli İnsan

Birey kentin canlı kalmasını sağlayan unsurlardan biri olarak görülebilir. Oysaki ondan kaçmak gibi bir psikoloji içerisinde bulunmaktadır. Birey kentten ve kentliden kendini yalıtmak isterken; kent de bireyden, onun ölçeğinden giderek uzaklaşmaktadır. Bu durum büyük boyutlarda bir iletişimsizliğe doğru sürüklenirken anlam da dönüşmektedir.

İletişimsizliğin dönüşümü doğal olanın ne olduğuna yönelik anlamın değişimi ile başlamaktadır. Günümüz kentlerinde doğadan uzaklaşılmakta, onun yerine doğanın sembolleri artmaktadır. Bu semboller onu imgeleyen, o anlama gelen, onu çağrıştıran ancak onunla doğal bir yol ile iletişim kuramayan bir durumdadır. Bu sembollere bile yeri geldiğinde gereksinim duyan birey, onlarsız yapamayacağının düşüncesinde, kent içi tüm karşılaşmalarına yeni anlamlar yeni değerler yüklemeye başlamaktadır. Bu süreçte geçmiş ise sadece plastik ve fiziksel anlamda bir kopyalama ile bu yeni değerler sistemine dâhil olabilmektedir. Dolayısıyla anlamı bu yeni çevre kullanıcıları tarafından duyumsanamaz, hissedilemez bir hâlde bulunmaktadır. Tüm bunlar da kentin kendi içinde ruhsuz bir ortam olmasına neden olabilmektedir. Kente ruhunu katabilecek olan birey ve ardından toplum, iletişim konusunda kayıplar yaşadıkça döngüye dâhil olan kentler de bu duyarsızlığı yansıtabilmektedir (Helle, 1996: 78; Lefebvre, 2013: 30).

Özne-nesne döngüsü gibi düşünülebilecek olan bu durum, kimi zaman kullanıcıları kimi zaman kenti özne yapabilmektedir. Etki bu nedenle her bir aşamada farklılaşarak yeni sürecine olmaktadır. Duyarsızlaşan kentli insanın özünde, kendini koruma içgüdüsü bulunmaktadır. Bu güdü bir taraftan olaylara dâhil olurken, bir taraftan sessizce bir duvar örmeyi de beraberinde getirmektedir. Bu duvar ile kimi noktada soyut kimi noktada da somut olarak karşılaşılmaktadır.

Normal şartlar altında yapısal olarak düzenlenmiş olan bir mekân, yalıtılmışlık ve yalnızlıktan öte, bireye sosyal ilişkiler kurabilme, bunları geliştirebilme olanağı sunmalıdır (Helle, 1996: 73). Ancak bu durum günümüz kentlerinde son derece tanımlı, doğal olmayan bir şekilde sınırlı olarak gerçekleşebilmektedir. Kendiliğinden süregidebilecek bir kent akışı, bu şekilde tamamen kontrol altında tutulmaya çalışılmaktadır. Bunun dışına çıkanlar bir şekilde ya fiziksel ya psikolojik ya da sosyolojik olarak dışlanarak içinde bulundukları topluma ve sonra da kendilerine karşı yabancılaşmaktadır.

Yabancılaşma sürecinde bireyin sınırlarını birtakım gereksinimler oluşturmaktadır. Üretilen bu sahte gereksinimler bireyi onlara muhtaç bırakmaktadır. Öz, doğal olana kaçış, doğal olanı arayış peşindedir. Ancak kentli birey bir statü göstergesi olarak kentin ona sunduğu olanaklardan uzak kalmak istememekte; kentli olmanın birçok göstergesi olduğunu düşünmektedir. Bu göstergelere sahip olmadan kent içinde barınamayacağını düşünerek, dışlanma endişesi taşımaktadır. Kimsenin birbirini tanımadığı, birbirlerine karşı dışlanma duygusunun yaşandığı bu kent ortamında her türlü eleştiri serbesttir. Eleştiri, sorgulayabilme anlamında bir potansiyel taşırken; gündelik hayata yansıması, geldiği temelsiz durumdan beslenmekte ve yüzeysel bir şekilde, yapıcı/yapılandırmacı olmayan bir eylem biçiminde kendine yer edinmektedir. Buna bağlı olarak kent, bireyde kırıcı bir dil oluşturmaktadır. Kentli insan bu kırıcı dili bir savunma aracı olarak görmektedir. Başkalarını elemenin en kolay ve etkili yolu bireyin kendince geliştirdiği bu yeni dil olarak görülmektedir. Bu dil kimi zaman gerçek bir sözcükler öbeği, kimi zaman ise üstü kapalı bir şeyin göstergesi, yansıması olabilmektedir. Kentli insan ise kimi zaman sözsüz olarak bir şeyler yapmaya çalışmaktadır. Çoğunlukla aidiyet duygusundan uzaklaştığı bu sözde doğal ortamlardan kendini yalıtmaya başlamaktadır. Umursamama evresi de bir nevi kente yansıyan bir dil oluşturmaktadır.

Kentin zorlu koşullarında barınabilmek, gündelik rutinleri eksiksizce -herkes gibi- yapabilmek kolay değildir. Tüm bu karmaşada barınabilmek kimi zaman adeta bir yaşam, bir hayatta kalma savaşına dönüşmektedir. Dolayısıyla normalde doğal olan bir yansıma, kendini kent içinde, adil olmayan bir ortamda, bir güncel yaşam savaşında bulunmaktadır. Kazanabilmek için başkalarını elemek gerekmektedir. Yoksa kent şiştikçe şişmekte,

olanaklar da kaybolmaktadır. Bu kadar birey ne toplum olabilmekte; ne birbiri ile anlaşabilmekte, ne de gerçek anlamda bir şey paylaşabilmektedir. Sadece kuru topluluk denilen şeye dönüşmektedir. Bu da yapay bir kent-birey-toplum döngüsünün ürünüdür.

Sennett (akt. Bilgir, 2015: 271) kamusal mekânın Modernizm etkisi ile anlamının iyice boşaldığını ve kentli bireyin birer 'izleyici' karaktere dönüştüğünü belirtmektedir. Bu "izleyici" kişilikler hem kamusal alandan çekilmekte hem de bir şekilde bu alanı doldurmaktadır. Sennett'in vurguladığı şey bu yeni dönemde daha çok kişi ile kurulan az yoğun ilişkiler ve iletişimin kent mekânlarını doldurmakta olduğudur. Söz konusu muğlak ortam Arendt'in (2008: 77) belirttiği gibi arada olmasından kaynaklı olarak insanları hem birbirine bağlamakta hem de ayırmaktadır.

Bu durum kent mekânlarında tam anlamıyla bir vahşi doğa ortamı, bir kamuflaj metaforu ile kendini yansıtmaktadır. Kamuflaj metaforunda sadece bir yüzey söz konusudur. Bu yüzey, içeride ne olduğunun önemi olmadan, bulunduğu yer ile uyum sağlamakta; ama dönemi çok da yakalayamamaktadır. Zamanla kendi dâhil olduğu tüketim süreci içerisinde hantal kalmaktadır. Aktif bir dönüşümden, yapılaşmadan, güne uygun bir yeni kent düzeninden söz etmek mümkün değildir. Bugünün gözü ile yarın canlandırılmaya çalışılmakta; ancak ara durumlar göz ardı edilmektedir. Süreç öngörüsü bile kendi içinde tutarsızlıklar taşımaktadır. Dolayısıyla kentli insanın içine dâhil olduğu ortak alan kullanımı ve paylaşımı da kenti yaşanılabilir kılmayacak; bireyi yabancılaşma durumundan kurtaramayacak bir niteliktedir.

Kent İçinde Mekân: Karşılıklı Yalıtılmışlık

Kentlerin doğallıktan tamamen uzak bir şekilde yapılandırılmasıyla başlayan yalıtılmışlık durumu kente dair farklı bir duygu oluşturmaktadır. Bu duygu kentin karmaşa ve kaostan beslenmesi gereken bir yer oluşu ve insanın gündelik yaşamı içerisinde kendini bundan koruması gerekliliği üzerinden şekillenmektedir. Doğal olanın kendisini kaosta araması normal olabilmekle birlikte, potansiyel durum kaçarak değil dâhil olunarak ortaya çıkabilecektir. Ancak yeni dil kaçış alanlarında kendine anlam bulabilmektedir. Tuhaf bir şekilde özünde böyle olmaması gereken yaşam, bir taraftan yapay bir taraftan da doğal olarak "kent" adı altında belli bir süre sonra bu karmaşaya bürünmektedir. Daha doğrusu kendi yapay ortamında sözde doğal bir gündem yaratarak varlığını sürdürmektedir.

Bu yapaylık içerisinde var olan mekânların aslında "fiziken var" oldukları söylenebilir. Belli bir hacim kapladıkları gerçek olmakla birlikte, bu mekânlar üzerine, bir taraftan "tam anlamıyla toplum içinde bir etkileşim yakalanabiliyor mu, anlam üretebiliyor mu" gibi sorular da düşünülmelidir. Lefebvre'nin (2013) değindiği gibi geçmişte az olan şeyler artık boldur; ancak bol olan birçok şey de kaybolmaya başlamıştır. Bu kayboluş özünde bir anlam dönüşümü olarak yorumlanabilir. Dönüşüm içi boşaltılmış kavramlardan oluşan bir yığın olarak kenti, toplumu, bireyi buna dâhil etmektedir. Yine benzer döngüde her biri giderek birbirini anlamayan, birbirinden beslenemeyen bir noktaya gelinmektedir. Anlam için önemli olan dilin değişimi, sadece iki birey arasındaki söz üzerinden bir iletişimsizliğe değil, birey-kent arasındaki iletişimsizliğe, sonrasında toplum-kent, birey-toplum gibi çeşitli kombinasyonlarla çoğalabilen bir iletişimsizlik örüntüsüne dönüşmektedir.

İletişimsizlik örüntüsüne bağlı olarak, "yer" olarak tanımlanan, zaman ve mekân içine yerleşmiş, kültür kavramıyla da bütünleşen bir durumdan uzaklaşarak; varlığı yokluğu sorgulanan "yok-yer" alanları kentlerde çoğalmaktadır (Auge, 2016: 48). Bir yerin "yok-yer" oluşundan öte olarak zamanla o yok yer bile daha gerçekçi bir noktaya erişirken, onu kullanan birey ve toplum kendi anlamını kaybolurcasına dönüştürmektedir. Bu kentsel yığılmalar, anlam arayışındaki toplumun kimi zaman zorunlu olarak kullanmak durumunda kaldıkları, gönüllerince isteyip istemediklerinden emin olamadıkları; ama bir şekilde dâhil oldukları "kamusal mekân" jargonu altında toplanan ortamlardır.

Kentlerde hareketin bir karşılığı olarak kamusal mekânlar, yatay-dikey bütünlük arasındaki dengeyi sağlayıcı unsur olarak değerlendirilebilir (Arendt, 2008: 29). Gürallar'a (2009) göre de erişilebilirlik, kamusal mekânın kentli birey ile kurmaya çalıştığı dilin merkezini oluşturmaktadır. Dolayısıyla herkese açık olma hâli; erişilebilir, ulaşılabilir olma hâli kamusal mekânın önemli bileşenlerindendir.

Ortak mekânlarda da yalıtılmışlık etkisi kendini göstermektedir. Sennett'e (akt. Bilgir, 2015: 271) göre kamusallık, insanların kalabalık içerisinde yalnızlaşmasına ve kabullenilmişlikle birlikte kayıtsızlığa neden

olan bir ortam hâline gelmiştir. Tüm bu üretilen sahte gerçeklikler içinde oluşan sınıf ayrımının da gerek kent göstergelerinde gerek kentsel bir dil oluşumunda önemli bir paya sahip olduğu düşünülmektedir. Kentlerin sözde ortak mekânları herkesin kullanımına açık gibi görünse de özünde işleyiş bu şekilde gerçekleşmemektedir. Ortak mekânlar da bir anlamda bu sınıfsal farklardan etkilenmektedir. Buralara gitmek, buralarda bulunmak hiçbir birey için yasak değildir; ancak bu mekânlar da kendini insandan yalıtmak için çeşitli önlemlere başvurmaktadır. Bir taraftan herkesin kullanması istenmekte; ama bir taraftan da tam anlamıyla kullanım karşılığını bireye sunmamaktadır. Buna ek olarak bu mekânlara gidilse bile dışlanma, ayrıştırılma gibi durumlar da gözlemlenebilmektedir. Başka bir tartışma konusuna dâhil olabilecek olan bu ayrıştırmaların çeşitli versiyonları mevcuttur.

Kentin kendine oluşturduğu bu yeni dil aslında çok da yeni sayılmaz. Burada anlamı değiştikçe yenilenen bir durumdan bahsedilebilir. Adorno'nun (2012) sözünü ettiğini Sahicilik Jargonu aslında bu duruma gönderme yapabilir. Bu jargon, gerçek olmayan şeylerin adeta gerçekmiş gibi, onların birer yansımasıymış gibi olmasına izin vermektedir. Adorno bu dili "üst kültüre ait olmayan bir alt dil" olarak tanımlamaktadır. Bu dil özünde ne gerçek ne de doğru olarak görülmektedir; ancak kandırma aracılığıyla bir ortam oluşturmaktadır. Bir anlamda kendi gerçekliğini üretmekte ve ona yönelik ortamı kurgulamaktadır. Bu sahte gerçeklik jargonunun etki alanına dâhil olup sürüklenmek oldukça zordur. Bu durumun en önemli bileşenlerinden biri her şeyin olması gereken en iyi hâlinin burada gizli olduğu duygusudur. Dolayısıyla bu jargon çok yüksek bir ikna edicilik seviyesinden kentli insanı yakalamaktadır. Bunun için de kendine çeşitli yollar belirlemektedir. Öncelikle dipte olan, belki de hiç gereksinimi duyulmayacak olan, farkında olunmayan bir durum, bir ürün bulunmakta; ardından buna yönelik sahte bir gereksinim ortamı tasarlanmaktadır. Bunun için daha önceden var olan, aslında herhangi bir sorun oluşturmayan şeyler yavaş yavaş sorunlu hâle gelmekte ve buna yönelik söylemler yayılmaktadır. Öyle ki herhangi bir deneyim sahibi olmayan bir insan bile o konu hakkında olumsuz bir bilinçaltı ile bu duruma yaklaşabilmektedir. Bu etki ile bilinç açısından eskiyi yok etmeye yönelik ortam hazırlanmış olmaktadır. Sıra yeni gelecek olan, aslında hiç gereksinim duyulmayan yapay durumu süslemektedir. Bu noktada yeni kent dili de denilebilecek bir jargon ortaya çıkmaktadır. Daha önce belirtildiği gibi bu dil toplumu ikna etmek üzerine kurgulanmıştır. Kentli insanın bakış açısındaki neoliberal göz, kavramaktan, hesap etmekten uzak bir konumda bulunmaktadır. Kendisine sunulan bu oyuna da dâhil olmaya mecbur edilmektedir (Spencer, 2016: 272). Reklam kültürü ile üst seviyelerine ulaşan anlatım biçimi, eskiye ait her tür düşünce, nesne ya da yaşam biçimini kötüleyerek kendisine yer açmaktadır. Onu aşağıya çekerken; tüketilmesi gereken ürünü yukarıya çekmektedir. Öyle ki birey daha önce hiç gereksinim duymadığı o ürüne erişebilmek için çok fazla çaba sarf etmek zorunda kalmaktadır. Ulaşırken gidilen yollar da bu sahte gerçekliği bütüncül kılan diğer detaylar olarak sürece dâhil olmaktadır.

Kent de bireyin kendini kaybettiği gibi bu noktada giderek öz anlamını kaybetmektedir. Daha doğrusu çağrışım yaptığı ilk anlamını kaybettiği de söylenebilir. Sözü edilen bu yeni anlam sembolik, görüntüde, daha yüzeyde bir anlam gibi düşünülebilir. Gerçeklik olarak ise çok daha farklı bir yansıma yaratmaktadır. Bu yansıma gerçekleşebilmek için belli bir süreye gereksinim duymaktadır. Süre sadece zamansal, niceliksel bir durum değildir. İçinde belirli bir akışı, belirli bir deneyimi de barındırmaktadır. Bu noktada da yaşanan, biriken her şey bir noktadan sonra kendini içeride hapsedemez olmaktadır. Çatlaklardan, bulduğu ilk yarıktan, ilk açıktan sızıntılar vermeye başlamaktadır. Başlangıçta bu sızıntılar kentin zayıf olduğu, çözülemez, bozuk olduğu noktalar gibi düşünülebilir. Ancak bu çatlaklar konusunda da kent bir örtüdür. Çözüm için arka planını görebilmek, yorumlayabilmek ve arayışı orada gerçekleştirmek gerekmektedir. İçinde bulunulan sosyo-ekonomik düzen bu sızıntıları da 'süre' içinde gelişen adeta doğal bir durum olarak sunmaktadır. Bu sorunlar çözülürse tamamen huzurlu olunacağına inanılmaktadır. Oysaki bu da sözü edilen sürecin parçası olan bir aşamadır. Birey bir taraftan bu durumdan korkmakta ve kendini sığınabileceğini düşündüğü güvenlikli konutlara ya da ortak mekânlara doğru sürüklemektedir. Sürecin arka planı düşünülmeksizin, diğer kente dair mekânlara güvenilmemektedir. Düzene uymak bir kolaylık olarak görülmektedir. Dolayısıyla bu döngüde sorgulama eylemi de geçen süre ile birlikte kendini unutturmaktadır.

ANLAM ARAYIŞI

Sözü edildiği gibi tüm bu dönüşüm içinde kuşaklar, anlayışlar ve en önemlisi anlamlar ve yansımaları değişmektedir. Yeni anlamlar, yeni bir dil aracılığıyla kurulmaktadır. Hep bir beklenti içinde olmak; ancak bu beklentideyken de bir taraftan her şeyden, olabilecek en ufak bir ilintiden uzaklaşmak kentli insanın gündelik refleksi olarak yorumlanabilmektedir. Bu refleksin nedensiz ortaya çıktığı söylenemez. Süre zarfında çeşitli noktalarda kendisine çıkarımlar yapan birey, durumun yansımalarını gündelik yaşamı ile bu şekilde örtüştürebilmektedir. Bu durum kaçarak anlaşılma beklentisi ya da oldurmaya çalışmadan olmasını beklemek şeklinde de yorumlanabilir. Gerçek bir paylaşımda bulunmadan ortak mekânların, deneyimlerin anlamlanmasını beklemek de buna eklenebilir. Bunların hepsi son derece duyusal ve bireysel durumlar gibi görünse de bireyin toplumu, toplumun da bir kenti ve onun kültürünü oluşturduğu düşünüldüğünde, durumun çok daha kritik bir noktada olduğunun farkına varılabilir. 'Kentlileşmiş insan' diye Jurgen Helle'nin (1996) tanımladığı insan gibi, bu bir anda yapılmış bir şey değildir; tamamen geliştirilmiştir. Ancak ne yönde geliştirildiği konusu tartışmalıdır. Bu durum, bir anlamda yalıtılmışlığı her alanda üstünlük olarak gören bir toplum üretmenin bedeli olarak düşünülebilir. Her şey sahte jargonlar eşliğinde sunulurken, bunlara gerçekten gereksinim duyulmaktadır. Gerçekte ise o sahte jargon bir şeyin yine üstünü örtüyordur, ancak göstermek istemiyordur. Durum sadece o kapanan sorunun olduğu yerde kalması ile de kalmamaktadır. Bu noktada bireyi de yavaş yavaş dönüştürmektedir. Çok yönlü bir kısır döngü ve değişime neden olan bu karşılıklı yansımalar içinde bulunulan yeni normali, yeni kenti, yeni kentin anlamını ve dilini oluşturmaktadır.

Erdönmez ve Akı'ya (2005: 69) göre her kültürel uzantı, mekân kavramını ve buna yönelik anlayışı yakından etkilemektedir. İçinde anlamlı simgeler barındıran mimari dil, gücünü kültürden, toplumdan ve yaşantıdan almaktadır. Anlam oluşturma sürecinde kent kimi zaman eski bulunduğu noktadan çok büyük kopmalar yaşayabilmekte; adeta yeni bir sözcük hâline gelebilmektedir. Yeni gelen nesil tarafından da yeni anlamı ile algılanmaktadır. Eski nesil tarafından bu yeni durumu anlamak, kavramak, alışkanlıklardan kopabilmenin zor olduğu gibi oldukça zordur. Bu süreçte biraz daha zaman geçtikçe tamamen yeni bir dil üretilmektedir. Anlamı dönüşmeye başlayan kent içinde artık eski anlamlar maddi/manevi boşlukları dolduramaz hâle gelmektedir. Dolayısıyla birey tamamen kentten izole olmak yolunu seçmektedir. Aidiyet duygusundan yoksunluk başlamaktadır. Kent onu ittiği gibi, aynı zamanda gündelik yaşamına devam edebilmesi için bir taraftan da çekmektedir. Ancak en önemlisi sözü edildiği gibi sonunda birey de kentten kaçmaktadır. De Certeau'a (2009) göre aidiyet mekânın zamana karşı zaferidir. Gündelik yaşamı sürdürebilmek için gerekli olan taktiksel anlayış, mekânsız olduğu için, zamana bağımlıdır. Bu anlayış, kendi çıkarına kullanabileceği her şey için sürekli tetikte olmayı gerektirmektedir. Bu arada mekân ikinci plana düşmektedir.

İşlevlerin de bir şekilde soyutlanması ve bu soyutlama sürecinde geçmiş-şimdi arasında bir anlam ilişkisinin kurulamaması durumunda bireyin de bulunduğu konumda kendini oraya ait hissetmesi artık oldukça zordur. Kentlinin kendini bulunduğu yer ile özdeşleştirememesi çoğu zaman sembolik ilişkinin eksikliğinden kaynaklanan bir durum olarak tanımlanabilmektedir (Helle, 1996: 78). Kentin tüm kaosunu daha yaşanılabilir kılan bu aidiyet hissine ait semboller bireyi oraya bağlamakta ve tanıdık duygular içinde adeta eve dönmesini sağlamaktadır. Oysaki Auge'nin (2006) Descombes'in görüşü üzerinden aktardığına göre içinde bulunulan bu üstmodern dünyada insan her zaman kendi evindedir ve artık asla kendi evinde değildir. Bu ikilem içerisinde direnç gösterebilen birey çoğunlukla kendini olabildiğince yalıtılmış bir ortam aracılığıyla ifade edebilmektedir. Kendini ne toplum ne de yer olarak oraya ait hissetmez iken yapabileceği tek şey en azından yer olarak bu özerkliği kendi ölçeğinde bir şekilde kurabilmektir.

Bu durum da aslında sorunu ortadan kaldırmamaktadır. Kapitalizm, belirli bir an için kendi ortamını kolaylaştıran bir coğrafi çevre sunarken, bir süre sonra bu coğrafi çevrenin kendisi bir sorun oluşturmaya başlamaktadır (Işık, 1994: 19). Sorun olan şey zaten önceden görülebilir, kurgulanmış da bir durumdur. Kapitalist üretim biçimi içerisinde sorun bir noktadan alınmakta, başka bir noktaya taşınmaktadır (Harvey, 2013: 59). Sonraya atılan bu sorun eski noktasında çözümmüş gibi görünse bile gerçek anlamda bir çözüm olduğunu söylemek mümkün değildir. Atılmış olan sorun ile yeni yerinde geçen süre ile daha büyük bir sorunlar yumağı olarak karşılaşılmaktadır. Bu, içinde bulunulan düzenin adeta bir döngüsü olmuştur. Yaşam savaşı ve hayatta kalabilme endişesi bu döngü üzerinde şekillenmektedir. İşte bu büyüyen tüm sorunlar, artan mekân gereksinimine, göçlere, nüfus artışına ve belli kent merkezlerinde şişmelere neden olmaktadır. Kentler taşıyabileceği yükün üstünde yükler ile karşı karşıya kalmaktadır. Doğal bir yapılaşma biçiminden son derece

uzak olan bu durum, yapı-alt yapı olarak da çözüme ulaşabilmiş değildir. Dolayısıyla sorunun kendisi aslında bir bütün olan o kent yumağıdır. Bu yumak, kaçıldıkça içinde hapsolunan bir bataklık gibi düşünülebilir. Kapitalizm de tüm bu durumları kentteki sorunlara çözüm üretme jargonuyla ele almakta ve şehirleşmeye bu noktada gereksinim duyarak iyice yüklenmektedir (Harvey, 2013: 45).

Bu yapay üretim kent kaosunun, son yüzyılın bir getirisi olduğu söylenebilir. Peki kent karmaşadan beslenir mi? Doğası bu mudur? Bu kadar karmaşa doğal olabilir m? Karmaşa ve kaos aynı şeyler midir? İçinde bulunulan gündelik yaşam rutini bu karmaşadan tamamen besleniyor gibi görünmektedir. Bütün bunlar da bir çeşit zorunluluk gereksinimleri gibi gösterilmektedir. Ama kentli insan buna karşı çıkacak, bunun için direnç gösterip savaşacak gücü bulamamaktadır. Öyle bir karmaşa ki insan nereden başlayacağını bile şaşırmakta ve kendini bir şekilde bu akışa bırakmaktadır. Onun için oluşturulmuş çalışma-dinlenme rutinini bir şekilde kabul ederek, böyle olması gerektiğini düşünmektedir. Yalıtma aslında çevresinde olan biten her şeye duyarsızlık olarak ortaya çıkmakta, sonra da katılaşarak nesne hâlini alabilmektedir. Sonunda da savaşmaktan, en önemlisi sorgulamaktan vazgeçebilmektedir.

Lefebvre 1900'lerde içinde bulunduğumuz çağ için kentten doğmayan bir devrimin gereksiz bir çaba olacağını söylüyordu (akt. Harvey, 2013: 69). Bunun gerekçelerinden biri tüm bu anlam dönüşümünün gündelik yaşam akışı içerisinde ve bireyin doğrudan iletişimde olduğu kent üzerinden gerçekleşmesidir. Kent ile temasın fiziksel olarak artmak zorunda olması ancak manevi anlamda ondan uzaklaşıyor olmak, kente ilişkin tüm göstergeleri ve bunların fark edilme önemlerini yok etmektedir. Tamamen katı bir bakış açısından uzak olarak bu göstergeleri yorumlayabilmek ve o şekilde güncele, kente taşıyabilmek önemli görülmektedir. Bireyin farkındalık kazanıp direnç gösterebileceği durumlar dışında, kentsel anlamda gerçek bir dönüşümün gerçekleşemeyeceği aşikârdır.

SONUÇ YERİNE

Kentin gündelik diline herkes belli durumlar dâhilinde alışkın olabilir. Bu dil, kimi zaman doğrudan deneyimlenmekte, kimi zaman ise aktarılmaktadır. Bundan uzaklaşmak çok mümkün olmamakla birlikte; rahatsız olunan bir gündelik akışa direnmeden dâhil olmanın da bir o kadar can sıkıcı olduğu söylenebilir. Özellikle de olan bitenin farkına varıldıktan sonra bu rahatsızlık derecesi artabilmektedir. Bir noktadan sonra birey kendini tüm bu deneyimlerden yalıtarak yeni bir düzen kurmaya çalışmaktadır. Bu yeni düzen bireyi kendince özgür hissettirse de ne yazık ki bu da o tasarlanmış döngünün bir parçası gibi görünmekten öteye gidememektedir. Çünkü yalıtılma, inziva, yalnızlık, sakinlik arayışları bile lükse dönüşmüş durumdadır. Metnin başında söz edildiği gibi, eskiden bol olan şeyler artık erişilmesi güç, oldukça değerli ve özlem duyulan gereksinimler olarak sunulmaktadır. Sonrasında ise o özlem duygusu bir anda bir kentleşme jargonuna dönüştürülerek topluma bir yaşam biçimi vadetmektedir. Yine kaçma duygusu ile bu sefer de mutlu olunabileceği varsayılarak bu yeni yapay inziva ortamlarına akın edilmektedir. Sonuçta ise ne kadar soyutlanırsa soyutlansın günümüzde teknolojinin ve reklam kültürünün geldiği noktada bu eylem artık çok da mümkün olamamaktadır.

Aslında tam anlamıyla bir ölçek problemi yaşanmaktadır. Tanımların ve durumların ifade ettiği şeyler değişmektedir. Tüm bu olanlar bireysel algı ve anlayabilme ölçütüne göre de oldukça hızlı gerçekleşmektedir. Birey, ürettiğini düşündüğü ancak duyusal olarak kendisine ait olmayan bir yerde yaşamını sürdürmektedir. Dolayısıyla da buranın dilini anlayabilmekte, buranın yerlisi olabilmekte zorlanmaktadır. Ancak bir şekilde sürüklenmek yerine dâhil olup değişiklik ölçeklerini düzenleyebilmek için bu dili çözümlemek mi gerekmektedir? Buna bir anlamda potansiyel noktalarını keşfetmek de denilebilir.

Kentsel mekân ölçeğinde gerçekleşen sorunların tespiti mimarlık adına potansiyel bir dönüşüm alanını tanımlamaktadır. Geçmişten günümüze taşınan 'kamusal' tanımının artık karşılığını bulamadığı bir gerçektir. Bu konuda "yeni bir kamusallık nasıl kent mekânlarını beraberinde getirir" sorusunu her tür mimarlık üretiminde yeniden yorumlamak gerektiği düşünülmektedir. Derrida (akt. Bauman, 2005: 120-121) bir röportajında modern hümanizm fikrini terk etmek yerine onu yeniden düşünme çağrısında bulunmuştur. Bu yeniden düşünme felsefi temeli olan bir görev gibi görülebilir. Sorgulamayı gerektiren bu bireysel davranışa ek olarak bir bütün toplum olarak da aynı sorumluluğu paylaşmak ve kentsel potansiyel ve strateji arayışına

çıkmak gerekmektedir. Mimarlığın güncel konumunda mekân kavramı sonsuz muğlaklık içerisinde anlamını farklılaştırmaktadır. Bu noktada mimarlık mesleğinin sürdürülebilirliği de bu yeni dile karşılık gelecek iletişimli kent mekânları, kamusal alanlar ve özgürlük ortamları sunabilmek ile gerçekleşebilecektir.

Koolhaas (2014), mimarların bu bağlamda mevcut potansiyeli keşfetmek açısından tıkanmış bir noktada olduklarını ve bir şeylerin neden gerçekleşemeyeceği ile ilgili bir bahane üretme sürecinde olduğunu söylemektedir. Söz konusu sorunların bahane olmadığı görünür olsa da potansiyellerin keşfi konusunun da durumları yeniden yorumlayabilmek adına önemli olduğu düşünülmektedir. Farklı ölçekler içerisinde alternatif öneriler ile başlamak ve sorgulamak bu potansiyel keşfinin ilk aşaması olarak görülebilir. Temas hâlinde olunan noktalarda yalıtılmışlığı kırma yönünde çeşitli girişimler beklenmelidir. Belki de başlangıç için Auge'nin (2016) de dediği gibi kent ölçeğinde ve insan ölçeğinde mekânı düşünmeyi de yeniden öğrenmek, yeniden merak etmek gerekmektedir.

Çatışma Beyanı

Çalışma için herhangi bir potansiyel çıkar çatışması bulunmamaktadır.

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Research Article

Comparative study of aerial photography / (UAV)-drone vs 16th century cityscape art

Asst. Prof. Dr. Yoong Wah Alex Wong[1*], Sr. Lect. Ernesto Carlos Pujazon Patron[2], Sr. Lect. Jose Domingo Elias Arcelles[3]

[1]Sabancı University, Faculty of Arts and Social Sciences, Visual Arts and Visual Communication Design Program, İstanbul, Turkey.
ywalexwong@gmail.com

[2]University Technology MARA, College of Creative Arts, Kuala Lumpur, Malaysia.
hsecpp@gmail.com

[3]Pontificia Universidad Catolica del Peru, Faculty of Arts and Design, Lima, Peru.
jelias@pucp.edu.pe

*Corresponding Author

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Abstract
Technology has predisposed us to various opinions on the current state of affairs. This article aims to investigate the historical approach and the development of aerial photography, namely a comparative study using drone (UAV) as a device vs 16th-century city and landscape mapping. This article also intends to explore how aerial photography with a drone (UAV) technology may provide a better understanding of how to improve the development of the metropolitan landscape. This study indicates that one can use a drone device to instantly visualise and better understand the cityscape from different dimensions and perspectives. The drone potentially previews and captures the live visuals, offering another representation of scale and reality that is impossible in the traditional city and landscape painting (mono composition). This study would employ an empirical method of observation and measurement of phenomena using verifiable evidence that the researchers experienced before reaching concrete outcomes. At the same time, this paper reviews the usage of the drone as a visualisation and representation tool to better construct an alternative reality (possibilities of different views). As a result, the most appealing aspect of utilising a drone (UAV) device for photography is the ability to shoot from a higher viewpoint. Most drones, particularly those meant for more advanced users, include built-in cameras that can spin and swivel to allow the operator to take photographs and videos from various angles. As a result, drone usage improves visual and cultural background documentation to provide alternate answers that would otherwise be incomprehensible.

Keywords: Camera Obscura-Pinhole Camera, Photography, Aerial Drone-Photography, Panoramic-View, Unmanned Aerial Vehicle (UAV).

INTRODUCTION

The simulation of depth, space, 3-Dimensions or the illusion of space in artistic works presented on a flat surface has been a challenge for artists ever since the first people walked the earth. Although mapping the ground to be represented is invariable, voluminous and located at various distances or graphic scales, these representations on the wall, paper, or canvases have been, by necessity, in two dimensions (Brooks, 2017:1). Throughout human history, artists, scientists, and explorers have attempted to imply the depth of space (landscape) by using various tools and techniques that exploit and explore the profundity of prominent monocular “pictorial cues”. Techniques such as “interposition” relative to object (item) size, linear position/perspective, aerial/atmospheric perspective, texture, gradient, and height in the visual field are interpreted through perception. The capacity to acquire, portray, and understand spatial data and utilise that data to analyse the physical and human components of the environment is a critical trait for the artist (Williams, et al., 2016: 2).

A Look Back at the History of Photography

The origins of photography as the device machine per se are somewhat of a mystery. However, it may have been a gradual development from the early invention of the “Camera Obscura” (Latin for a darkroom), where

people independently moved towards the same goal of capturing images, which has been revealed since the time of Leonardo. This device utilises the optical principle that light rays from a bright source pass through a small aperture or pinhole into a dark space (room, box), projecting an inverted image of that thing onto an opposite surface (Myers, et al., 2018: 169), easy for an artist to trace over. These images were sometimes known as light-drawing or light-painting. The term "photography" derives from the Greek word "phos-φως", meaning "light" or unit of illumination and "grapho-γράφω" meaning "writing". Unfortunately, the image reproduced inside the box could not be kept or protected for further development. From its earliest time, the "Camera Obscura" was a popular tool for drawing and recording the realistic landscape used in rendering any views or architecture (Myers, et al., 2018: 169). The "Camera Obscura" has been well-known since classical times. To photograph the living or non-living objects (thing) required the image to be fixed and reproduced on another surface (Forrester, 2020). Such an invention was not achievable until the 19th century following the discovery of certain light-sensitive silver compounds. Centuries of advancement in chemistry, physics, and optics, including the development of the "camera obscura" set the stage for the world's first photography. In the 17th century, Johann Heinrich Schulze (1687-1744), a German professor and polymath, showed that specific composites of silver nitrate and silver chloride blackened on exposure to sunlight (Forrester, 2020). Schulze, discovered that sunlight rendered the substance black in 1725 while producing a phosphorescent material by mixing chalk with nitric acid containing dissolved silver. He experimented with shapes and forms cut from paper and doused with a solution bottle. Still, he never created a lasting image.

The Spanish town of Toledo was the focal point of a massive endeavour to translate Arabic texts into Latin in the early 12th century. Scholars of Christianity, Judaism, and Islam came to the city, where they coexisted and collaborated to transcribe ancient knowledge into Latin and eventually into other European languages (Dowidar, et al., 2015). Arab astronomers such as Ibn al-Haytham (965 AD-1040 AD) was an 11th-century scientist, mathematician, astronomer and physicist of the Golden Age of the Islamic civilisation. He utilised a dark chamber dubbed "Albeit Almuzlim", which translates into Latin as "camera obscura" the instrument that forms the basis of photography to investigate the nature of light and vision. He saw that light passing through a tiny hole travelled straight and projected an image onto the opposite wall. Based on similar experiments, Ibn al-Haytham determined that vision is accomplished by rays entering the eye from external bright sources, rather than rays emanating from the eye, as was previously thought (Dowidar, et al., 2015). It was also used to observe the movements of the sun and the moon. Roger Bacon (1220-1292) was a medieval English philosopher and Franciscan friar who placed considerable emphasis on the study of nature through empiricism. Bacon described the use of a "camera obscura" for the safe observation of solar eclipses. This device introduced the optical principal to Europe, where photography would eventually be born. Leonardo da Vinci (1452-1519) in the 15th century was familiar with the works of Ibn-al-Haytham (Alhazen) in Latin translation, and used the same method to produce accurate drawings. After an extensive study on optics of the human eye, he described the first clear definition of the "camera obscura" in the Codex Atlanticus (c. 1502). Johannes Kepler (1571-1630) a German astronomer developed, at the beginning of the 17th century, an understanding of the optics of the "camera obscura" with a lens and its relation to the human eye. He also developed the first portable "camera obscura" in the form of a "tent" with sheets of paper inside which the camera image could be projected and drawn on.

It has been widely speculated that Johannes Vermeer, who was one of the brightest stars among the famous Dutch Masters of the 17th century, might have used such a device as the "camera obscura" to create most of his paintings. There is an incredible precision with which Vermeer rendered details, particularly his domestic interiors (Wolfgang, 2007). One of the compelling qualities of his pictures is the feeling of "reality" they convey (Jelley, 2013: 19). Maps, furniture, and framed paintings are precise in scale but not in details, mostly how a simple camera with a lens will work. It does not focus sharply at once on every aspect of the picture (Jelley, 2013: 19). Optical instruments are mentioned countless times in art treatises and manuals, yet few individual artists have left written documents on the actual use of such devices (Carson, et al., 2008: 24). In the 16th century, the "camera" was known as a "device" to help artists to draw more accurately. The device's abilities enhance an artist's awareness by prolonging the landscape's presence. Further study of the landscape details is possible by capturing the moment of the atmosphere, such as tones, colours, and shading of the landscape (Carson, et al., 2008: 24). It was a Frenchman, Joseph Nicéphore Niépce (1765-1833), an inventor and a pioneer in this field, who in 1827 discovered how to make an image permanent (Forrester, 2020: 3).

Niépce developed a technique called “heliographie” from the Greek “helios” meaning “the one above” or a personification of the “Sun” and “grapho-γράφω” representing “writing”, making the early photography of “View from the Window at Le Gras” (Figure 1, beneath). This technique captures the image with a “camera obscura” on a bitumen-coated pewter plate. The light-sensitive plate took several hours to record the image, as the sunlight illuminated both sides of the building. Later on, he partnered his development with Louise Jacques Mande Daguerre (1787-1851), a French artist and photographer, refining the process into Phys-autotype (Myers, et al., 2018: 169). Those impressions have an evidentiary power due to their indexical relation with the physical world.

Figure 1. Joseph Nicephore Niepce, “View from the Window at Le Grass”, c.1826.

In the early days, photography could be regarded as mirror art. This is because photography’s primary purpose was to record and document existence. Occasionally malfunctions and accidental circumstances while capturing a scene led to those half-tone images. Such unintentional results may convey the illusion of space and form. An utterly distinctive appearance that differs from any previously made – an image is now formed mechanically through such a device, unaffected by the values and selective human judgments inevitably contained in any drawing, painting or printmaking creative process. Despite its crudeness, those half-tone shades could transmit a more realistic, three-dimensional image than any print or picture previously (Crawford, 1992: 2-8). A new profession appeared on the horizon; photographers used cameras as skilled craftsmen, adapting lenses made by optical manufacturers to their new devices. On August 19, 1839, the daguerreotype, the first entirely feasible photographic technology, was presented to the French Academy of Sciences and was subsequently made accessible to everyone to use for free and for whatever they chose. Germany became the new pioneer in a veritable camera boom a few weeks later. Many cabinetmakers made their initial cameras as individual pieces and sold them to clients or dealers. Dr Richard Leach Maddox, an English surgeon, invented the bromide silver gelatine dry plate in 1871, which opened the door for industrial camera manufacture. Numerous manufacturers attempted to establish themselves in this new market, and lens expert ZEISS was also interested in joining this developing business (Oberkochen, 2020). Optical manufacturers like Zeiss (Founded in 1846), Leitz (Founder of Leica), and others began to create lenses specifically for cameras early in the timeline of the history of photography. In 1840, Voightlander AG went further and produced the first all-metal camera. The revolutionary lens was light-fast to reduce exposure time to around one minute.

Aerial Photography

Britannica online dictionary defines aerial photography as the technique of photographing the Earth’s surface, atmosphere or hydrosphere with the camera mounted on aircraft, rockets, or earth-orbiting satellites and other spacecraft (Britannica, T. Editors of Encyclopaedia (2019, March 7). aerial photography). The word “aerial” originated in the early 17th century, which is from the Latin “āereus- ἀέριος” originally from the Greek “ἀήρ” a masculine meaning for “air” *(“ἀήρ” – WordSense Online Dictionary (February 8, 2022)*. The main characteristics of aerial photography are mostly for terrestrial mapping features taken in an overlapping series from a flying object (Drone-UAV) following a flying pattern, commonly a fixed altitude. These snapshots include surveys of several control points and strategic locations. The extracted data is an invaluable method used in topography, geology, hydrology, soil and vegetation, meteorology, ocean currents, fish resources and

art. Aerial photography is also necessary during natural disasters, accidents, or emergencies, such as searching for surviving victims, damage assessment appraisal, construction progress report, property boundary, records, and clarification of zoning issues. Aerial photography is vital for military purposes, such as surveillance and intelligence gathering applications used with satellite technology and expert interpretation. In the 19th century, photographers such as Thaddeus S. C. Lowe (1832-1913), an American Civil war aeronaut, scientist and inventor, is considered the father of military aerial surveillance in the United States. George R. Lawrence (1868-1938) was a commercial photographer who took impressive pictures with a camera suspended in hot-air balloons or hung from kites, demonstrating two crucial points; a) the scenic landscape geography and b) the military value of this method. (Figure 2, beneath).

Figure 2. San Francisco in ruins, waterfront in the foreground, with sunset over Golden Gate in the background, looking from 2,000 feet (610 m), by George R. Lawrence using Kite aerial photography, May 28 1906. Market Street leads directly away from Ferry Building tower, centre foreground, towards Twin Peaks, centre-left background

Subsequently, with the development of aviation, "photogrammetry" became an important tool for map-making and landscape surveying (Britannica, T. Editors of Encyclopaedia (2016, October 21). Photogrammetry). Relaying in photogrammetry is important for the information provided by studying the physical objects and the environment through recording, measuring and interpreting images and patterns of electromagnetic radiant imagery and other phenomena. Taking photographs from two locations provides an "aerial triangulation". (Figure 3, beneath). However, references from drone-UAV for landscape coastal erosion surveying and monitoring are still scarce in the scientific literature (Gonçalves et al., 2015: 102). Most studies on military applications, state surveillance, and adapted for use as a weaponised device with expensive sensors might not be available commercially (Gonçalves, et al., 2015: 102). Several artists have interpreted drone-UAV devices to symbolise current preoccupations with governmental surveillance, privacy, artificial intelligence, or distant warfare. The preoccupations have led to a strong interest in this new technology, likewise, for the film and entertainment industries it opened unexplored fields filled with unlimited boundaries and possibilities (Figure 3, beneath).

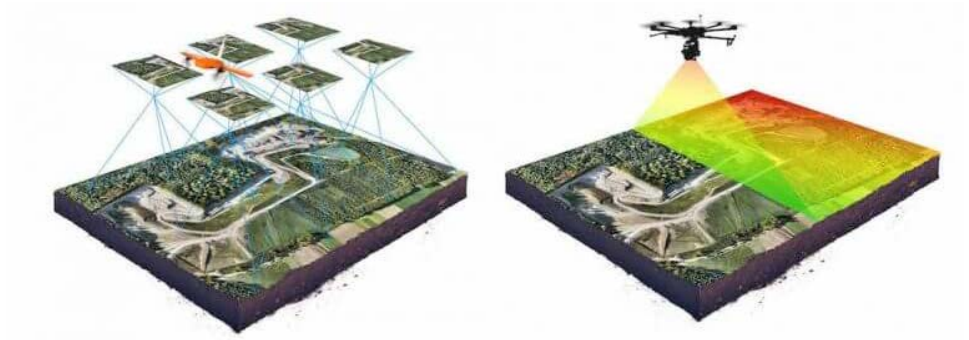


Figure 3: Photogrammetry using aerial triangulation

In photogrammetry, the formation of perfectly combined details is challenging to achieve. The cause is inevitable angular rotations and tilts produced by meteorological circumstances, such as air-pockets, air-currents, and human errors that cause an imperfection in attaching the camera to a flying device. There are, however, numerous devices that are light enough to be carried by a single camera with GPS link to a tiny computer processor for image-making (Gonçalves, et al., 2015: 102). As the First World War developed, aerial photography provided vital information and intelligence. Due to its importance, much of the sophisticated surveillance technology remains classified, aerial photography (Drone-UAV) and satellite photography function in a comparable pattern. The geographical land and camera speed are set or determined before entering the photographing area to guarantee the homogeneity of speed and altitude. The result is an image of a narrow strip that merges with overlapping photos of nearby strips to create a panoramic view known as a mosaic of photos. Single photography of an area could provide visual data. In the mid-1960s, the National Aeronautics and Space Administration (NASA) launched an attempt to design and deploy the first Earth-monitoring satellite to satisfy the demand of earth science and resources managers providing repetitive global coverage of the Earth's landmasses. The most well-known remote scanners are the Landsat series: 1,2,3,4,5,6,7 of satellites, which have been mapping vegetation and geological formations on the earth's surface since 1972. The satellite continued to function beyond 1 year of its designated life expectancy and finally ceased to operate on January 6, 1978. Under its application, the Landsat data has been used by government, commercial, industrial, civilian, military and educational communities in the United States and worldwide. It also provided data on global forestry, geological research, agriculture resources, mapping water quality and oceanography (USGS, fact Sheet 2015-3081. U.S. Department of the Interior & U.S. Geological Survey). Over the last 10 years, the Landsat programme has undergone significant changes, many of which have been made possible by activities taken by the two government Landsat partners: NASA and the United States Geological Survey (USGS) (Wulder, et al., 2015). The French Satellite Pour L'Observation de la Terre (SPOT) series was first launched in 1986, a commercial high-resolution optical Earth-imaging satellite system operating from space. It helps to facilitate better image visualisation and a wide panchromatic band with a high spatial resolution (Mhangara, et al., 2020: 2).

The National Aeronautics and Space Administration launched the Magellan spacecraft from a space shuttle in 1989. It used synthetic aperture radar to obtain and map the Venusian surface through the clouds that permanently surrounded the plane (Logsdon, J. M. (2019, 5 March). *Magellan. Encyclopedia Britannica). The* Lunar Prospector was launched in 1989 from Cape Canaveral using a Lockheed Martin LMLV2 rocket. Their mission was to map the moon's surface composition, locate lunar resources, measure the magnetic and gravity fields, and study the Lunar outgassing. There were no cameras installed on this satellite, instead, there was a Gamma Spectrometer (GRS), Magnetometer (MAG) and Electron reflectometer (ER) (Lozier, et al., 1998). The Mars Global Surveyor (MGS) spacecraft was launched in 1996 to circle Mars and acquire photos of its surface using several instruments such as the Mars Orbiter Camera (MOC), the Thermal Emission Spectrometer (TES), and the Mars Orbiter Laser Altimeter (MOLA). The spacecraft aimed to monitor and research long-term trends in Mars' atmosphere, collect data on geologically significant locations on Mars' surface, and help future Mars missions (Figure 4, beneath). The Mars Global Surveyor, which communicated with scientists four times as long as initially expected, met the goals. In 1989, the Galileo spacecraft was launched from the shuttle Atlantis and began exploring Jupiter and its moons. This old spaceship was running low on fuel in 2003, battling radiation difficulties and other technical challenges. NASA opted to fly Galileo directly into Jupiter rather than leaving it in orbit, in case the probe inadvertently crashed onto Europa and destroyed potential life there (Howell, 2017).

Figure 4. The stunning panorama with 5,000 commands parameters shot a total of 142 images that were directed back to Earth where NASA stitched them together. NASA stitched it together tile by tile in a circular formation, starting with the horizon and ending with the rover

Investigating the Nature of the Landscape

As an intrinsic representation in the human interpretative approach, the landscape shows many contents for its methodological research approach. As a result, it is not only limited to the cultural realm or the physical manifestation of nature, it also reflects conceptual variables that express paradigmatic rules that manifest regulatory models as territory (Levrand, 2021: 1-17). Similarly, when natural riches and human buildings combine to improve the evaluative quality of the space included in the landscape (González, et al., 2021), they promote interest in historical and geographical topics as a teaching-learning approach context (Serrano, 2021). These traits enable us to dive deeper into its evaluative aspects in everyday contact. Humankind has designated cognitive, procedural, and attitudinal interpretation from an integrated viewpoint for the approach to landscape study (Muratore, et al., 2020). Even the fervently Positivist School of thought or the empiricists' philosophical theory holds that all genuine knowledge is either proper by definition or "positive" meaning a posteriori fact derived by the reason and logic from sensory experience. From the middle of the 19th century to the early 20th century, it was also postulated that, under a biological agency supported by a Darwinian perspective, the landscape inscribed in a territory shaped the morphology of its inhabitants and their temperament. The proclivity for work, the good spirit, and the advancement of civilisation, or, on the contrary, the inability to solve new civilising challenges, melancholy, and barbarism of primitive people, were channelled by the landscape in which they lived (Margaretucci, 2020). Geographic determinism, which was imposed on the inhabitants regarding their uses and customs, combined with the landscape, intellectually generated by Eurocentric academic circles (Aguirre, 2020), greatly influenced the interpretation of reality beyond the European continent in those centuries; for example, in South America, works such as "Facundo o Civilización y Barbarie" (1845) by the Argentine Domingo Faustino Sarmiento (1811-1888), where its narrative complements the historical and social overview of the southern area overlaid on the scenery. Sarmiento (1955: 189) concludes that the bountiful terrain of the Argentine terroir has created a local population (original) foreign to the civilising process and development, and so emphasises that European migration will be the saving medicine that reverses this evil for the welfare of the Argentine country. Even further from the period in which the positivist interpretation of the progress of reality embodied in the previous example is circumscribed, in the middle of the 20th century, Luis Alberto Sánchez (1958: 201) in El Peru: portrait of a country adolescent, points out the benefits and limitations, successes and failures towards national progress, possessed by city and provincial Peruvian inhabitants of the north, centre, and south of the country from a sociological perspective related and interrelated with the landscape, concluding that the adolescent stage in which Peru finds itself suffers from situational and attitudinal prerogatives that maturity grants. The landscape as a unit of study allows for revealing approaches to tangible reality, which, as previously stated, express paradigmatic examples that provide interpretations intrinsic to the human being; from a descriptive interpretation of the concrete to a symbolic interpretation of the sensible that the landscape evokes (Gómez, 2021). Both views are being reconfigured as component aspects of a primordial tradition or transcendent entity

that shelters the creative nature to be depicted or conveyed through pictures, manifested by the person who sees it. The problematic sense of the various variables converges the study and observation of the landscape.

On the other hand, it reveals how in the world of ideas, the reason is insufficient in wielding ideas that involve transcendental entities to explain the nature of the landscape in the metaphysical field (Justo, 2022). The warning to this prelude is made clear in "Critique of Pure Reason" (1781), by Immanuel Kant (1724-1804), where he claims said insolvency is to deal with issues about God, the soul and the world, as an event germ of creative nature. Kant's philosophical theories, which encouraged replacing knowledge with faith (González, 2020), produced an anti-rationalism that permitted romantic thinking to glimpse a naturalistic mysticism (Tillera, 2021). Similarly, Edmund Burke's (1728-1797) sublime category stimulated the perception that the human being showed in his interaction with the landscape. In nature, the landscape is neither beautiful nor ugly, but sublime (Godoy, 2019), assessments between order and chaos, the traditional posture of the classical canon already surpassed by romanticism. The portrayal of the landscape in Western art history demonstrates the application of many talents and skills typical of the Fine Arts (Bartolotta, 2017) since it might be represented on a sheet of paper, canvas, wood, or wall using sketching, watercolour, tempera, or oil methods. The observer should not assume that the environment was also wonderfully ornamented in painted pottery, which displayed the natural essence that materialised the artist's viewpoint. This portrayal interweaved into the stained-glass architecture of Western churches. Understanding linear perspective enabled the depiction of the landscape to be the outcome of a well-balanced study at the schools of Fine Arts and recorded with verismo. The hunt for precise tools in landscape depiction was never-ending, with the conical or linear perspective viewpoint accounting for it. With the introduction of the photographic camera, facilitated by the industrial revolution, artists turned to the study of colour. They were influenced by Isaac Newton's (1642-1727) and Michele Eugène Chevreul's (1786-1889) research on colour theory, and enthusiastically assumed the transfer of said knowledge to the handling of the physical pigment and the chromatic elaboration of their palette. They incorporated tools and technological findings typical of their time's basic and applied sciences. As a result, it is not surprising that contemporary artists use visual representation technologies to express themselves in their work. Digital tools encourage the exploration of various media in which they manifest the symbolic meaning of what is represented and describe the artist's feelings (Blanco-Barrera, 2021). In the communal imagination, these symbolic configurations depict the daily manifest in diverse ways mediated by technology (Marcial & Bessone, 2021). Due to the quest that the artist aims to achieve and the method he or she wishes to participate in realising their work, this mediation can be hybrid or fully digital (Renó, 2021).

The First Bird's-Eye View

Gaspard-Felix Tournachon (1820-1910) was born in Paris to a printer and shopkeeper; although he was better known under the nom de plume "Nadar". He combined his interest in aeronautics, journalism and photography, becoming the first to capture an aerial-view in photography in a tethered artificial balloon called "Le Géant" over Paris in 1868 (Sodomo, et al., 2020, 3). This photography provided the first opportunity for humankind to view the landscape from an aerial perspective. 1863, his studio became the home of the "Society for the Encouragement of Aerial Locomotion utilising Heavier-than-Air Machines". Jules Verne (1828-1905) was secretary, and Nadar was honorary president. Charles Louis Napoléon Bonaparte (Napoleon III, 1808-1873) requested Nadar take aerial photographs for the French government during the war against Italy, however, he refused. During the war with Prussia, Nadar helped to break the blockade of Paris by carrying mail by air balloon from Paris to Normandy. Nadar was also an essential person in the history of painting. He held the first impressionist exhibition in his studio in 1874, providing a forum for the controversial art of Manet, Monet, Renoir, Degas, Cezanne, Pissaro, Sisley, Boudin and others. He championed exhibitions for many artists he believed in.

Presenting Two Stereography Projections - 16th Century Aerial Image of A City Map and Current Photography Utilising Drones-UAV

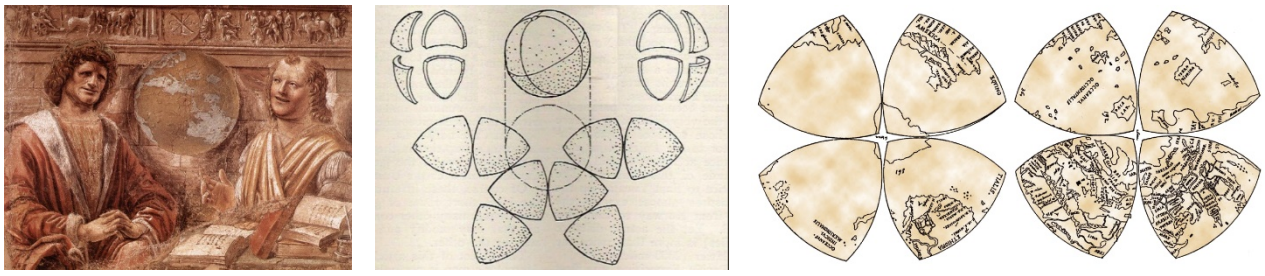
Example 1

Leonardo da Vinci (1452-1519) is known to the Western world for his contribution to art and his technological ingenuity captured in his surviving working books. He is the polymath of the High Renaissance, who viewed

the world from the perspective of an active painter, engineer, scientist, theorist, sculpture and architect (Kent, 2021). His immense output and creative genius transcended the boundaries of science and art. However, he is less known among cartographers and land surveyors (Pucekovic, 2013: 34). Nevertheless, he was installed at Imola, Italy, as Cesare Borgia's military engineer. He was in charge of enabling Borgia to be aware of the town's layout. He made a ground-breaking map that combined cutting-edge surveying techniques with his artistic imagination. In August 1502, Leonardo was appointed as the "General Architect and Engineer" and marshal of the Papal troops, giving him powers to requisition men for surveying and improving fortifications. Leonardo offers a view of the Earth as a living, yet measurable, organism seen through the lens unblemished by the tensions of the art-science, a dualism that took hold in the Enlightenment. In his holistic approach, he paced the lengths of the streets, as recorded on an annotated sketch of each quarter of the town, took bearings from the tower of the "Palazzo Comunale" at the central crossroads and presumably worked out the layout by geometry as no construction lines are visible (Heydenreich, et al., 1988: 154) (Figure 5, beneath).

Figure 5. Leonardo da Vinci, *Aerial view of a map of Imola*, 1502, red chalk, stylus lines, pen, ink and coloured washes on paper, 44.0x60.2 cm.

Another critical aspect to highlight of Leonardo da Vinci was when he became interested in global geography, especially in map-making. It may have been in the early 1500s or perhaps after Columbus discovered the Americas (Tyler, 2017: 263). It is one of the aspects that doesn't garner much attention in Leonardo's life achievements. Da Vinci's connection to world mapping (painting) is furthered by his companion Donato di Pascuccio d'Antonio (1444-1514), also known as Bramante Lazzari, an Italian architect and painter, during his early years in Milan. The picture represents the Greek philosophers Heraclitus and Democritus, who symbolise pessimism and optimism, respectively, flanked by a geographically realistic world representation. The two figures are often assumed to be portrayals of Leonardo da Vinci on the left side and Bramante himself on the right side (Figure 6a, beneath). Their involvement with the globe appears to represent a common interest in the largescale vision of the region they lived in, which is compatible with the assumption that da Vinci took his global interests from Florence to Milan when he moved there in 1482 (Tyler, 2017: 265).



a b c

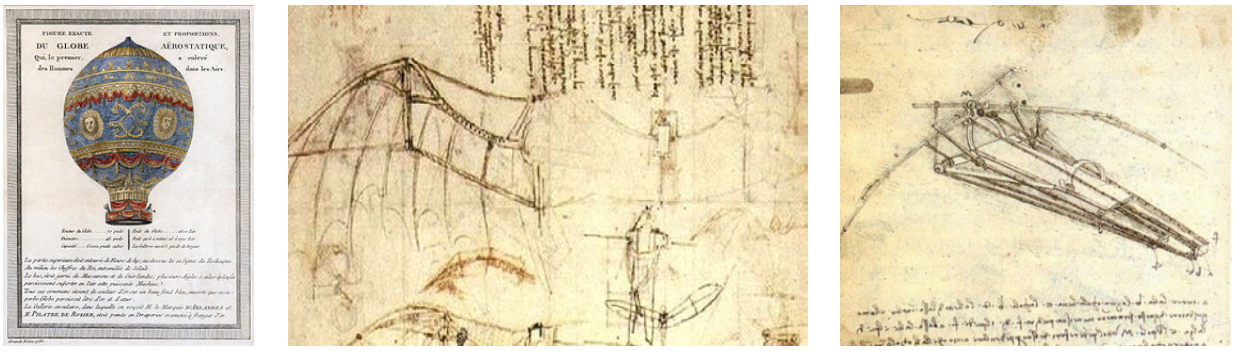
Figure 6. Donato Bramante (1444-1514), Left-right: "Crying Heraclitus and Laughing Democritus", c.1486, Fresco transferred to canvas, 102x127cm. (a), development of Cahill-butterfly's quasi-octant projection (b), Leonardo da Vinci, Octant projection with Reuleaux triangle's shape (c)

Leonardo provided his unique solution to the sphere rounded map that used to be produced during the early days of the Renaissance cartography, created by far the most isometric mapping geometry obtained from eight octants' petals projection (Figure 6b and 6c, above). These maps were produced based on the information gathered by travellers coming back from long journeys finding new destination routes for economic purposes. They also served two main functions: a) they are a spatial database for further travels; and b) as communication tools indicating records of features, landscape, flora-fauna, cities and places that may not exist anymore or have dramatically transformed through time.

Example 2

Da Vinci lived in a time when aeronautics was understood by few, if any. Simply by empirical observation and the development of his mechanical knowledge of his blueprints that nature manifested to him, he was able to design inventions that could fly. Da Vinci researched and noted how birds enact a circular flying path by altering their wings geometry in many of his manuscripts (Goodheart, 2011: 34). Originally Leonardo wished to emulate birds and bats; he said: "a bird is an instrument working according to a mathematical law, which instrument it is within the capacity of man to reproduce with all its moments…" Therefore, he designed a contraption device to let its wearer flap their wings to create thrust. An ornithopter derives from the Greek word "ornis, ornith", which means "bird" and "pteron", which means wing; it is an aircraft designed to fly by mimicking the flapping motion of a bird's wings. Nevertheless, most of his designs were not constructed until hundreds of years later. (Goodheart, 2011: 34) (Figure 7b and 7c, beneath).

His contributions, however, had little impact over the following three centuries and remained obscure until 1797. (Wragg, 1974). His sketches are reasonable, but they lack the facts of respectable math and maybe scientific in their own way. It is essential to recognise and comprehend how the design of such early aviation machines contributed to art, science, and engineering. Such an innovation aims to view and understand the height, scale, and weather (atmospheric pressure, temperature, humidity, cloud formation, rain, and wind) in the air, from a high vantage point that humankind cannot readily reach. Later, in the 18th century, the hot air balloon was constructed and completed the aforementioned aeronautical exploration objective. When staring directly down from a high vantage point, the viewer's chance of forming a vertical image increases, introducing a second mode (a reverse surface). Before the invention of flight machines, the vertical aerial view was virtually always attainable from a steep mountain top or a high tower vantage point. The "camera obscura" functioned as the closest representative device during the construction of the early flying devices by Joseph-Michel & Jacques-Etienne Montgolfier. In 1783 they displayed their first unmanned hydrogen hot air balloon (Globe aerostatique) (Figure 7a, beneath), in Paris (Jeyan, et al., 2019: 954). This hot air balloon was tied to the ground and controlled by individual ropes preventing it from flying away. Heavier-than-air planes were not used as a strategic connector for the camera until World War I.



a b c

Figure 7. A depiction of the Montgolfier brothers Hot Air Balloon, 1786 (a), Codex of the flight of birds, c.1505, Royal Library of Turin, Italy (b), Codex Atlanticus Folio 846v, Manuscript B, f, 75r. "Wingspan Design", c.1486- 1490, Biblioteca Ambrosiana (c)

In his Treatise on Painting, Leonardo da Vinci conceived the concept of aerial perspective. “Colours get dimmer in proportion to their distance from the person gazing at them” he observed (Britannica, T. Editors of Encyclopaedia (2016, June 6). aerial viewpoint). Throughout the Renaissance, amazing mural paintings were based on mythology in the Christian world. Aerial perspective, also known as atmospheric perspective, provides the illusion of depth or recession in a picture by altering the colour to approximate effects caused by natural occurrences such as a wet, foggy, overcast, and bright day from a distance. The mural paintings depicting the Assumption of the Virgin Mary (Fig 8a, 8b beneath) were created by Antonio Allegri da Correggio (1489-1534) between 1526 and 1530 inside the dome of the Cathedral of Parma, Italy. The mural paintings displayed an in-depth examination of atmospheric perspective (Collins, Encyclopedia of Art Education, 2000). Correggio’s Assumption of the Virgin).

Figure 8. Antonio Allegri da Correggio: Assumption of the Virgin Mary, Cathedral of Parma, Fresco (1526-1530), 1093x1195cm.

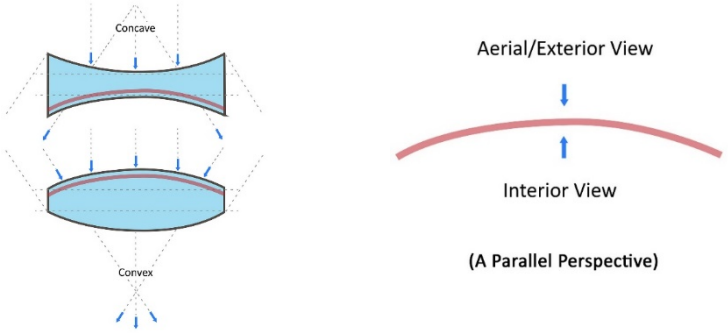


Figure 9. A parallel perspective view

Even though the mural painting in the cathedral is not directly (top-down) created with an aerial vantage point, such an atmospheric perspective and point of view is the direct opposite surface of Example 1 (Figure 6a, above). The internal perspective of the opposite surface is directly mirrored when viewed from a high vantage point (globe outside) (globe interior). It is analogous to observing and investigating the concept of concave and convex (Figure 9a and 9b, above), which may be perceived as a parallel viewpoint. Without a doubt, the notion and impression of aerial or atmospheric perspective illuminated many of the 16th century cathedrals’ dome fresco designs and paintings, such as those in the Medici Basilica of San Lorenzo (project begun in 1419), Duomo di Milano (c. 1386), Seville Cathedral, Cattedrale di Santa Maria del Fiore (completed 1436), Cattedrale di Santa Maria Assunta (c. 1217), Saint Peter’s Basilica (completed 1626), Granada Cathedral (completed 1561), St John’s Co-Cathedral Valletta (completed 1577) among others (Figure 10, beneath).

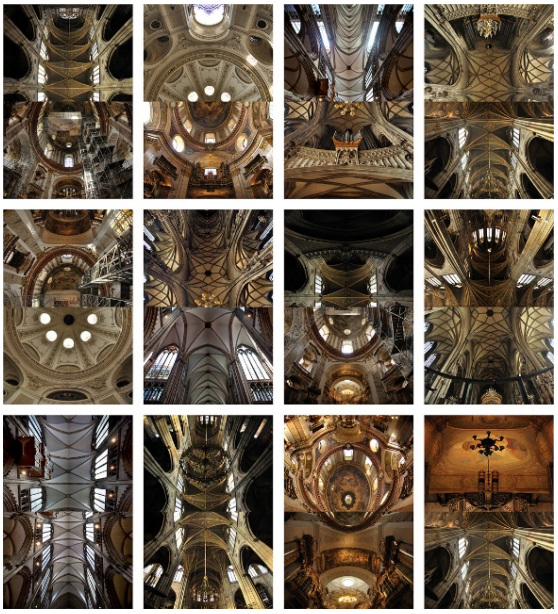


Figure 10. Stereoscopic photography, Camera DJI Phantom 3 Pro, C-Print, 90x60cm

AIM

This article aims to investigate the historical approach and the development of aerial photography. At the same time, to review the early principles of aerial perspective applied to painting during the 16th century and the aerial view photography produced using modern devices such as unmanned aerial vehicle (UAV) drones. Aerial photography is currently a widely used method to record the progress of the earth's surface. Such observation and recording are not always easily trackable, likewise, monitoring the landscape changes over time, discovering new surface features using topsoil characteristics, or stereoscopic image examination. Thus, aerial photography does have an advantage over maps because its purpose is to provide a current visual perspective of the ground (surface) that no map can match. Other issues may include photo-surface analysis, interpretation, and the aerial-photograph of the earth's curvature.

METHODOLOGY

This study would employ an empirical method of observation and measurement of phenomena using verifiable evidence that the researchers experienced before reaching concrete outcomes. Additionally, it presents a significant focus on two specific areas of discussion, a) the manipulation of a photographic camera reproducing an aerial view (Images) which is mounted to a drone-UAV device, and b) the advantages and disadvantages of creating landscape mapping images for aesthetic acknowledgement. Before drawing any conclusion, it is critical for this study to comprehend the definitions and technical descriptions of those gadgets and devices such as drone-UAV. This paper offers a thorough analysis and a concise historical account of the early recording technologies such as the "camera obscura" device, aerial photo-camera balloons, and the current aerial-camera technology drone-UAV.

RESULT AND DISCUSSION

Given the strength of the instrumentalist paradigm in which aerial photography is viewed as a process of objective documentation - that is, given the value of the medium's practical applications - it becomes difficult to find authors who specifically approach aerial photography from an artistic or cultural perspective (Fraser, 2010: 72). Aerial photography serves multiple functions within the photography discipline such as archaeology, cartography, commercial advertising, conveyancing environmental studies, espionage, land-use planning, movie production, state surveillance, and other fields. Such application provides new perspectives

on understanding and practice. Not everyone has access to nor is capable of producing aerial photography. Modern photography (camera) can obtain more information in a colour format rather than a panchromatic (black and white) image. Colour may aid in providing more positive and accurate data for use in aerial landscape photography. Examining drone art helps us think about how society behaves, reacts, and incorporates technology into its cultural language. Drone-UAV art is also a case study in how artists utilise new transformational technologies to communicate, sometimes to resist this technology itself and other times to promote it. This proliferation has inspired a dynamic response for the art world. Aerial photography also provides positive information or evidentiary material in court. Experts classify aerial photography into numerous forms based on the camera axis (photo angle), picture size (proximity to the ground and breadth of the region photographed), lens, film, digital sensor, and filter employed (Figure 11a, beneath). The advantages of having good weather conditions are that they may contribute to the following positive outcomes:

a) Provide a graphical representation of the ground, which no chart can match.
b) It is readily retrieved due to quick digital processing for viewing.
c) It is designed for hard-to-reach or inaccessible terrain.
d) It provides observation for military purposes.
e) It can provide day to day information for assessment and comparable objectives.
f) Information received through photographs is objectively recorded in perpetuity (Figure 11a, beneath).

a b

Figure 11. Aerial Photography, 2016, Sertar, Sichuan Province, China (a), Aerial Photography, 2018, Lake Baikal, Russia (b)

The main factor contributing to a significant shortcoming is that the weather condition can change drastically and even cancel the photo session. This can result in the following negative outcomes:

a) Ground features such as buildings, electrical towers, canals, rivers or streams may be difficult to recognise due to limited visibility or a lack of symbols.
b) The position on the ground may approximate the elevation.
c) Inadequate contrasting of colours for ground recognition.
d) Insufficient marginal data.
e) Detail variation of ground structures can only be comprehended by overlapping other stereoscopic images (Figure 11b, beneath).

Drone-UAV Technology Has Mediated the Landscape

The use of drones by artists to collect photographic images shows the interest in discovering and producing new visual areas of study in the depiction of the landscape, which may combine daily behaviours in the socialisation of its message or the content of the landscape. Similarly, the viewer will be able to follow a

complicated slope of visual representation that externalises the specific characteristics of the operation of the technical instrument known as the drone-unmanned aerial vehicle (UAV). Thus, in addition to the appropriate knowledge conveyed through photographic experience and skill, the artist must also develop competence in flying the drone that favours its movement in space, in the landscape setting and a favourable learning curve of that technical instrument by the user. The captured image is achieved through the photographic lens inserted in the camera and attached to the drone. This method provides unusual perspectives in which the geographical horizon line is positively subordinated to the artist's personal decision, in the selective choice that he or she executes based on compositional concepts of the observed image, based on aesthetic and evocative disciplinary criteria for the visual arts. The photography product's ultimate result is a collection of compositional methods. The depth of the component stands out in the variables' size of the pieces that arrange the landscape and buildings. At the same time, the artist structures their placement in position at a distance, creating textures that generate different size dimensions, appearing smaller and motley from a distance. The overlapping compositional landscape elements indicate which subjects are located in front of them and behind them, implying depth and three-dimensional character through their projected shadows. Careful examination of the image captured by the drone lens reveals that the photographer or artist is the one who is in control and chose the appropriate way to compose the environment that makes us perceive the grandeur of the landscape, intelligently portrayed by the artist through a visual precision technological tool (Curto, 2021).

The photographic image obtained from a drone demonstrates the executing artist's photography skills; they must pick the suitable placement of the drone by accurate or intuitive coordinates, which enables them to capture the qualities of depth exhibited in the landscape in a snapshot. Based on the spectator's interpretation of this photography snapshot, the static image of that natural environment that embodies the essence of the landscape displays a three-dimensional quality (Rius, 2021). The two-dimensional image captured in the photograph will evoke previous and interpretive experiences of how the viewer approaches the message's content perceived in the landscape. The concept of what it is to understand the three-dimensional elements of depth, and, most importantly, the perception of the atmospheric environment in which the landscape lies (Acosta, et al., 2018). These variables, taken together, will suggest the depth and distance of each of the elements composed in their organic nature and distributed within normative compliance in the photographic shot. That alludes to the three-dimensionality of the landscape even if the printed representation in the photograph materialises two-dimensionally. The aerial photography exercise integrates art and technology because this interdisciplinary mix is offered from a visual perspective. The human being moves away from everyday life and observes, with new eyes, what was always within his geographical reach (Pacheco, 2017). But from the point of view of aerial perspective, revealing the theme of the landscape from a humanistic stance. In the light of human knowledge of the landscape, qualities that enhance their visual senses to capture the natural environment from the air increase. The time has come to witness the birth of the technological human being, who can extend their senses and perceptions of the habitat surrounding them to transcend to a later stage of development and knowledge. However, this argument is similar to transhumanist thought in terms of the concept of the super-human amalgamated with high-tech components. Such an act and search sharpen a person's senses and reconstruct themself at will to enhance their abilities and skills in the human habitat (Acosta, 2021). The recognition of human finitude in the face of the awareness of how sublime the landscape is from an aerial perspective becomes apparent when contemplating the set of components that comprise the nascent human habitat. The landscape that shelters nature in all of its generative manifestations occasionally reveals the civilising presence as the germ of progress today. At the same time, as an occasional or fervent vestige in the urban presence of finite humanity, it essentially manifests the excellence of a creative constant in the genesis of the aerial landscape.

The Essence of Drone-UAV Photography

Drone photography has grown in popularity over the last 10 years. In the recent past, aerial images could be captured only by using hot air balloons or aeroplanes. We can now capture photographs from an aerial perspective due to the availability of low-cost consumer drones. Nonetheless, all drones flying in other nations are subject to international norms, regulations, and prohibitions. The benefits and drawbacks of employing drones to capture dramatic photos are similar to any other photography genre. Technically, the bigger the sensor in today's digital photographic technology, the more likely it will produce higher-quality images. The

larger the gadget sensor and the more light it takes, the more information and less noise it records. The light intensity, direction, and time of day (sunlight) all play essential roles in producing such outstanding photographic results.

The best hours of photographing with a drone depend on the weather conditions and the purpose of flying it. Although one could fly a drone at any time of the day, the ideal situation for photography would include the warmer light in the morning and late evening (Figure 12a and 12b). Such hours provide better contrast and defined shadow. The blue hour - before sunrise (dawn) and after sunset (dusk) (Figure 12c) and night photography with moonlight can be stunning since the drone is able to do a long exposure and time-lapse in the air (Cladera, 2022). It is a misperception and misunderstanding to believe that to achieve good outcomes, the drone must be flown as high as possible. Instead, regardless of the drone's height, photographers should seek unusual compositions such as fascinating shapes, symmetry, lines, patterns and repetition, texture, contrast, abstract forms, shadows, and so on. RAW file settings could help the photographer improve their exposure, contrast, detail, colour balance, and dynamic range. Photographers may continue modifying the perfect image to their satisfaction during post-production with a RAW file.

a b c

Figure 12. Aerial Photography, 2019, Marble City, Malta (Sunrise) (a), Aerial Photography Earth Veins, 2018, Iceland (Sunset) (b), Aerial Photography Calving Iceberg, 2020, Ilulissat, Greenland. (Dusk, blue hours) (c)

Consumer drones (from beginner to intermediate user) such as DJI Mavic, Air, and Phantom typically come with fixed lenses that the photographer operator cannot alter, change or modify. These drones (UAV) come with a zoom or fixed lens. Professional drones, such as Yunnec Tornado, Mavic 2 PRO, DJI Inspire 2, allow the photographer operator to change lenses. Most drones (UAV) within this category are costly for the average freelance photographer. Professional photographers neither want to utilise, limit or be restricted by a default drone camera. In such circumstances, the photographer could opt to mount an additional camera or similar device to the drone (such as a cellphone, action camera, or Insta360-One-X2). Doing so allows the photographer to acquire innovative and diversified aerial images instantaneously. This range of drones (UAV), industrial, business and agricultural drones are developed for various multitasking uses.

CONCLUSION

In the earliest period of camera's creation, its purpose was not to capture images but rather to study optics. The pinhole camera's purpose was to show how light could be cast-off to project an image onto a flat surface. Humans have created many devices to study and improve their lives through their creativity. The Unmanned aerial vehicles (UAVs) enable today's scholars to accomplish new objectives that previous generations of academics could only dream of and hope for. Today's drone-UAV survey technology is used by researchers worldwide to increase human understanding as they seek answers to the world's most pressing challenges. Drones can navigate any locations that humans could not access easily, making them a valuable alternative for risky search and rescue missions and capable of delivering supplies to remote areas during an emergency. Drones are utilised for purposes other than imaging production, such as tourism, building, and undersea investigation, to promote the long-term growth and the improvement of humanity. Drones frequently get praised for their potential to provide a fresh and alternative perspective on the landscape (Earth), displaying the beauty of our planet from above and below. However, they are merely the most recent advancement in a lengthy history of aerial photography.

Authors' Contributions

The authors contributed equally to the study.

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Figure 10, 11a, b: Y. W. Alex Wong. Camera DJI Phantom 3 Pro, C-Print, 90x60cm.

Figure 12a, b, c: Y. W. Alex Wong. DJI Mavic 2 Pro, C-Print, 90x60cm.

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Research Article

As a reflection of current tendency of contemporary western calligraphy: A Montreal urban art collective “garbage beauty”

Res. Asst. Almıla Yıldırım[1*]

[1]Muğla Sıtkı Koçman University, Faculty of Fine Arts, Graphic Design Department, Muğla, Turkey.
almulayldrm@yahoo.com

*Corresponding Author

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Abstract
Today, western calligraphy is performed as an art form with new dimensions, creating a rich diversity in the contemporary mindset technically and conceptually. Understanding the current tendencies is involved in interpreting the traditional aspect and how it is projected through today’s practices. The aim of this study is examined through the work of Montreal-based urban calligrapher Garbage Beauty, who employs discarded objects on the streets as platforms for calligraphy practices by blending them with creative applications. The paper proposes to frame the contemporary mindset by examining Garbage Beauty's works, which are inspired by the tradition fused with today’s attitude, and gain insight into the contemporary intentions of western calligraphy. The literature was reviewed in the context of the traditional western calligraphy with collected data. The works of Garbage Beauty are selected to provide a variety that enables a technical and practical examination and discussion that provides the traces from the past and the present to be located. It can be claimed that western calligraphy is no longer utilized just as a functional entity but also performed as a way to experiment and express emotions. It is seen that there is an established and preserved link with the appreciated convention of tradition fused with the contemporary mindset, which is observed by considering the literal meaning of the word calligraphy and the contemporary perception of its attributed features.

Keywords: Garbage Beauty Collective, Calligraphy, Conventional, Contemporary.

INTRODUCTION

Western calligraphy is based on the Latin writing system. Western as a term is used for all languages written with Latin, Greek, and Cyrillic alphabets. Latin and Greek were developed from a script with neat handwriting used for mercantile purposes to produce technically perfect works which eventually turned into artistically inventive outcomes. Latin-based scripts are divided into two categories, namely formal and informal scripts. While formal scripts were used as instruments of authorities, informal, i.e., cursive scripts were quickly written scripts for everyday use (Harris, 1995: 6).

Western calligraphy tradition covers the time period that may roughly be started with the Roman period -the Trajan Column of the first century- and had reached its pinnacle level in the Middle Ages till the innovation of the movable type by Johannes Gutenberg in the fifteenth century (Brown, 1993: 14-15).

It was the period when western calligraphy was employed for functional reasons, namely copying, preserving, and conveying the text, and it evolved both according to the facilities and limitations of the time and current needs. This means that the history of the western calligraphy tradition is directly related to the manuscripts demanded by the Christian Church during the Middle Ages, and with the growing demand, also depending on the tools used, the transformation of the styles can be seen through these manuscripts.

One of the main concerns was to create legible and readable writings that would serve for monasteries, and later, for the universities and nobles who desired to possess a luxurious version of manuscripts that would reveal their wealth (Mediavilla, 1996: 7-11). This issue is also underlined as “working as clearly as a signature” (Jackson, 1981: 62), which eventually constructs basic letter shapes that could be easily produced, read and understood.

Throughout the calligraphic history, scripts have undergone significant changes and transformations; a great variety of new styles have emerged and developed for particular purposes, and also profoundly influenced by the needs, technical advances in writing surfaces (such as clay, stone, wax tablets, wood, metal, papyrus, parchment or vellum) and writing materials (such as reeds, chisels, quills, broad nib pens). Moreover, the perceptions of different historic periods about "content" and "context", regional and national variations, political and geopolitical factors, and also invaders who bring their spoken and written language as a part of their culture for instance, had affected the form of the letters.

It is also necessary to mention the laborious journey of the scribes, who had to exercise constant training and practice processes in order to be a master in calligraphy. The western calligraphy tradition has been conveyed from masters to apprentices for centuries through a seven-year calligraphic training which covered the rules, methods, and techniques passed from person to person based on personal interaction. Calligraphy training entails mastering the skills, which refers to learning the manipulation, control, and domination of tools -such as quill pen, bamboo or metal nib with the ink, and learning how to prepare the materials -the vellum for instance-, and also organizing the layout, spaces between the words, lines which mean the overall page of the manuscript (Clemens and Graham, 2007: 3-48).

Figure 1 illustrates a young apprentice Everwinus, studying under the supervision of master Hildebert. He was portrayed as if practicing arabesques with a brush, whilst his master scribe attempts to throw a stone or a sponge (Jackson, 1981: 84) at a mouse due to disturbing his labor. The written text stated the curse "pessime mus, sepius me prouocas ad iram; ut te deus perdat", the master directed and translated as "you worst of mice, too often do you rouse me to anger; may god destroy you" (Clemens, and Graham 2007: 99).

Figure 2 demonstrates one of the scribe's posters as an earlier surviving example of belonging to the 15th century, with all the scripts that he was capable of. Such specimens were prepared in order to demonstrate the scribe's skill. To let the customer pick one of the styles that he was capable of, he would prefer to attach it to inns, church doors, and his temporary residence (Hamel, 1992: 30).

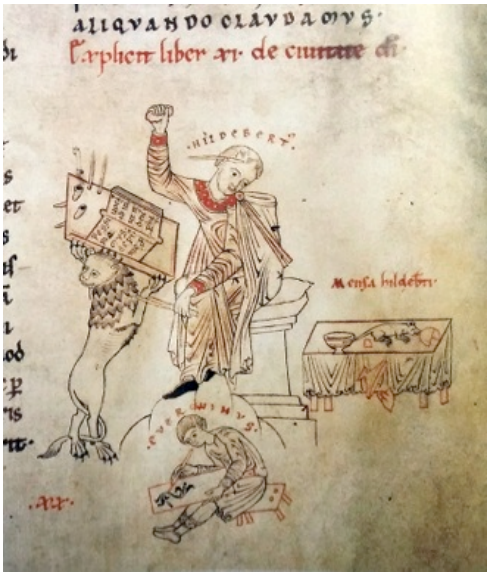

Figure 1. Scribe Hildebert cursing the mouse because of stealing his cheese
Figure 2. Parchment handbill advertising the skills of the master calligrapher Johannes von Hagen of Bodenwerder-on-the-Weser, Germany, c. 1400 (540 x 350 mm).

For a long time, the monk scribe was responsible for all levels of the book production. Considering the growing demands of the handwritten text, the medieval monk had to work in collaboration with a layman who was not an actual member of a guild. As can be seen in Figure 3, for the process of the production of the medieval book, first, the parchment maker is supposed to prepare the parchment; he soaks the skin, stretches it into a wooden frame, and scrapes it with a half-moon knife. Next, the dried parchment cutting to size is trimmed,

and he scored the lines for lettering in preparation for the scribe. The newly sharpened nib of the quill is prepared with a critical eye. When the bounded book is ready, the scribe starts to write. The text should be planned in detail, considering spaces left for the illustrator's work and illuminator. After completing the handwritten text, the leaves of the manuscript are placed in order for stitching together. Sewed pages are ready for the preparation for its cover, then clasps and bindings are fixed; hence the book is ready to display (Jackson, 1981: 68-69).

Figure 3. A process of manuscript production

When all the preparations were done, the scribe was ready to write. Since the readability and clarity were the musts, the scribe had to avoid any kind of writing mistakes. The mistake maker is described with a memorable anecdote of a scribe, illustrating the general view on a specific occasion. One of them, so-called *Chuck*, the most common label, refers to one who takes his duty home and brings it back without completing, assuming that it "covered a multitude of sins". A *Royal Chuck*, the extreme of this crime less than a felony, is used to describe the one who takes his duty home and brings it back in the morning without unrolling. The next one, *Grass*, was used for the scribe who works in a bad manner in general. The author also mentions the intention of covering the mistakes and finding some viable excuses -it is maybe because they wanted to maintain one's prestige among the connoisseurs in the guild- also reminding us the list that aforementioned complaints of the same scribe can be seen as a left mark of their existence as a nameless scribe. The list of excuses for "Chucks" throws a pathetic light on the domestic arrangements of some of the nineteenth-century Law Writers: for example, "Been very sick all night. The brokers were put in for debt. So cold I couldn't hold the pen." But: "I could not go on as I had left my knife at the office" has a solid ring of practical truth about it" (Jackson, 1981: 148).

To sum up, it can be claimed that the western calligraphy tradition is the accumulated knowledge that serves for functional reasons that cover the theoretical and practical knowledge and skills which require constant practice. The main aim is to focus on the message/text and find a way to preserve, copy and convey depending on the conditions, technical possibilities, and cultural and religious features of the time and the region.

Looking through the word calligraphy in the etymological sense considering western languages, the following explanations are always encountered that derived from the Greek word *kaligraphia, kallos-* (καλλος) meaning "beauty," and *-graphein* (ϒραφειν) meaning "to write," commonly translated as "the art of beautiful writing" or "the art of writing beautifully" in the English language. However, the word is so much controversial that it needs to be discussed from various perspectives by considering the words beauty and writing, as well as the time when, how, and what reason calligraphy was employed and performed in the West.

First of all, it has to be considered that the concept of beauty in the Middle Ages actually refers to the intelligibility of moral harmony of the daily emotions within lived experiences (Eco, 1986: 4-5). On the other hand, *graphein* (writing) is an activity that cannot be limited with the act of the hand that writes ABC but also has to be included in the act of digging, scraping, and drawing lines (Online Etymology Dictionary, n.d.). Furthermore, art concept of the Middle Age was far from the creative concept and aesthetic enjoyment in

today's sense. These manuscripts were handwritten and bound books which were eventually products that had certain functions. Hence, traditional western calligraphy -in other words the ancient writing style- requires certain skills, such as learning the construction of the styles, knowing the materials, and dominating them to manipulate without reflecting any personal interpretation on the text content. That means there was no space to experiment and express individual feelings on the pages of ancient manuscripts.

To sum up, western calligraphy traditions were employed as a craft used to satisfy the needs of the time; hence, the scribe did not have room for self-experiment or reflecting any type of individuality. They had to act as "servants of texts" (Stevens, 2013: 25). Considering the almost two thousand years of its' history with its evolution and transformation in respect of the crucial breakpoints, it would not be wrong to say that western calligraphy has started to be considered as a space of an artistic platform by scribes after the invention and dissemination of movable type.

Current Tendencies in the Realm of Western Calligraphy

Here, the current tendency primarily covers the 21st century because artists created their calligraphic works with a different attitude. It can be claimed that with the growing interest, western calligraphy has started to be employed as a platform to convey personal understandings of writing and calligraphy that contains various inspirations, which was also affected by new technical opportunities, fused with the background of the contemporary artists. Rather than being "servant of the text" (Stevens, 2013: 25), which means using the calligraphy as a tool that serves the convey, preserve or copy the written text, western calligraphy artists have started to prefer to focus on themselves as artists with the motivation of demanding a different kind of reading that is far from the literal meaning of the western writing concept that has a certain function.

One of the significant shifts can be observed through the visual interpretation of the calligraphic work as well as the concept behind the projects, which are mostly performed as an act. Calligraphy has become a performance of the contemporary calligraphers inspired by the past and the present and probably projecting the future of the western calligraphy understanding through practical and conceptual experiences. That means highly individual attitudes are preferred to underline the individuality of a calligrapher as an artist, which seems thrilled to reveal the accumulated knowledge and experience in the realm of western calligraphy. Beyond the literal text, contemporary calligraphers have started to seek ways to use calligraphic works that express the feelings and emotions of the writer, which enable the western calligraphy to be assessed as an art form, and also creates an ambiguity in terms of the definition and the attributed notion of the western calligraphy tradition. While some artists prefer to eliminate the text, the word, or even the letter from their work, just focusing on the strokes and strikes -a gesture of the tool and the hand- calligraphic works become closer to abstract forms. However, here, it should be underlined that contemporary calligraphy cherishes the tradition, and the technical and practical knowledge of the past since it is an accumulated form of art that even the contemporary calligrapher is supposed to be aware of. All of these features are rich sources for contemporary artists, which may enable the creation of something beyond the text.

Apart from the experimental artists in the realm of calligraphy, there are various calligraphers that prefer to stick to the fundamental notion of western calligraphy -servant of a text through the readable texts- but still prefer to fuse it with their personal experiences, such as graphic design, graffiti or urban arts. Primarily focusing on the distortion and transformation of the styles inspired by ancient scripts, the concept is rethought, and the notion seems to be expanded. That means what is encountered is, once again, a calligraphic work, which is beyond the literal meaning of the text. The Montreal-based urban calligraphers of Garbage Beauty use the western calligraphy and create their own attitude and understanding of western calligraphy melted into the urban act.

Garbage Beauty with Beauty on Garbage

Living in a society means to be surrounded by writings in the form of advertisements, posters, shop signs of all shapes and sizes etc. Individuals are so used to see them that it is not surprising for them to ignore these scripts after a certain point. However, seeing some writings in the least expected places captures the attention of almost every passerby. The works of the Montreal-based urban calligraphers of Garbage Beauty are significant examples that draw attention to their contemporary western calligraphic attitudes, which are

embodied on the surface of everyday objects left on the streets from all over the world (Ugolini, 2013), namely Paris, Miami, New York City, Toronto, Québec, Montréal, Austin, New Orleans, Detroit, Berlin, Amsterdam and Brussels since 2010 (Mumtl, nd.). These are discarded objects, basically garbage that people do not need or want anymore. Garbage Beauty interrogates the common perception and aims to save the beauty of these garbages in a way that they are used as canvases that sometimes carry a certain message to passersby. In other words, Garbage Beauty delight the people again with their retouch even on the humblest objects of everyday life.

Here, various works of Garbage Beauty are selected to show the variety of the goods, how the group prefers to employ the calligraph, and how they decide on the concept, the word written on the discarded image - garbage. All these works cover the same concept, which is underlined before as being willing to target the common perception in terms of unwanted/unneeded object -not beautiful anymore in a sense- that is transformed through the performed calligraphy as a retouch into something desired. Figure 4 illustrates one of the examples, which exhibits a script on a washing machine left on the street. It can be observed that it is covered with various letters and words written with the blue marker as if the washing machine is bombed like graffiti writers bombard the walls.

Figure 4. Washing machine

Examining the style of the letters on this washing machine as can be seen in Figure 5, and the certain calligraphic style that inspires Garbage Beauty, the way they adopted and stylized it can be examined through the details as pointed with the red circles in the Figure 5.

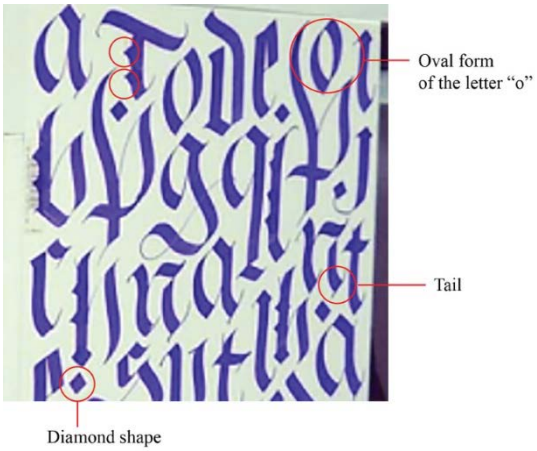

Figure 5. Details extracted from Figure 4

The overall forms of letters carry the same characteristics, such as the basic diamond shape used to begin the first stroke of the letterform and serifs and dots. The other basic characteristic is that the overall forms consist

of curves but mostly broken strokes with highly contrasted lines and tails. It may be hard to determine which ancient style inspired the calligraphers to catch the attention of the uninformed eye; however, when it is investigated, it will be observed that the style has many common characteristics with *the fraktur* hand, which is a part of the gothic family, mostly used between the sixteenth and nineteenth centuries. The gothic writing system is a style characterized by its dense and compressed forms that fold the text woven-like textural composition, which makes the text hard to read. The pre-gothic forms started to appear in the 12th century, mostly in France, England, and Germany, and were used till the 16th century. *Fraktur* (L. *fraktus*, broken), as a gothic hand, can be observed in Figure 6 and Figure 7 with the detailed example extracted from the book entitled Kunstrichtige Schrei, published in 1709 by a master scribe and arithmetician, Adolph Zunner (c. 1696-1752). It is identified with the forked ascenders, a more rounded and less angular appearance than the formal gothic hand.

Figure 6. *Kunstrichtige Schrei*, 1709

With a closer examination of Figure 7, basic characteristics that can be encountered on the washing machine - the diamond shapes, highly contrasted lines and tails, the broken and curved forms-, the overall forms of the letters are similar to the *fraktur*. It means that Garbage Beauty is inspired from one of the ancient writing styles, namely *fraktur*, and prefers to employ it in order to beautify the discarded object and eventually to make them beautiful again.

Figure 7. Details extracted from Figure 6

Here, apart from referring to the past and the western calligraphy tradition, the significant issue that is needed to be underlined is the concept that is focused on beautifying. As mentioned earlier, calligraphy as a term, points to the term beauty with the term *kallos*. Common appreciation without detailed examination may be referred to a general understanding of the word, which points to a pleasing feeling. However, as underlined, with the function of the ancient writing, hence calligraphy, the beauty comes with the functionality, legible and readable text that is written with well-constructed letter forms depending on characteristic styles that belong to certain time periods and regions. By emphasizing the *beauty* term, Garbage Beauty seems to indicate this issue and tries to orient the viewers to rethink.

Apart from that, another noteworthy issue is selecting the *fraktur* as a gothic hand. It should be underlined that *fraktur* was attributed with ideological implications in Germany during the 19th and 20th centuries. *Fraktur* had

mostly used works that were written in German languages, which created the polarization. During the 19th century, with the rise of nationalism, it was assessed as a German-style; hence the National Socialist German Workers' Party preferred to employ it as a style for their propagandas till the Nazis banned it in 1941 with the accusation of being Jewish (Kellerhoff, 2021). With this tricky reputation, stiff form as well, *the fraktur* style may seem to be chosen on purpose to reflect the beauty inside the unwanted, discarded object that leads to reconsideration.

Another example can be observed in Figure 8, a sofa left on the street, written *Pendant que tu rêves dans ton canape nous on reve d'un canape* in French by a white marker with the same stylized form of *fraktur*. The message can be translated as "while you dream in your sofa, we dream of a sofa".

Figure 8. A sofa

Here, apart from the concepts that are mentioned earlier through the word beauty and *fraktur*, Garbage Beauty seems to decide to give an actual message to consider. And the last example can be observed in Figure 9, a commode, written *on est sur la meure longueur d'onde* in French which means: "We're on the right wavelength" by a white marker with the same stylized *fraktur*.

Figure 9. A commode

Here, what also takes attention is that the group prefers to employ the heavy decoration that can be seen in the example observed through the book *Kunstrichtige Schrei* mentioned in Figure 6. The sideways of the applications of the letters also create a pattern that can be appreciated as a decoration that marks the usage of the letter as an image. While they prefer to write a message as a readable sentence on the front piece of a commode, they utilize same style letters and arrange them on the sides of the commode, which creates a patter that is created with a stack of letter, but still, can be recognized through the letterforms.

CONCLUSION

Western calligraphy redefines and regenerates itself in a continuous movement with a highly dynamic structure that is produced by unique individual approaches. Its context and content have been adopted and adapted from the past and fused with the present in an accumulated manner in the current position of art and design.

Montreal-based urban calligraphers group Garbage Beauty's calligraphy, applied onto discarded objects on the streets, takes the attention and surprise of passersby, and even provokes them to recollect their trash. By writing poetic, sometimes sarcastic messages, or even slang words with calligraphy, Garbage Beauty conduces people to rethink and consider the garbage as a piece of artwork which inholds the "beauty". While their works refer to the literal meaning of the calligraphy through the *kallos* and *graphos*, Garbage Beauty seems to convert the usage of these terms and project them to discarded objects, which are transformed once again into desirable and beautiful belongings. They prefer to do it in an unexpected and surprising way, as a performance on the streets. Moreover, utilizing one of the traditional styles of calligraphy -*fraktur*- and stylizing and applying it in their own way show that they are inspired by traditional styles, which cover one part a rigid, and the other part more flexible, curvy forms of letters. These features seem to give them much more possibility to create through the employed letterforms that can be easily practiced.

Historical references in the realm of western Calligraphy can provide possibilities in various ways for contemporary artists who are eager to build a harmonious interconnection between the past and the present. They can serve as inspirational sources, not only as contexts but also as techniques and writing instruments that were used in the pre-printing era and can provide an opportunity to experiment the search for expressiveness. Even though these instruments and techniques are ancient, they still preserve the aspect of being experimental for contemporary artists, particularly in the process of ideation and creation.

The works of Garbage Beauty that are examined here give clues about the contemporary tendencies in the realm of western calligraphy, in which ancient writing styles no longer serve as a servant of the text. In other words, they reveal the fact that western calligraphy goes beyond functionality or needs. There is an inevitable shift both in the visual interpretation of western calligraphy and the appreciation and understanding of it. There is more individuality in the artists, who actually perform calligraphy as an act that is a form of art that can convey or express the artist's feelings. However, it should be underlined that this situation does not mean producing calligraphic works by completely moving away from or even rejecting past traditions because calligraphy is an accumulated knowledge and technique that always includes and cherishes the past to go beyond. Everything can be an inspirational source for the contemporary calligrapher, who is aware of ancient styles, techniques, methods, materials and historical evolutions of the western calligraphy that leads the enhance and the vision of the contemporary calligrapher, who is willing to express individual understandings and appreciations of the western calligraphy. In that continuum, the current state of western calligraphy forces us to take into consideration and reassess western that is enriched with contemporary tendencies.

Authors' Contributions

There is a single author in this paper who contributed 100%.

Competing Interests

There is no potential conflict of interest.

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Research Article

Mobilya tasarımında ses komutlu çekmece ve kapak aç kapat kontrol sisteminin uygulaması

Application of voice command controlled drawer and door open and close control system in furniture design

Farid Yusifli[1], Prof. Dr. Kemal Yıldırım[2*]

[1]Gazi University, Faculty of Technology, Department of Woodworking Industrial Engineering, Ankara, Turkey.
yusifli.ferid.yf@hotmail.com

[2]Gazi University, Faculty of Technology, Department of Woodworking Industrial Engineering, Ankara, Turkey.
kemaly@gazi.edu.tr

*Corresponding Author
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Özet
Bu çalışmada, engelli ve yaşlı bireyler başta olmak üzere tüm kullanıcıların iç mekân donatı elemanları ile ilgili yaptığı eylemlerde kullanım kolaylığı, zaman ve enerji tasarrufu sağlanması için mobilyaların kapak ve çekmecelerinin uzaktan sesle kontrol edilerek açılıp kapatılmasında kullanılabilecek bir sistemin tasarlanması amaçlanmıştır. Bu maksatla, bluetooth bağlantılı akıllı telefonlar ile uzaktan kontrol edilebilen bir sistem tasarımı yapılmıştır. Tasarlanan dolap çekmecesinin uzaktan sesle kontrol edilebilen açma-kapama sisteminde Arduino yazılımı ve Servo motor kontrolü gibi alt sistemler kullanılmıştır. Ardunio ile ses kontrollü sistemin tasarımı; donanım (algılama sistemi, haberleşme sistemi, yorumlama sistemi, güç sistemi ve hareket sistemi) ve yazılım (sesle uzaktan verilen komutlara göre belirlenen algoritmalara karşılık veren Arduino yazılımı) olmak üzere iki aşamadan oluşmaktadır. Bu sistem önceden yazılmış ve tanımlanan algoritmik kodlara dayanarak sonradan uzaktan verilen komutlara göre yönünü belirleyip hareketi sağlayan işlevsel bir tasarımdır. Sonuç olarak, uzaktan kontrol ve robotik teknolojileri kullanılarak tasarlanan dolap çekmecesinin mobil uygulama ile uzaktan kontrol edilebilirliği uygulamalı olarak gerçekleştirilmiştir. Böylece, ses algılama özelliğine sahip çeşitli alanlarda görev bazlı çalışabilecek akıllı mobilyanın otonom şekilde çalışabilmesi sağlanmıştır.

Anahtar Kelimeler: Mobilya, Çekmece, Arduino, Teknoloji, Uzaktan Sesli Kontrol.

Abstract
This study aims to design a system that can be remotely controlled by using electronic technology regarding interior equipment elements in the opening and closing of furniture doors and drawers to provide ease of use, time, and energy savings in the actions of all users and especially disabled and elderly individuals. For this purpose, a system design that can be controlled remotely with bluetooth-connected smart phones has been designed. Sub-systems such as Arduino software and servo motor control are used in the remote voice-controlled on-off system of the designed cabinet door and drawer. Sound-controlled system design with Arduino consists of two stages: hardware (sensing system, interpretation system, motion system, communication system, and power system) and software (Arduino software that responds to algorithms determined according to remote voice commands). This system is a functional design that determines its direction and moves according to commands given remotely, based on pre-written and defined algorithmic codes. As a result, the remote controllability of the cabinet drawer, which was designed using a remote control and robotic technologies, is realized practically with the mobile application. Thus, it has been ensured that smart furniture, which can work on a task-based basis in various areas with sound detection, can work autonomously.

Keywords: Furniture, Drawer, Arduino, Technology, Remote Voice Control.

GİRİŞ

Son yıllarda gelişen yeni nesil kontrol sistemlerinin yaygın olarak kullanılmaya başlandığı ve günlük hayatın bir parçası haline geldiği görülmektedir. Geliştirilen bu kontrol ve otomasyon sistemleri sayesinde insanların yaşamında büyük kolaylıklar sağlanmış ve yaşanan mekânların konfor koşulları artırılmıştır. Bir ihtiyacı karşılamaya yönelik tasarlanan kontrol ve otomasyon sistemleri farklı türlerde geliştirilmiştir. Bunlara uzaktan kumandalı kontrol sistemleri, zaman ayarlı sistemler, parmak izi tanıma, ses tanıma ve kişisel verilerin uygulanması gibi farklı seçenekleri olan sistemler örnek gösterilebilir. Akıllı diye tanımlanan sistemler genel olarak tablet, cep telefonu, bilgisayar veya özel kumanda ile kontrol edilebilmektedir. Yaygınlaşan bu sistemlerin tasarımı ve üretimi ile elde edilen deneyimlerin eğitim ortamlarına aktarılması büyük önem taşımaktadır. Literatürde konuşmaya dayalı uzaktan kontrol edilen sistemler üzerine yapılan çeşitli çalışmalar geniş bir yer tutmaktadır. Bugüne kadar komut verilerek uzaktan kontrol edilen ve tasarlanan sistemler ile ilgili pek çok çalışma yapılmıştır (Öztürk, 2011; Hou vd., 2020; Güneş, 2019; Ece, 2019; Uysal, 2019; Vatansever vd., 2018: 230; Chikhale vd., 2017: 92; Sen vd., 2015: 39; Andrea, 2014; Aydın, 2012: 23; Baltacıoğlu, 2010; Bhatt, 2010). Bu çalışmalara ilişkin bilgiler aşağıda verilmiştir.

Hou vd. (2020) ileri düzeyde engelli bireylerin yaşam kalitesinin artırılması için herhangi bir manuel tekerlekli sandalyeye eklemlenebilecek özelliklerde Arduino tabanlı uzaktan sesli komutlara yanıt vererek hareket edebilen bir tekerlekli sandalye prototipi tasarlamışlardır. Güneş (2019) ebeveynler ile engelli bireylerin sesli komutlarıyla ayrı bir kuvvet uygulamasına gerek kalmadan (fiziksel güç kullanmadan) bebek arabasının hareketini ve kontrolünü sağlamasına yardımcı olacak bir sistem tasarımı yapmıştır.

Vatansever vd. (2018: 230-231) yaşlıların ve engellilerin bazı cihazları uzaktan, sesli olarak kontrol etmelerine olanak sağlayacak ve hayatlarını daha kolaylaştıracak Arduino tabanlı komutları analiz ederek ve Zigbee iletişim protokolü ile haberleşerek ses kontrollü bir ev otomasyon sistemi tasarlamışlardır. Bhatt (2010) yaşlılar ve sınırlı hareket kabiliyetine sahip kişiler için olumlu bir gereklilik olarak sesle kontrol edilen, kablosuz iletişim protokolü ZigBee aracılığı ile Arduino mikrodenetleyici entegre edilmiş akıllı ev otomasyon sistemi tasarlamıştır. Sen vd. (2015: 39) kullanıcıların evindeki cihazları bir kablosuz teknoloji olan bluetooth aracılığıyla kendi sesleriyle kontrol etmesini sağlayan mikrodenetleyici tabanlı ses kontrollü bir ev otomasyon sistemi tasarlamışlardır. Andrea (2014) Arduino tabanlı sistem ile akıllı Android telefon kullanılan, IR sinyallerini Smart TV Samsung cihazına gönderen ve konuşmayı tanımayı sağlayan bir sistem tasarlamıştır.

Baltacıoğlu (2010) bilgisayar üzerinden sesle veya klavye ile kontrol edilebilen, RF haberleşme ile kablosuz kontrolü sağlanabilen ve görüntü aktarımı yapabilen bir robot tasarlamıştır. Aydın (2012: 23) robot kolun hareket etmesi için gereken açı bilgisini, Servo motor sürücü kartına gönderen ve robot kolun eklem hareketlerini kullanıcının tanımlanan sesiyle kontrol edilebilen bir sistem tasarlamıştır. Uysal (2019) çok fonksiyonlu robotun sahip olduğu bluetooth modülü ile Android cihaz üzerinden verilen talimata göre kullanıcının istediği yönde hareket etmesini sağlayan uzaktan kontrollü elektromekanik bir sistem geliştirmiştir.

Chikhale vd. (2017) insanların girmesinin riskli olduğu alanlarda, kontrol ünitesi Arduino programlama kartına entegre edilmiş bluetooth modül kullanılarak Android cihaz üzerinden alınan uzaktan sesli komutlarla kontrol edilebilen robotik sistem tasarlamışlardır. Ece (2019) ses tanıma ve kablosuz haberleşme teknolojisine sahip olmayan bir laboratuvarda kullanılan tezgâh üstü cihazlara sesle uzaktan kontrol edilebilme özelliği kazandıran "uzak laboratuvar ortamı" tasarlamıştır.

Yukarıdaki literatüre bakıldığında, son dönemde insanların yaşamlarını daha konforlu hale getirebilmek için wi-fi, bluetooth bağlantılı akıllı telefonlar ile konuşmaya dayalı uzaktan kontrol sistemlerinin yaygın olarak kullanılmaya başlandığı görülmektedir. Bu sistemler; özellikle engelli ve yaşlı bireylerin yaşam alanlarında gereksinim duyduğu eylemleri yalnız başına sorunsuz olarak yapabilmesi, hayatlarının daha kolay hale getirilmesi ve zaman kaybının minimuma indirilmesi için önemli katkılar sunabilmektedir. Bu noktada engelli ve yaşlı bireylerin başkalarına muhtaç olmadan, tek başlarına eylem gereksinimlerini karşılayabilmeleri için ses tanıma teknolojisinin kullanıldığı ortamların tasarlanması büyük önem taşımaktadır.

Bu çalışmada, özellikle engelli ve yaşlı bireylerin akıllı sistem teknolojileri yardımıyla iç mekân donatı elemanlarını daha kolay kullanmalarını sağlayan bir sistem tasarımının yapılması amaçlanmıştır. Bu

kapsamda, sesli komutla yönlendirilen sistemde Arduino Uno programlama kartı kullanılmıştır. Bu Arduino Uno karta bağlı olarak çalışan 1 adet hareket sistemini sağlayan Servo motor kullanılmış olup, sistem içinde telefonla haberleşmeyi sağlayan Bluetooth HC-05 modülü kullanılmıştır. Bu sistemin elemanlarının, hazırlanan çekmeceli bir dolaba montajlanan breadboard üzerinde jumper kablolarla birbirine bağlantısı yapılmıştır. Kontrol edilen elektronik sistem, dolabın çekmece kısmının altına monte edilmiştir.

YÖNTEM

Bu çalışmada, akıllı sistem teknolojileri kullanılarak insan verimliliğinin artırılması için yapılan işlerde zaman ve enerji tasarrufunun sağlanmasına ve engelli ve yaşlı bireylerin iç mekân donatı elemanlarını kullanımlarının kolaylaştırılmasına katkı sunacak bluetooth bağlantılı akıllı telefonlar ile uzaktan kontrol edilebilen bir sistem tasarımı yapılmıştır. Bu çalışmada kullanılan sistemin Arduino kartları, Arduino IDE kodların yazımı, güç, bellek, Breadboard, algılayıcı sensörler, mikrodenetleyici, Servo ve Step motorlar, haberleşme sistemi ve protokolleri, bluetooth, mobil işletim sistemleri ile Google Play Store gibi donanım unsurları sırasıyla aşağıda açıklanmıştır.

Arduino Programlama Kartları

Arduino kartları, açık kaynak kodlarına ulaşılarak çeşitli sistemlerin tasarlanması için hazırlanmış, yazılım ve donanım temelli bir giriş ve çıkış kartı, Processing/Wiring dilinin bir uygulamasını kapsayan, kolay programlanabilir ve geniş kütüphanesi ile kısa kodlarla karmaşık işlemleri yapabilmeyi sağlayan fiziksel programlama platformudur (Öcal, 2017; Güneş, 2019; Uysal, 2019).

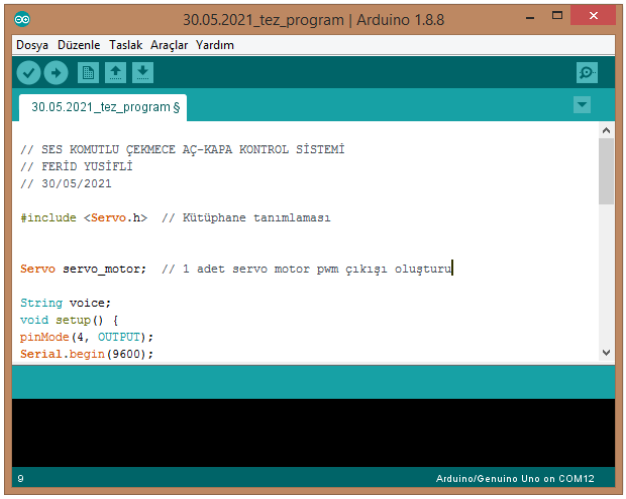
Bu platformda ATMEL mikrodenetleyiciler kullanılmaktadır. Arduino platformu zamanla gelişen kütüphaneleri ile elektronik ve programlama alanında kolay ve ulaşılabilir çözümler sunmaktadır. Kütüphaneler Arduino yazılım geliştirme platformu üzerinden sorunsuz şekilde indirilebilmektedir (Öcal, 2017; Güneş, 2019; Almali vd., 2016; Uysal, 2019; Sezer, 2019; Chikhale vd., 2017). Hayatın her alanında farklı problemlere uygun şekilde Arduino kullanımı oldukça gelişmiş ve yaygınlaşmıştır (Güneş, 2019; Sezer, 2019). Arduino çeşitleri genel olarak Görsel 1'de verilmiştir.

Görsel 1. Arduino kartları

Arduino IDE ile yazılım geliştirme

Arduino programlama kartları için tasarlanmış Arduino IDE (Integrated Development Environment), kodların yazılmasına, herhangi bir hata olduğunda önceden kontrol etmek için derlenen kodların Arduino'ya yüklenmesini sağlayan bir yazılım geliştirme platformudur. IDE kodları derleyip mikrodenetleyiciye yüklenmesini sağlar (Fezari ve Dahoud, 2018). Yazılmış kodlar Arduino kartına yüklenir (Görsel 2). Bu kodların karta aktarımı USB kablo ile bilgisayara bağlanarak gerçekleştirilir. Arduino programlama dili C ile aynı söz dizimine sahip olduğundan, C / C ++ dillerini desteklemektedir. Açık kaynak kodludur ve Windows,

Linux, MacOS gibi her işletim sistemi için sorunsuz çalışabilen bir çapraz platform yazılımıdır (Uysal, 2019; Vikipedi, 2020a).



Görsel 2. Arduino IDE Program arayüzü

Güç

Güç sistemleri, gereken enerjiyi karşılamak için kullanılan araçlardır. Günlük hayatta sıkça karşılaşılan ve kullanılan adaptör ve pil gibi gereçler birer güç kaynağıdır (Kopuz, 2018). Elektronik devrelerin çalışması için tek yönlü olarak dolaşan (DC) akıma ihtiyaç vardır. Arduino Uno bir USB kabloyla bilgisayara bağlanarak çalıştırılabilir ya da AC-DC adaptör ya da pil/batarya gibi harici bir güç kaynağından beslenebilir. Pil veya bataryanın uçları ise power konektörünün GND ve Vinpinlerine bağlanmalıdır (Robotik Sistem, 2021).

Bellek

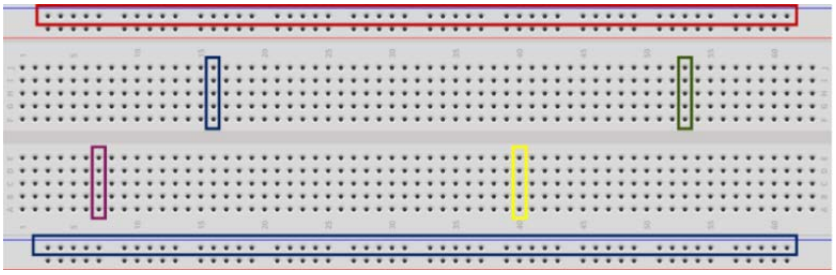
Arduino'larda programların bulunduğu bölüm (Flash), program çalıştığında değişkenlerin oluştuğu ve gerekli durumlarda değerlerinin değiştiği bölüm (SRAM-StaticRandom Access Memory) ve yazılımcının uzun süreli değişkenleri sakladığı bölümden (EEPROM) oluşan üç çeşit hafıza bulunur (Robotik Sistem, 2021).

Giriş ve çıkış

Arduino Uno'da bulunan 14 dijital giriş çıkış pininin tamamı, pinMode(), digitalWrite() ve digitalRead() fonksiyonları ile giriş ya da çıkış olarak kullanılabilir (Uysal, 2019; Robotik Sistem, 2021).

Breadboard

Breadboard bileşenlerin ayakları deliklere yerleştirilerek kullanılır. Üstteki delikler alt taraftan geçen metal şeritlerle birbirlerine birleştirilmiş durumdadır. Altındaki bu metal şeritlerle birbirine bağlanan her bir delik takımı bir düğüm oluşturur. Farklı bileşenler arasındaki bağlantılar, bacakları ortak bir düğüme yerleştirilerek oluşturulur (RPI Plasma Dynamics Laboratory, 2021; Static Cs, 2021). Üst ve alt sıradaki delikler yatay, kalan delikler dikey olarak konumlandırılmıştır. Uzun üst ve alt sıradaki delikler çoğunlukla güç kaynağı bağlantılarında kullanılır. Devrenin kalan kısmı, bileşenleri yerleştirip jumper kablolarıyla birbirine bağlanarak kurulur (Görsel 3).



Görsel 3. Breadboard (Düğüm örnekleri)

Algılayıcı Sistem (Sensör)

Algılayıcı sensörler, otomatik kontrol sistemlerinde duyu organlarına verilen isimdir. İnsanların çevresindekileri duyu organlarıyla algılamasına benzer biçimde, otomatik makineler de sıcaklık, hız, basınç, koku, ses vb. değerleri algılayıcılar vasıtasıyla algılarlar. Algılayıcı, fiziksel ortam ile endüstriyel amaçlı elektrik/elektronik cihazları birbirine bağlayan bir köprü vazifesi görür (Öcal, 2017).

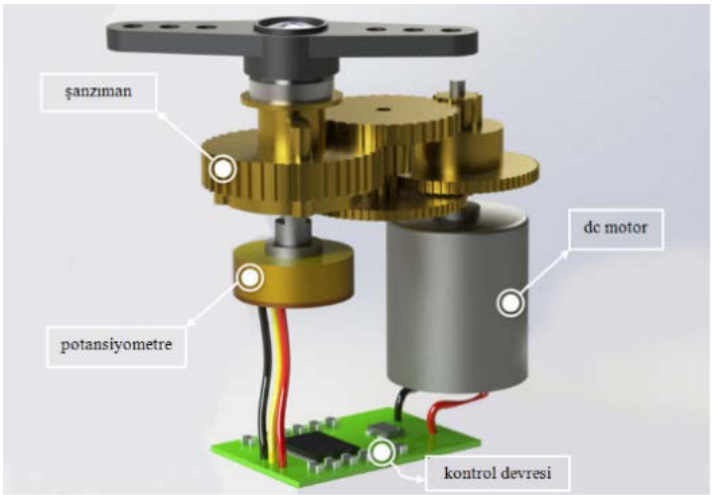
Yorumlama Sistemi (Mikrodenetleyici)

Bir robotik sistemde bulunması gereken temel bileşenlerden ünitelerin hafıza birimleri (RAM), giriş ve çıkışların (I/O) tek bir entegre devresi içerisinde üretilmiş haline mikrodenetleyici denilmektedir. Mikrodenetleyiciler, genel olarak tasarımı yapılmış uygulama devresinin içine yerleştirilmekte ve bulundukları devreye ait olarak kullanılmaktadır (Özsoy vd., 2019). Mikrodenetleyiciler çalışmak için yüklenen program dışında bilgisayar gibi bir işletim sistemine gereksinim duymaz. Bu yetenekleri sayesinde kontrol sistemleri uygulamalarında başka bir tercihe gerek duyulmayacak şekilde alternatifsiz olarak karşımıza çıkmaktadırlar (Behiye Dr. Nevhiz Işıl Anadolu Lisesi, 2021).

Teknolojinin gelişimi ile kullanımı yaygınlaşan cihazların birçoğunda mikrodenetleyiciler kullanılmaktadır. Günümüzde endüstrinin her kolunda kullanılan mikrodenetleyiciler; otomobil, kamera, cep telefonu, fax-modem cihazları, fotokopi makinesi, radyo, TV, trafik ışıklarından bazı oyuncaklara kadar çok değişik alanlarda tercih edilmektedirler. Çok küçük boyutlu olmaları ve uygulama devrelerinde az yer kaplamaları, yüksek performanslarına göre çok düşük güç tüketimlerine sahip olmaları gibi özellikler nedeniyle ve gerek ekonomik açıdan gerek çok fazla özellik gerektirmeyen uygulamalarda kullanılmasının avantajları bakımından mikroişlemcilere göre çokça tercih edilmektedir (Öcal, 2017; MEGEP, 2012; Sezer, 2019).

Hareket Sistemi (Motorlar)

Motorlar; DC, AC, Servo ve Step motorlar olmak üzere dört gruba ayrılır. Dört farklı grupta toplanmalarına rağmen bu türlerin hepsi çalışma prensipleri birbirlerinden farklı olmakla birlikte elektrikle çalışırlar. Bu türlerin en gelişmişi Servo ve Step motorlardır. Servo motorlar, çalışma prensibi bakımından DC veya AC türlere benzemekle birlikte donanım olarak bazı ek özelliklere sahiptir. Bir mekanizmada kullanılan Servo motor, son kontrol elemanı olarak görev yapar. Bu motorlar kullanıcının komutlarını icra eden motorlardır. Robot teknolojisinde, otomasyonda en çok kullanılan motor çeşididir (Görsel 4). Servo motorlar; çıkış, mekaniksel konum, hız veya ivme gibi parametrelerin kontrol edildiği, hareket kontrolü yapılan bir düzenektir (Öcal, 2017; Sezer, 2019; MEGEP, 2011).



Görsel 4. Servo motor iç görünümü

Motorun çalıştığı **tork** en önemli parametredir. Servo motorların en yaygın olanı SG90 Motor ile birlikte gelen 1.8kg/cm tork özelliğe sahip olanıdır. Bu 1.8 kg/cm tork, motorun 1 cm mesafede asılı kaldığında 1.8 kg ağırlığı çekebileceği anlamına gelmektedir (Görsel 5). Yük 0,5 cm'de askıya alınırsa, motor 3.6 kg'lık bir yük çekebilir, aynı şekilde yük 2 cm'de askıya alınırsa sadece 0.9 kg'lık bir yük çekebilir (Components 101, 2021).

Görsel 5. Servo motor tork-ağırlık örneği

Haberleşme Sistemi

Haberleşme sistemi herhangi bir biçimdeki bilgilerin adı verilen bir noktadan kullanıcı (alıcı) olarak adlandırılan bir noktaya yüksek verimde ve yüksek kalitede güvenli bir biçimde iletilmesidir. Elektronik haberleşme sisteminde gönderilecek bilginin üretildiği en önemli kısımlar aşağıda verilmiştir (Karakuş, 2011):

- Kaynak
- Gönderici
- İletişim ortamı
- Alıcı devreleri (Karakuş, 2011).

Haberleşme sistemlerinin gelişmesi ile birlikte, bu sistemlerin belli protokollerle düzenlenmesi gerekliliği zorunlu hale gelmiştir (Öcal, 2017).

Haberleşme protokolleri

Her geçen gün cihazlar, makineler, otomasyon sistemleri arasında iletişim gittikçe zorlaşmaktadır. Bu tür zorluklara çözüm olarak endüstride haberleşme konusuna belirli standartlar getirilmiştir. Birden fazla bilgisayarın aralarındaki iletişimi sağlamak amacıyla verilerin düzenlenmesini gerçekleştiren, tüm dünya tarafından kabul edilmiş bu standartlar aynı zamanda endüstriyel haberleşme protokolleri olarak da anılmaktadır. Haberleşme sistemlerinde verici ve alıcı olarak iki ayrı sistemin birbirleri arasındaki iletişimin hızlı ve güvenilir olması için kullanılan cihazlara göre bazı kuralların belirlenmesi gerekir. Bu kuralların belirlenmesi sonucunda haberleşme protokolleri hazırlanmış olur (Karakuş, 2011; Öcal, 2017).

Teknolojinin gelişmesiyle birlikte kablosuz haberleşme sistemleri ile çalışan cihazlar yaşamın neredeyse vazgeçilmez bir parçası haline gelmiştir. Kablosuz iletişim örnekleri olarak internete wi-fi ile kablosuz bağlanmak, kablosuz bluetooth kulaklıklarla müzik dinlemek, okul/iş yeri vb. yerlerde kimlik kartının okutularak giriş yapılması gösterebilir (İzgöl, 2015). Akıllı ve otomasyon sistemlerinde kullanılan çok farklı çeşitte kablosuz haberleşme protokolleri bulunmaktadır;

- RFID
- Bluetooth
- Wi-Fi
- Zigbee
- NFC
- Uydu sistemleri
- Hücresel sistemleri gibi.

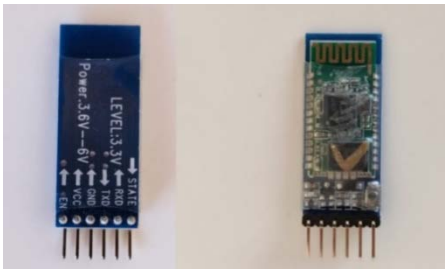
Kablosuz protokolleri seçerken aşağıdaki önemli kriterler karşımıza çıkmaktadır:

- Kapsama alanı
- Gönderebileceği maksimum veri hızı
- Maliyet
- Haberleşmenin yönü.

Düşük veri için Zigbee ve Bluetooth protokolleri uygundur. Sınırlı batarya gücü ile hızlı uygulama oranı (mobil cihazlar ve pille çalışan sensör ağları), düşük güç tüketimi sayesinde uzun ömürlüdür. Bu nedenle düşük enerji tüketimi sayesinde özellikle daha çok tercih edilmektedirler (Öcal, 2017).

Bluetooth

Bluetooth iletişim protokolü bütün dünya tarafından kabul görmüş kısa mesafelerde veri transferi için geliştirilmiş teknoloji olarak yakın mesafe iletişim protokolüdür. Kullanıcılar tarafından daha çok tercih edilen bluetooth iletişim protokolünün çift yönlü iletişim sağlaması ve ucuz olması diğer önemli avantajlarıdır (Güneş, 2019; Bal, 2015; İzgöl, 2015). Günümüz teknolojisinde bluetooth cihazlarının temel hız (Basic Rate BR) ve düşük enerji (Low Energy-LE) kullanımı olmak üzere iki farklı formu vardır (Bluetooth, 2021). Arduino projelerinde genellikle HC-05 ve HC-06 bluetooth modülleri kullanılır (Üye ve Durmuşoğlu, 2016) (Görsel 6).



Görsel 6. HC-05 Bluetooth modülü

Android Arayüzü

Mobil işletim sistemlerinden biri olan Android 2003 yılında Kaliforniya'daki Palo Alto'da kurulmuş bir yazılımdır. Android platformu hayatın bir şekilde yönetilmesine yardımcı olabilecek milyonlarca uygulamaya sahiptir ve bu nedenle, çok popüler olduğu için piyasada düşük maliyetle mevcuttur (Azzola, 2014; Android Developer Fundamentals Course Concepts, 2021; El-Pro-Cus, 2020).

Google Play Store

Google Play Store Google tarafından yönetilen ve Google'ın Android işletim sistemine sahip olan tüm cihazlar için geliştirdiği, bu cihazların uygulama ve oyunlara erişebileceği çevrimiçi bir market ve elektronik medya dağıtım/satış platformudur. Bu mağazada uygulamalar kategorilere göre kullanıcıya sunulmaktadır (Güneş, 2019; Vikipedi, 2020b).

BULGULAR

Bu çalışmanın deneysel aşamasında akıllı sistem teknolojileri kullanılarak özellikle engelli ve yaşlı bireylerin iç mekân donatı elemanları kullanımlarının kolaylaştırılmasını sağlayacak bluetooth bağlantılı akıllı telefonlar ile uzaktan kontrol edilebilen bir sistem tasarımı yapılmıştır.

Tasarım, İmalat ve Analiz Aşamaları

Çalışmanın tasarım, imalat ve analiz aşamaları; (1) Arduino kodlarının yazılması ve elektronik devrenin hazırlanması, (2) çekmeceli dolabın tasarımı ve elektronik sistemin montajı, (3) sesli komutlarla uygulamanın test edilerek tamamlanması şeklinde 3 kademeli olarak gerçekleştirilmiştir.

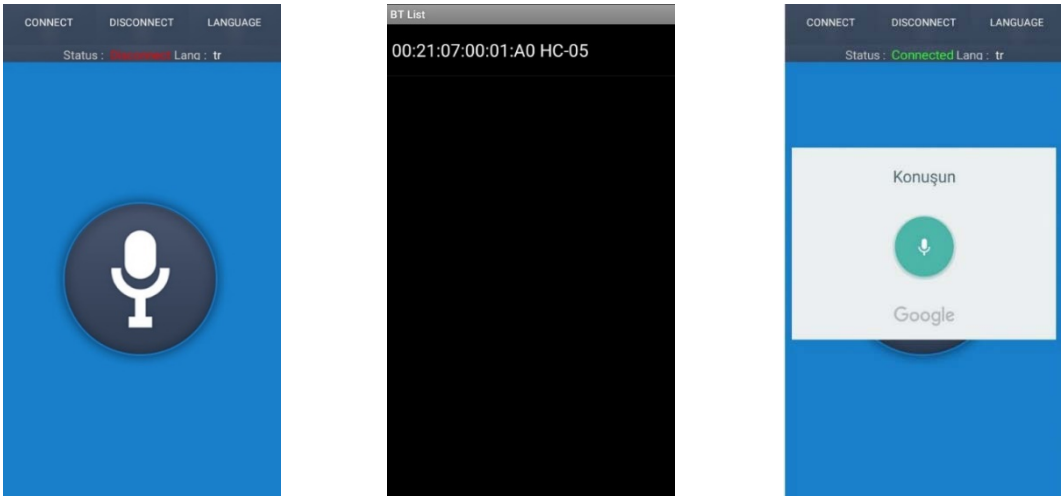
1. Aç-kapa kontrol sisteminin hareketini sağlayacak Servo motorun ileri ve geri dönerek çalışmasını (arka planda yorumlama sistemi tarafından) sağlayan kodların yazılması Arduino IDE Programı kullanılarak yapılmıştır. Yazılan bu kodlar, ilk olarak ses komutları olmadan fonksiyon halinde 1 (aç)-0 (kapa) şeklinde test edilerek motorun hareketi sağlanmıştır. Servo motorun ileri ve geri hareketi fonksiyon halinde ayrı ayrı test edildikten sonra yazılmış kodlar, sesli komutlara uyumlu hale getirilmek üzere güncellenmiştir.

2. 20x20x25cm boyutlarında tasarlanan çekmeceli dolabın gövdesinde orta yoğunluklu lif levha (MDF) kullanılmıştır. Sesle kontrol edilebilecek çekmeceli dolabın tasarımında, kendine ait çevrimiçi ve çevrimdışı

editörleri bulunan Arduino Uno programlama kartı, bu karta bağlı çalışan 1 adet hareket sistemini sağlayan Servo motor, sistem üzerinde telefon ile haberleşmeyi sağlayan bluetooth HC-05 modülü kullanılmıştır. Bu elemanların birbirine bağlantısı, mini breadboard üzerinde jumper kablolar yardımıyla sağlanmıştır. Sesle kontrol edilebilen bu elektronik sistemin devresi, dolabın çekmecesinin iç kısmına dışarıdan görünmeyecek şekilde monte edilmiştir (Görsel 7).

Görsel 7. Elektronik sistemin çekmeceli dolaba montajı

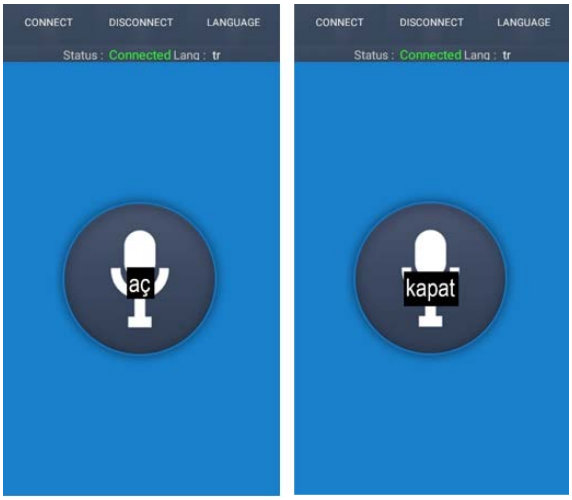
3. Üçüncü aşamada elektronik sistemin hareketini belirleyecek sesli komutu Arduino'ya iletmek için mikrofon ve bluetooth bağlantı özelliği bulunan Arduino Voice Control uygulaması kullanılmıştır. Uygulama arayüzünde bluetooth modülü ile uygulama arasında bağlantı kurmak ve mevcut bağlantıyı koparmak için iki farklı buton bulunmaktadır (Görsel 8a). Sol üst kısımda bulunan "connect" butonuna tıklandığı zaman bağlantı kurulabilecek aktif cihazların listesi ekrana gelmektedir (Görsel 8b).



a b c

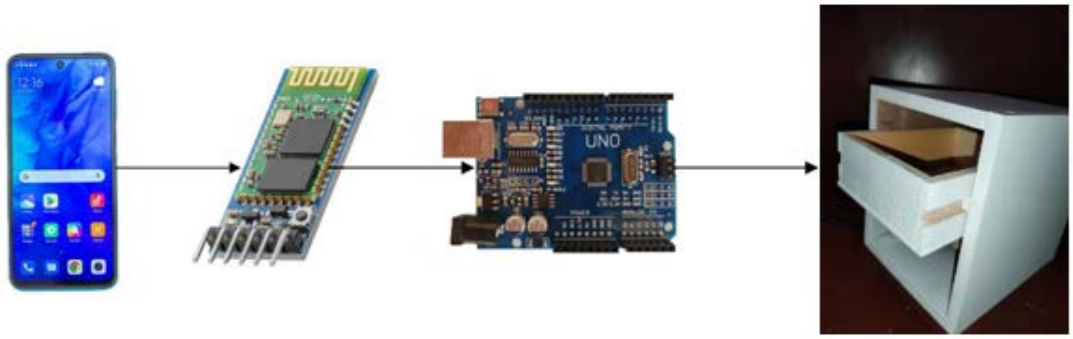
Görsel 8. Arduino Voice Control mobil uygulama arayüzü

Şekil 8b'de gösterilen HC-05 bluetooth modülü seçilip tıklandığı zaman bağlantı kurulmuş olur ve uygulama ekranında bağlantı kurulduğuna dair bilgi mesajı görüntülenir. Şekil 8a'da gösterilen uygulama arayüzünde komutların sesle verilmesine olanak tanıyan, Google'ın ses tanıma özelliği bulunan mikrofon butonu bulunmaktadır. Komutları vermek için bu butona tıklamak yeterlidir. Butona tıklanıldığında program arayüzünde "konuşun" yazılı küçük ekran gelmektedir (Görsel 8c). Bu buton kullanılarak verilen ve Google tarafından algılanan sesli komutlar yazılı olarak da ekranda görüntülenmektedir (Görsel 9).



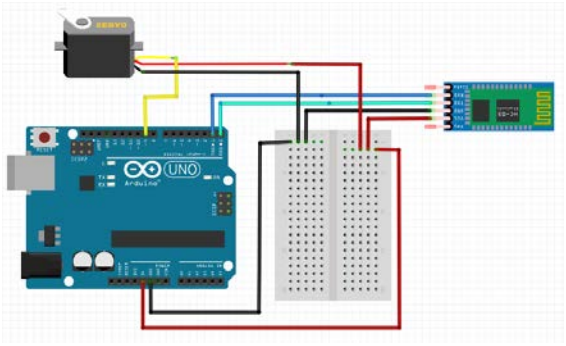
Görsel 9. Verilen komutların ekranda yazılı örneği

Arduino mikrodenetleyici kart üzerinde Servo motorun önceden belirlenmiş dereceye kadar ve ileri-geri yönde hareketini sağlayan fonksiyonlar bulunmaktadır. Mobil uygulama üzerinden ses komutu verildiği zaman bluetooth modülü tarafından alınan sinyale göre bu fonksiyonlara karşılık gelen kısım çalıştırılmaktadır. Bu fonksiyonlar yardımı ile Servo motorun yönlendirilmesi, yani dolap çekmecesinin ileri ve geri yön kontrolü, sesli komutlarla sağlanmış olacaktır (Görsel 10).



Görsel 10. Sistemin uygulama döngüsü

Bu çalışmada Arduino Uno'nun dijital portundan 0 (RX) ve 1 (TX) numaralı portları HC-05 bluetooth modülü ile haberleşme yapabilmek amacıyla kullanılmıştır. 0 numaralı port RX olarak belirlenip HC-05 modülünden gelen bilgileri almak için kullanılmıştır. 1 numaralı port ise TX olarak belirlenip HC-05 modülüne bilgi göndermek amacıyla kullanılmıştır. Bluetooth modülünün RX ve TX portlarına Arduino'nun 0 (RX) ve 1 (TX) numaralı portları birbirine çapraz olarak bağlanmıştır. Arduino Uno kartının 9 numaralı pwm portu Servo motoru ile haberleşme için kullanılmıştır. Çekmeceli dolap üzerinde yer tasarrufu sağlaması için 3,5x 4,5cm boyutunda mini breadboard kullanılmış olup, devre şeması ise Görsel 11'de verilmiştir.



Görsel 11. Sistemin devre şeması

Son olarak çekmece içine monte edilen deneysel düzenekte kullanılan elektronik sistem elemanlarının aç-kapat test gösterimi Görsel 12'de verilmiştir.

Görsel 12. Aç-kapa kontrol sisteminin test edilmesi

SONUÇ VE ÖNERİLER

Günümüzde görsel teknolojilerin olduğu kadar ses teknolojilerinin de kullanıldığı alanlar yaygınlaşmakta, yeni teknolojik gelişmeler hızla devam etmektedir. Bu çalışmada, Endüstri 4.0 teknolojileri açısından bir yaklaşım geliştirilerek dolap çekmecesinin mobil teknolojiler yardımı ile sesle uzaktan kontrolü gerçekleştirilmiştir. Arduino mikrodenetleyici ile Android mobil cihaz, bluetooth modül ile haberleştirilerek, çekmecenin mobil uygulama sayesinde "Aç/Kapa" özelliği olan komutlar yoluyla hareketi sağlanmıştır. Mobil uygulama herhangi bir Android cihaza yüklenerek kullanılabilmektedir. Ses kontrollü bu mobilya tasarım projesi iki aşamadan oluşmaktadır.

1. Donanım kısmı (Arduino Uno kart devresi, Servo motor ve Bluetooth modülü)
2. Yazılım kısmı (Android cihazdan verilen talimatlara göre belirlenen algoritmalara karşılık vermesi için Arduino yazılımı).

Tasarlanmış çekmeceli dolabın işlevi şu şekilde açıklanabilir:

Uzaktan ses ile kontrol edilebilen devre ile teçhiz edilmiş mobilya çekmecesi, sahip olduğu bluetooth modülü ile Android cihazdan verilen talimatlara göre yönünü belirleyip hareketini sağlamaktadır. Tasarlanan bu dolabın çekmecesi, kullanıcının isteğine göre ileri veya geri yönde hareket ederek açılıp kapanabilmektedir. Bluetooth ile veri aktarımı otomatik ve devamlı olduğundan kablo ile haberleşmeye göre veriler sürekli güncellenmektedir ve çekmece dâhilinde kablo karmaşası bulunmamaktadır.

Sonuç olarak, uzaktan kontrol ve robotik teknolojileri kullanılarak dolap çekmecesinin mobil uygulama ile uzaktan kontrol edilebilirliği uygulamalı olarak gerçekleştirilmiş olup, ses algılama özelliğine sahip çeşitli alanlarda görev bazlı çalışabilecek akıllı mobilyanın otonom şekilde çalışabilmesi sağlanmıştır. Arduino tabanlı ses kontrollü akıllı mobilya, sesli komutlara yanıt vermek üzere başarıyla oluşturulmuş ve test edilmiştir. Bu çalışmanın bir sonraki aşamasında, çekmeceli dolabın bulunduğu mekânın karanlık olduğu

durumlarda açık veya kapalı olduğunu belirlemek amaçlı çekmece üzerine LED bağlantısı yapılabilir. Böylece, çekmece açık ise LED yanar, kapalı olduğu durumlarda LED de sönmüş olur. Ayrıca tasarlanmış devrenin ileri zamanlarda sistemsel arıza nedeni ile bozulabileceği düşünülerek çekmecenin ses ile kontrolü dışında manuel olarak kullanılabilmesi için on/off butonu eklenebilir. Bu çalışmada, maliyeti düşük olan ve gerekli performansı gösterebilecek 16 Mhz hıza sahip Arduino programlama kartı tercih edilmiştir. Arduino platformları içerisinde farklı çeşitlerde ve daha hızlı performansa sahip gelişmiş versiyonları vardır. Gelecekte yapılacak çalışmalarda projenin geliştirilmesi adına yüksek hızlarda çalışabilen mikrodenetleyicilere sahip Arduino çeşitleri tercih edilerek kullanılabilir.

Günümüzde güvenlik en önemli konulardan birini oluşturmaktadır. Son dönemlerde teknolojinin gelişmesinde güvelik sistemleri açısından biyometrik tanıma sistemleri önem kazanmaya başlamıştır. Ses biyometriği; insanlarda retina, parmak izi gibi kişiye has, taklit edilemeyen ve kişiyi sesinden tanıyan bir teknolojidir. Çalışmanın bir sonraki aşamasında güvenlik amacıyla yalnız sisteme tanımlı kişinin sesini tanıyan ve bu kişi dışında aynı komutu duyduğunda yanıt vermeyen sistemler de tasarlanabilir. Gelecekte yapılacak çalışmalar için bir diğer öneride, kullanıcıların kas gücü ile yaptıkları işleri olabildiğince kolaylaştırmak, özellikle kas gücünü kullanamayan bireylerin örneğin duvara monte edilmiş bir dolabın içinden çıkan bir yatağın açılması gibi yapacakları işlerin, ses tanıma sistemi ile kolaylıkla yapılabilir olmasıdır.

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Research Article

A study on applications of glocalization in creative industries

Ziya Gökberk Baykan[1*], Asst. Prof. Filiz Şenler[2]

[1]Keiki Education Consulting and Trade Inc., Ankara, Turkey.
zgbaykan@gmail.com

[2]TOBB ETU, Faculty of Architecture and Design, Visual Communication Design Department, Ankara, Turkey.
fsenler@etu.edu.tr

*Corresponding Author
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Abstract
The painful transition process from modernism to postmodernism makes its impact felt in the field of globalization as well. Advances in technology have overcome the difficulties experienced in mass production and accessing global markets, enabling the integration of more local markets into the global economy. However, the rapid increase in participants made it difficult to compete in the global market, and the proliferation of different local markets caused cultural differences to become more evident. The study examines the contribution of creative industries and glocalization strategies to the resolution of the global-local conflict, by considering them together. In this study, the findings were analyzed by using the literature review and the survey method together. A total of 310 people, 145 men and 165 women, participated in the survey in Janury 2019. In the case of Turkey, the research shows that there is a positive correlation between the customer experience created by the global brand by considering the cultural, economic and political data of the local society and the level of ad appreciation.

Keywords: Postmodernism, Creative Industries, Globalization, Glocalization.

INTRODUCTION

Since the concepts of glocalization and creative industries emerged as a result of similar paradigm shifts in society and continue their development under common factors in order to solve problems that are essentially different but complementary to each other, discussing these two concepts together can create an alternative for the solution of the current global-local conflict. Radical changes in economic and social life that started with the Enlightenment Movement in 17th century Europe and accelerated with the Industrial Revolution in the 18th century, with the transition from agricultural society to industrial society, triggered paradigm shifts. The use of steam-powered machines in production, paved the way for mass production to create excess demand and standardize quality. The labor force required by many established factories and unemployment in rural areas accelerated the migration from rural to urban areas, lead to the establishment of large metropolises and the emergence of modern society and city life. This progression in Western society is defined as the modernism movement in philosophy. By prioritizing reason and science, modernism aimed to compensate for the great destruction after World War I. "Modernism promised to get rid of the scarcity of resources, poverty and the random blows of natural disasters with its scientific domination over nature" (Harvey, 1998: 24). Modernism intervened in every aspect of social life (personal relations, family relations, business relations) to provide the prosperity and wealth it promised with the principle of rationalization. According to Taylor (1997: 23), no one can deny that a single individual can achieve the greatest welfare only by achieving the maximum individual productivity, by realizing the maximum daily production.

According to Eğilmez (2018: 95), despite the rationalism concept based on modernism, people who are supposed to behave rationally often do not behave rationally, and their irrational behavior is at least as common as their rational behavior. Many researchers state that modernism has not fulfilled its promises and has begun to produce its own problems. Mechanization of individuals by the pressure of capital owners, alienation of individuals from objects, themselves and other individuals, discontent becoming a social emotion, the emergence of diseases causing mass deaths, and the beginning of unplanned urbanization with the effects of sudden migration are examples of this problem (Talu, 2010: 144). While the debates on modernism continue, the destruction caused by the Second World War that broke out in 1939 will attack the foundation of modernism, beating a path for a new concept called postmodern society and Postmodernism, where the line between real and virtual is blurred and gradually disappears. Postmodernism responds to the rationalization effort imposed by modernism, which does not accept criticism, with a social structure in which objective knowledge is not accepted as the only truth, and populism and post-truth rise. According to Antmen (2016: 275), the scope and boundaries of the term "postmodernism", which started to become widespread in art communities in the last half of the 1970s, do not seem to be fully clear even today.

The break in the post-World War II period and the developments in thought, science, and technology have shaped the postmodern society by rearranging the economy, production methods, consumer behavior, and national policies. The postmodern society intends to take its revenge on the modern society, which strictly adheres to the principle of rationalism and promises unrequited welfare with science, by killing the truth. According to Jameson (1985: 124), the great change that postmodernism has created in the field of culture can be measured by the fact that Joyce and Picasso are no longer repulsive and strange, but considered classics and even quite realistic.

Table 1. Changes in supply and demand methods in transition from modern society to postmodern society

Production Society		Consumer Society
Consumption Patterns Based on Socio-Economic Status		Unique Consumer Behaviors
Standardization in Production, Mass Production	⟷	National / Regional / Individually Customized Production
Labor Intensive Production		Knowledge Intensive Production
Unregulated Copyright and Culture Industries		Creative Industries
Globalization		Glocalization
Modern Era	⟷	**Postmodern Era**

In the modern society period, the differences in the quality of life and styles are quite evident and the transition in classes are quite difficult between the aristocrats, the bourgeoisie and the working classes. The period in which the main features are mass production, mass consumption and mass culture with a society structure based on production culture, consumption patterns (especially the consumption habits of the working class cannot exceed compulsory consumption goods), and ways of thinking are quite similar to each other in the social class they are in (Azizağaoğlu & Altunışık, 2012: 41). Contrary to the ideal society of modernism, postmodern society and postmodern consumers, who have begun to put their feelings and criticism in the foreground, are not only interested in the functional benefit of the product, but also expect their emotional needs to be satisfied when making a purchase decision. According to McColl and Legorburu, today's consumers are emotional beings and feel better when their emotional needs and wants are satisfied. When a brand shares its purpose with the public, it establishes an emotional bond with consumers who share the same values (2014: 46). The fact that the consumers started to create their unique consumption behaviors by abandoning the consumption patterns of the modern period forced the producers to be original and creative in the production and marketing stages to make a profit. Producers who focus on social needs must now also listen to the demands of the postmodern consumer. With the transition from the beginning of the modern era, when it was difficult to produce, to the postmodern era, where marketing was difficult, manufacturing, business, and service industries began to need creative classes in an organized structure to satisfy the new generation of consumers. This development has helped creative industries have the potential to generate large amounts of value.

CREATIVE INDUSTRIES

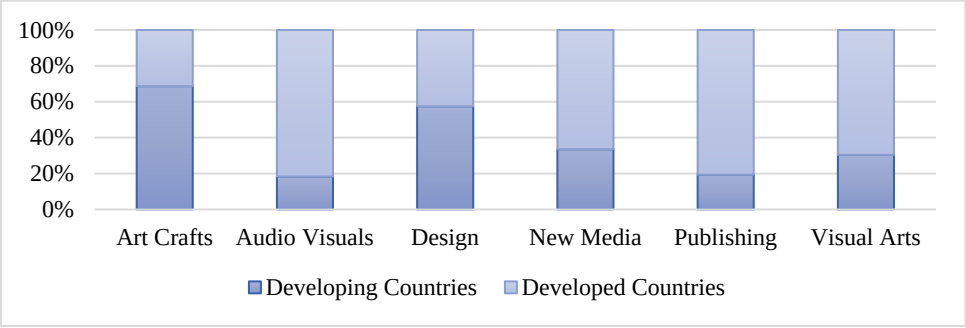
In his 2001 book examining the relationship between creativity and economics, John Howkins talks about creative economies as "creativity is not new and neither is economics, but what is new is the nature and the extent of the relationship between them and how they combine to create extraordinary value and wealth" (UNCTAD, 2010: 9). The concept of the creative economy gained its current popularity after this publication by John Howkins. The meaning and boundaries of creative industries vary by country, academia, and industry. Creative industries do not fit well with the traditional expression "industry". The definitions of "creative industries" by national and international organizations are not an industry consisting of sectors that have developed naturally as a result of individual or collective initiatives in the market, and that have multifaceted relations with each other. However, it is an effort to transform economic activities based on individual creativity and individual entrepreneurship, which have the potential to create high added value, into a planned, sustainable economic model that can generate wealth for society. The "Creative Nation" report tried for the first time in Australia to transform the cultural industries into a planned and high value-added structure, supported by national policies (Department of Communications and the Arts, 1994: 1).

The Department of Culture, Media and Sports of the United Kingdom defines creative industries as "The creative industries are those activities based on creativity, individual talent and skill, and that have the potential to create jobs and wealth through the generation and exploitation of intellectual property.". With the reports updated in 2001 and 2013, DCMS expanded the sectors within the industry and emphasized the economic relationship and closeness between tourism, museums, cultural heritage and sports sectors (Department for Digital, Culture, Media & Sport, 2001: 4). In its report prepared in 2013 for the classification and measurement of creative industries, DCMS suggested that sectors with a 30% or more employment rate of creative professionals in total employment should be included in the creative industries (Department for Culture, Media & Sport, 2013: 4).

The most significant advantage of creative industries, whose base? Production input is individual creativity, is that creative industries offer the potential to create a high added value and royalty-based long-term income model at low cost and less capital risk. This feature of creative industries plays a convincing role in being preferred by developing countries.

In the chart compiled by UNESCO, where the shares of developed and developing countries in creative product exports are compared, it is seen that it is possible for developing countries to compete with developed countries in this area. According to UNCTAD data, creative products and services reached a total of 624 billion dollars in world trade in 2011 (UNESCO & UNDP, 2013: 10).

Table 2. Share of economic group in World exports of creative goods, 2011



When the creative industries are examined on the scale of Turkey, Turkey gives great promises for the future in this field. According to the data for 2015 included in the report published by UNCTAD in 2018, Turkey ranks 6th among developing countries in creative product exports and 13th in the world (United Nations, 2018). Turkey has 8,671 million dollars of creative product exports and has a foreign trade surplus of over 5 billion dollars in the creative industries, although it has a foreign trade deficit in the general economy. The fact that China, which is considered among the developing countries according to the report, increased its foreign trade surplus of 29 billion dollars in creative products in 2002 to 154 billion dollars in 2015 can be a reference for Turkey.

GLOCALIZATION

Although there is no consensus on the content of globalization in many areas, many people agree that the concept of globalization started to become popular after T. Levitt published his article “The Globalization of Markets” in 1983. The steps from the industrialization process to the formation of the global market are as follows;

- Increasing labor demand with the industrialization process accelerated the migration from rural to urban areas and increased the purchasing power of these communities,
- As a result of modernism, mass production and standardization in production caused product costs and final consumer prices to fall, and many luxury goods became normal goods,
- Manufacturers who want to increase their competitiveness in the international market have moved their factories from developed countries to less developed countries to benefit from cheap labor and reduce their costs,
- With factories and technology transferred to underdeveloped countries, these countries jumped into the developing countries class, and per capita income began to increase,
- With the increase in the purchasing power of these countries, now seen as a new market by manufacturers. The concept of the global market began to emerge.

According to Levitt (1983: 309), if a company provides an increase in quality and reliability while pushing costs down, it will be preferred despite differences in national and regional tastes, preferences, and needs. However,

- increase in per capita income in the world,
- their concerns about meeting their basic needs begin to decrease,
- people's recovery from post-war psychology, the strengthening of postmodernism
- caused the functional benefit to lose its dominant effect in the purchasing decision process and
- the global-local conflict that emerged with the rejection of the cultural imperialism of the west by the eastern culture,
- the belief that globalization has begun to harm the nation-state phenomenon,

have challenged the sustainability of globalization, which carries the effects of modernism, and has led to the questioning of its methods. The concept of glocalization, which started to emerge in the 90s, with its dynamic structure and its potential to cover the areas where globalization strategies are lacking, caused the debates about it to become more frequent and to show itself among the popular topics of today. Glocalization has entered lives as a result of the local/global conflict -especially in the field of culture- that rise against globalization, similar to the fact that postmodernism is a result of criticism and reactions of modernism.

According to The Oxford Dictionary of New Words, glocalization is the fact of adapting products or services that are available all over the world to make them suitable for local needs (“Glocalization” 1991: 134). The term used in the literature by Roberston in 1995 to refer to the Japanese word “dochaku-ka” (global-localization) has become a hot topic after Robertson's work (Singh, 2013: 7). Robertson conceptualizes glocalization with the phrase “means the simultaneity-the co-presence-of both universalizing and particularizing tendencies” (Robertson, 1992: 173). Friedman speaks of glocalization against cultural imperialism as follows;

> *I define healthy glocalization as the ability of a culture, when it encounters other strong cultures, to absorb influences that naturally fit into and can rich that culture, to resist those things that are truly alien, and to compartmentalize those things that, while different, can nevertheless be enjoyed and celebrated as different.* (Friedman, 1999: 295)

The positive response of populist policies in society can be given as an example of the relationship between glocalization and politics. Today, the belief that problems can be solved by turning to the past is almost a common idea in world politics. This idea is supported by the majority in different parts of the world, with local variations. In America, to make America great again, to bring back the days of prosperity and justice in Turkey by returning to the Ottoman Empire, returning to its former glory by re-establishing the Commonwealth of

Nations after Brexit in the UK, and so on. “In the past, did life promise justice and prosperity for a group of elites or society?”, while even though the question is a matter of deep debate, the postmodern society, which opposes the objectivity of modernism, produces its reality by saying, “feelings and beliefs say this is true” instead of making rational explanations with objective information, making it clear that they do not even want to be involved in this debate.

The reasons for the intense need for glocalization strategies today are examined under two headings. The first is that politics cannot become as globalized as the economy. Although the organizations established to regulate world trade have generally discouraged countries from customs duties and policies that restricting capital movements for the free movement of capital and goods around the world, different taxation policies, different laws regulating society and purchasing power varying from country to country, can turn into an advantage or disadvantage in different markets for the products coming out of the same production band. The second heading is that the total economic volume of the differentiated local markets is starting to outpace the global market.

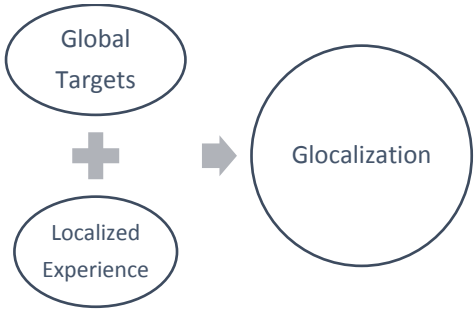


Figure 1. Glocalization

Although it differs from globalization in many ways, glocalization cannot be defined as an anti-globalization concept, but as an alternative method to achieve the goal of globalization. Today, the most effective use of glocalization is included in global marketing strategies. The main function of glocalization in this field is to overcome the cultural barriers faced by the brand in the new local market, to initiate the establishment of an emotional bond between the consumer in the target market and the brand, and help ensure the continuity in the market. Building these strategies on the differentiation of brand experience prevents the production of stereotypical theories and everyone can apply methods seen in modernism and globalization. The need to create unique strategies by evaluating the brand, product, and local market together to achieve the goal is the builder of the tight bond between the creative industries and glocalization strategies.

PURPOSE AND LIMITATIONS OF THE STUDY

Research Hypotheses

“Creative industries make a positive contribution to the solution of the Global-Local problem by using glocalization strategies” statement constitutes the research question. The research sub-hypotheses developed in accordance with the purpose of the research are given below.

H1: There is a correlation between the admiration level of advertising campaigns with glocalization strategies and the perception created by the brand for differentiation in customer experience.

H2: The level of appreciation of advertising campaigns with glocalization strategies and the degree of agreement with the statement “Global brands push local brands to raise their quality standards with the competition they create” shows a significant difference according to the individual calling herself/himself a global citizen.

H3: The degree of agreement with the statement “I prefer to use local competitors as much as possible instead of global brands” shows a significant difference according to age groups.

H4: The degree of agreement with the statement “I prefer to use local competitors as much as possible instead of global brands” varies according to income level.

Sample and Method of the Research

The research was conducted with 310 people over the age of 18 living in Turkey with the online survey method in January 2019. The survey consists of 2 parts. In the first part, there are questions that aim to measure the demographic information of the participants, and in the second part, there are questions that aim to measure their reactions to glocalization-oriented advertising campaigns. In order to measure the reliability of the data set obtained through the questionnaire forms, the Cronbach Alpha test was applied to all questions between the 7th and 10th questions and it was accepted as reliable after the result of “.832”.

Table 3. Reliability test

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,832	,836	8

FINDINGS

Demographic Findings

Table 4. Distribution of participants by age range

		Gender		
		Male	Female	Total
Age	18-24	26	28	54
	24-34	71	53	124
	34-44	27	22	49
	44-64	21	60	81
	64 +	0	2	2
	Total:	145	165	310

According to the age range distribution, 55% of the participants in the study are women and 45% are men. According to the same table, the most intense age group among the participants is the 24-34 age group with a rate of 41.3%.

Table 5. Distribution of Participants by Income Level

Income Level	**Frequency**	**Share**
0-2.200 TL	83	26,8 %
2.200 Tl - 4.000 TL	88	28,4 %
4.000 TL - 6.000 TL	62	20,0 %
6.000 TL - 10.000 TL	49	15,8 %
+10.000 TL	28	9,0 %
Total	310	100,0 %

Findings on Global Local Conflict

Table 6. Frequency Analysis of Coca-Cola changing its name on packages to Koka-Kola (Turkish pronunciation of Coca-Cola) to celebrate its 50th anniversary in Turkey by preserving the font and style

What do you think about this campaign?					
	Very unsatisfied	Unsatisfied	Neutral	Satisfied	Very satisfied
Frequency	98	40	96	46	30
Share	31,6%	12,9%	31,0%	14,8%	9,7%
According to this campaign, what do you think about the customer experience the brand offers compared to its competitors?					
	Never makes a difference	Does not make a difference	Indecisive	Makes a difference	Makes a great difference
Frequency	72	46	96	54	42
Share	23,2%	14,8%	31,0%	17,4%	13,5%

Table 7. Frequency analysis of the campaign “taken with Iphone”, revised for Turkey on April 23 (Turkish National Sovereignty and Children's Day), and sharing photos taken by children with Iphone on rental billboards and social media accounts

What do you think about this campaign?					
	Very Unsatisfied	Unsatisfied	Neutral	Satisfied	Very Satisfied
Frequency	24	24	97	78	87
Share	7,7%	7,7%	31,3%	25,2%	28,1%
According to this campaign, what do you think about the customer experience the brand offers compared to its competitors?					
	Never Makes A Difference	Does Not Make A Difference	Indecisive	Makes A Difference	Makes A Great Difference
Frequency	24	17	100	95	74
Share	7,7%	5,5%	32,3%	30,6%	23,9%

Table 8. Frequency analysis of Netflix hanging a banner with “KOLOMBİYA’DAN SEVGİLERLE” (from Colombia with love) on a cargo ship passing through the Bosphorus within the Narcos Series Turkey promotion campaign

What do you think about this campaign?					
	Very Unsatisfied	Unsatisfied	Neutral	Satisfied	Very Satisfied
Frequency	26	27	88	87	82
Share	8,4%	8,7%	28,4%	28,1%	26,5%
According to this campaign, what do you think about the customer experience the brand offers compared to its competitors?					
	Never Makes A Difference	Does Not Make A Difference	Indecisive	Makes A Difference	Makes A Great Difference
Frequency	28	23	85	89	85
Share	9,0%	7,4%	27,4%	28,7%	27,4%

Table 9. Frequency analysis of potato chip producer Lay's choosing the character “Ayşe Teyze” in Turkish Commercials, while competing brands choose world famous models like Megan Fox and Pamela Anderson for their advertisements

What do you think about this campaign?					
	Very Unsatisfied	Unsatisfied	Neutral	Satisfied	Very Satisfied
Frequency	36	31	55	78	110
Share	11,6%	10,0%	17,7%	25,2%	35,5%
According to this campaign, what do you think about the customer experience the brand offers compared to its competitors?					
	Never Makes A Difference	Does Not Make A Difference	Indecisive	Makes A Difference	Makes A Great Difference
Frequency	37	22	75	89	87
Share	11,9%	7,1%	24,2%	28,7%	28,1%

Table 10. Correlation test statics of relation between admiration of the campaign and the perception of customer experience created by the brand

Correlation			**Satisfaction**	**Difference**
Spearman’s rho	Satisfaction	Correlation Coefficient	1,000	,786
		Sig. (2-tailed)	.	,000
		N	310	310
	Difference	Correlation Coefficient	,786	1,000
		Sig. (2-tailed)	,000	.
		N	310	310

According to the correlation test of the results above, the statement "There is a positive correlation between the level of admiration of the campaign and the perception of customer experience created by the brand" in the H1 Hypothesis is supported.

Table 11. Frequency analysis of findings on global local conflict

Q.2. "I consider myself a World citizen." Do you agree with the statement?					
Agree			Disagree		
Frequency	**Share**		**Frequency**	**Share**	
258	83,2%		52	16,8%	
Q.3. Which of the statements do you think best describes your situation?					
	Western		Eastern		
Frequency	228		82		
Share	73,5%		26,5%		
Q.4. Which of the statements best describes Turkey's situation?					
	Western		Eastern		
Frequency	75		235		
Share	24,2%		75,8%		
The fact that a brand is sold and preferred all over the world creates a feeling of trust in me.					
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Frequency	33	22	93	99	63
Share	10,6%	7,1%	30,0%	31,9%	20,3%
I prefer products and services sold by global brands in my country to be of the same quality and exact same features as the rest of the world.					
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Frequency	12	9	39	59	191
Share	3,9%	2,9%	12,6%	19,0%	61,6%
The products and services offered by global brands in my country, adhering to the quality standards in the world but being customized according to geographical, ethnic and cultural differences, affects my impression of the brand positively.					
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Frequency	20	21	65	84	120
Share	6,5%	6,8%	21,0%	27,1%	38,7%
Global brands have better quality products and services than their local competitors.					
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Frequency	9	59	55	135	52
Share	2,9%	19,0%	17,7%	43,5%	16,8%
I prefer to use local competitors as much as possible instead of global brands.					
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Frequency	12	65	48	111	74
Share	3,9%	21,0%	15,5%	35,8%	23,9%
Global brands push local brands to raise their quality standards with the competition they create.					
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Frequency	18	37	41	102	112
Share	5,8%	11,9%	13,2%	32,9%	36,1%

Table 12. Mann Whitney U Test statics of differs level of appreciation of advertising campaigns with glocalization strategies according to individual's characterization of herself/himself as a global citizen

Test Statistics[a]				
Statements	**Mann-Whitney U**	**Wilcoxon W**	**Z**	**Asymp. Sig. (2-tailed)**
Campaign Satisfaction	6389,000	7767,000	-,544	,586
Global brands push local brands to raise their quality standards with the competition they create.	5773,500	7151,500	-1,659	,097
a. Grouping Variable: Q.2. "I consider myself a World citizen." Do you agree with the statement?				

According to Mann Whitney U test results; the level of appreciation of advertising campaigns with glocalization strategies does not show a significant difference according to the individual's characterization of herself/himself as a global citizen. This result did not support the H_{2a} hypothesis.

"Global brands push local brands to raise their quality standards with the competition they create". The degree of agreement with the statement does not differ significantly according to the individual's characterization of herself/himself as a World citizen. This result did not support the H_{2b} hypothesis.

Table 13. Kruskal Wallis test statics of differs the degree of agreement with the statement "I prefer to use local competitors as much as possible instead of global brands" according to age groups

I prefer to use local competitors as much as possible instead of global brands.	
Chi-Square	11,056
df	4
Asymp. Sig.	,026

a. Kruskal Wallis Test
b. Variable: Age

According to Kruskal Wallis test results; the degree of agreement with the statement "I prefer to use local competitors as much as possible instead of global brands" differs significantly according to age groups. This result seems to support the H_3 hypothesis.

Table 14. Kruskal Wallis test statics of differs the degree of agreement with the statement "I prefer to use local competitors as much as possible instead of global brands" according to income level

I prefer to use local competitors as much as possible instead of global brands.	
Chi-Square	4,692
df	4
Asymp. Sig.	,320

a. Kruskal Wallis Test
b. Grouping Variable: Q.1. Monthly Income

According to Kruskal Wallis test results; the degree of agreement with the statement "I prefer to use local competitors as much as possible instead of global brands" does not show a significant difference according to income level. This result did not support the H_4 hypothesis.

CONCLUSION AND RECOMMENDATIONS

Creative industries are seen as an important leverage for entrepreneurs and countries with the flexibility in investment they need and their significant volume in world trade. It is observed that the structure of the creative industries, which allows personalization at the individual level, against the production understanding of the modern period based on standardization in production, better meets the demands of the postmodern society and as a result the economy it creates grows day by day.

Eric Schmidts, the Former CEO of Google, emphasized the potential of individual creativity on a global scale by saying, "But more important, someone, somewhere in a garage is gunning for us. I know, because not long ago we were in that garage." in a speech where he stated that their biggest rivals are not Amazon or Facebook, but entrepreneurs they do not know (Schmidt, 2014, para. 41). With the strengthening of postmodernism in society and the effect of industry 4.0, the responsibility of the creative class in the economy and social life from production to customer relations is increasing. The decisions to be made by the creative class, in today's world where mass production reaches huge numbers;

- At the macro level, how to use scarce resources, which is a global problem,
- At the micro level, the impact that the brand will have on the market and local economy

can directly create a positive or negative effect.

Despite the threat posed by global problems, the fact that globalization in cultural and political fields lags far behind economic globalization shows that the global-local conflict may increase rather than decrease in the near future. As the gap between global and local continues to increase, it is expected that the interest in glocal strategies, which is seen as an exit strategy against ethnic and cultural barriers in the global market, will

increase and the concept of glocalization will be used more widely in academic and professional business life. Turkey has a wide portfolio that can create a field of study for creative industries and glocalization, with the history of Anatolia and many different ethnic cultures that maintain their existence in today's Turkey. The service sector is the dominant sector in Turkey, as in many developed countries. However, Turkey's problem in launching a global brand is both the reason and the result of its being stuck in the status of developing countries and in the middle-income trap.

In the questions asked to the participants to identify examples of global-local conflict in Turkey, 73.5% of the participants describe themselves as Westerners, while 75.8% describe Turkey as Eastern. Participants answered;

- "Global brands push local brands to raise their quality standards with the competition they create." "Agree" with 32.9%, "Strongly Agree" with 36.1%
- "I prefer to use local competitors as much as I can, rather than global brands." "Agree" with 35.8% and "Strongly Agree" with 23.9%.

Although the participants tend to trust the brands in the global market and believe that they offer quality products / services, the idea that there are some barriers that global brands have to overcome in order to ensure their continuity while serving the postmodern consumer is supported.

The study results show that successful advertisements supported by glocalization strategies can be used to increase the perception of positive customer experience and overcome local - global conflict. Lay's campaign, which has the highest level of appreciation among the selected advertising campaigns, emphasizes the brand's support for the local economy by supporting farmers living in Turkey, as well as using local figures in its advertisements. According to the results of the survey, it is supported that there is a positive correlation between the level of ad appreciation and the perception of customer experience created by the brand in the case of Turkey. However, it can be suggested that in order to increase performance in the campaigns of brands seeking a way out of the global-local conflict, it is necessary to evaluate not only the cultural dimension but also the economic and political dimensions in their glocalization strategies.

This study shows that Turkey is promising in the creative industries and if it is supported under an institutional and planned structure, it can be beneficial to the country's economy in a short time, as in the case of China. But as the creative content produced continues to expand into the global marketplace, it will be caught in the local vs global conflict. It will be necessary to develop effective glocalization strategies to get out of this conflict and keep moving forward.

As a result, focusing on glocalization strategies by the creative industries will not only benefit the entry of a global product into the local market, but also play an important role in the successful launch of a local product into the global market, especially from developing countries that do not have a dominant cultural influence on the world.

Authors' Contributions

The first author contributed 60%, and the second author contributed 40%.

Competing Interests

There is no potential conflict of interest.

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Table 2: UNESCO, & UNDP. (2013). *Creative economy report 2013: Widening local development pathways.* (p. 162).

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Research Article

Fictional vernacular architecture as a worldbuilding element: Structure samples from the World of Warcraft video game

Asst. Prof. Dr. Atlıhan Onat Karacalı[1*]

[1]İstanbul Topkapı University, Faculty of Fine Arts, Design and Architecture, Department of Interior Architecture and Environmental Design, İstanbul, Turkey.
atlihankaracali@atlihankaracali.com

*Corresponding Author

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Abstract
This study aims to evaluate the structures of Azeroth, the fictional built world of the World of Warcraft video game, as samples of vernacular architecture. Therefore, the scope of the study contains video game architecture, vernacular architecture, and structure samples from the mentioned video game. For the methods of the study, first, the storytelling and worldbuilding concepts are investigated. Then, the use of architecture in video games is analyzed in the light of pioneer academic studies. Moreover, the term vernacular architecture is introduced to name the structure of World of Warcraft as samples of it. The elements affecting the design of vernacular architecture samples are mentioned. Finally, in the case study, the settlements and the structures of the fictional races with distinct cultures, from the mentioned video game, are studied in detail. And in result, some unique determinations of mentioned game's use of architecture, in both video game architecture and fictional vernacular architecture terms, are proposed.

Keywords: Video Game Architecture, Storytelling, Worldbuilding, Vernacular Architecture, World of Warcraft.

INTRODUCTION

Current era is the golden age of video gaming. And there is a growing interest in studying on academic grounds. Studies like "Allegories of space: The question of spatiality in computer games" (Aarseth, 2001), "The Role of architecture in video games" (Adams, 2002), "The importance of architecture in video games" (Brouchoud, 2013), and "Building imaginary worlds: The theory and history of Subcreation" (Wolf, 2012) can be considered as pioneers. Therefore, the use of architecture in video games is a popular subject. Many studies focus on a single video game title and directly begin writing its architecture. However, to understand the use of structures in any single videogame, first, the background of the field should be studied. As the main contribution of this study to the literature, the fields of storytelling and worldbuilding which were somehow absent in the previous works, and the overall relationship between the architecture and video games, should both be figured out as laying a foundation for studying the architecture of a single game.

The study should scale up from the structure base to the environment base. Many current video games introduce a brand new three-dimensional world to tell us its story within. And for the current level of technology, it is quite easy to build up a new world. However, is modeling a new settlement in a larger context enough for naming it a world? There are some base points in worldbuilding, and a newly generated one should meet these essential criteria to be considered as a world.

METHOD

The study used the literature review method for the first three findings sections, storytelling and worldbuilding, video game architecture, and vernacular architecture. And for the fourth finding section evaluating the structure samples from the mentioned video game, a case analysis method is followed. Selected in-game screenshots

(those created by the author on 13.4.22 from PTR version 9.2.5.43057) were evaluated over the concepts figured out in the previous finding sections. And in the result, general determinations have been made regarding the architectural use of the game in question in terms of video game architecture and vernacular architecture.

FINDINGS

As mentioned, this study groups its findings into four sections. These sections were ordered in a conscious order, to build up the knowledge stock on top of each other. The conclusion section, on the other hand, constructs a different concept. It covers an evaluation of the case study, over the knowledge collected in the previous three sections.

Storytelling and Worldbuilding

There is a growing interest in the storytelling phenomenon in either professional or academic fields, recently. The term "storytelling" is the cultural and social activity of sharing stories. Each culture has stories or narratives told as means of education, entertainment, or development of moral values. Storytelling is as old as mankind since the human brain has cognitive capacity. Oral traditions of storytelling (mythology, epic heroic legends, fairytales, fables, etc.) are found even in the earliest civilized stages. Visual media, on the other hand, can be considered equally aged. Later with the advent of writing, the stories were recorded as scripts and reached wider audiences. Modern storytelling has broader meanings. New forms of media create new ways for people to record and tell stories. In this age of communication, also image-makers create stories for brands, either a pop-music icon, a hamburger restaurant, or even a political leader. Now there are different modes of storytelling, varying from digital interactive narratives to tabletop role-playing games.

Storytelling has also been an object of academic scientific research under the name "narratology". Scientists investigate the forms and methods of storytelling and discovered some common issues. The most famous of them, popularized by Joseph Campbell in The Hero with a Thousand Faces (Campbell, 1949: 30), is known as the "hero's journey" or "monomyth" which is a common template for most stories, consisting of three main parts. On first, the departure, a hero goes on an adventure, on second, the initiation, the hero becomes victorious in a decisive crisis, and on the third, the return, the hero comes home changed or transformed (Singh, 2021: 184).

Another common characteristic of stories, also known as the "five elements of fiction", is the existence of plot, characters, theme, narrative perspective, and setting. The plot is the sequence of events and their relationship in a story, characters are the people and/or other beings in the work, the theme is the main idea or the message the story conveys, narrative perspective is the relationship of the narrator to the story, and the setting is the time and place in which the events occur. Each element can and should be studied in detail. However, here the one on the target is the place. Not all stories happen on the planet Earth or somewhere on its surface. Some stories, because of their features, need a special setting that does not physically exist. In such cases, worldbuilding plays a crucial role in storytelling.

Although somehow introduced as early as in the Homeric myths, before the twentieth century most worldbuilding can be accepted as existing only in novels leaving the imagination part to the reader. The later visual media had different aspects of storytelling, appealing to different senses. Now there are comics, films, and video games that tell us stories. To name a few, Star Wars and Middle Earth are examples of current-era stories with superior qualities and are often considered worldbuilding epics. The next set of media, the so-called Metaverses, claim to appeal to even different senses to tell us even different stories.

Worldbuilding, as a sub-branch of storytelling, is the process of creating imaginary worlds for telling stories. The term may express different scales and realities, from an ordinary but non-existent village to an inhabited planet and even to a complex system of galaxies. However, worldbuilding often involves the construction of fantastic environments. Therefore, the creators often put forward a new set of geography (continents, oceans, and climate), ecology (flora and fauna), and civilized inhabitants (humans or new races with technology, history, and the most important culture).

The worldbuilding process often begins with the construction of a fictional map. A concise map displaying the geographical features of the terrain and the exact place of the settlements can be helpful for both designers and the audience, in terms of storytelling. The existence of different biomes of plains, mountains, seas, deserts, wetlands, and forests as well as the towns, capitals, and roads would also define the destinies of the local inhabitants. The cartography of these built worlds is sometimes called "geofiction" (Erle et al., 2005: 508).

In these fictional worlds, of course, there also should be biological beings scattered around. Lifeforms like shiny magical trees, cryptozoological animals and monsters, and even hybrids of these two are common. Apart from the flora and fauna, there are also some intelligent civilized races, either humans or other anthropomorphic creatures, interacting with the defined terrain, flora, and fauna. In the real world, the distinctive feature of the only civilized biological species is being gifted with the ability of abstract thinking. And this amazing skill led people to create various cultures. Culture is defined as the totality of values, activities, and products. Cultural products of mankind are generally divided into two, intangible culture on one hand, and tangible or material culture on the other (Karacalı, 2020a: 27). The features like the rituals, norms, music, religion, customs, skills, mythology, and language fall into intangible culture whereas the ones with a physical appearance are considered tangible culture. In other words, the belongings of humankind like the tools, clothes, and architecture construct the material culture.

The creation of constructed cultures (also called "concultures") is the key element of worldbuilding since civilized races can only be distinguished via their existence. Cultures play a decisive role in which the built world reflects and represents stories that are relevant in the real world. More, they discuss how the built world is made to feel realistic. Wolf thinks an invented culture can be tailored in detail according to the story's needs and does not come with the baggage of an existing culture (Wolf, 2012: 179). However, making up an alien culture should exactly be challenging. Therefore, the designers somehow investigate existing human cultures for inspiration. Usual methods are hypothetically using an existent culture out of its context and creating different combinations of the various features of distinct real-world cultures. The twentieth-century developments like the growth of archaeology and anthropology, the spread of mass media, the emergence of new tourism opportunities, and the waves of immigrants arriving in the Western world all helped people to encounter firsthand cross-cultural experiences. And more complicated fictional cultures began to appear as the audiences became increasingly sophisticated in expectation of their existence. Configuration of a detailed fictional culture, for the sake of storytelling and worldbuilding, needs to determine both intangible and tangible features of the civilized inhabitants in question. There are a lot of things to ask first about the intangible ones. What are the values in this world? What do its inhabitant believe in? What do they celebrate? How do they communicate? Are there new languages? What are the economic, financial, and political systems? Are there battles? What about history?

Material culture, on the other hand, needs further explanation especially in constructed worlds for visual media since they are the concrete features of the culture. Another set of questions should be inquired. What do inhabitants of this world wear? Does the clothing represent social status? What kind of tools do they use? What is the technological level? Are there vehicles they drive? And especially what do they build? How was their architecture formed? And what does all this material culture do with the main story?

It is always argued that architecture works as an important storytelling element. Building Imaginary Worlds accepts it as one of the many facets of culture, along with the other infrastructure features which had to be considered concretely as an integrated whole (Wolf, 2012: 182). The architecture alone can transfer a bunch of messages in a built world, as well as it does in the real world. By just observing the structures, the economic cycle, technological grade, and social organization of a society can all be understood. In terms of visual worldbuilding, architecture also helps deepen the spatial experience. Architecture can be mentioned as a very important sub-element of worldbuilding, and essentially the storytelling on a larger scale, since the physical space does much of the work of conveying the story that the designers are trying to tell (Carson, 2000: 3).

All the criteria mentioned here are somehow carefully crafted in worldbuilding attempts. They all serve in the facilitation of the genuine realness of the fictional environment. They utilize the background richness and verisimilitude of the story. Some of the features may be explained in detail, some others may be mentioned superficially, or some may be left (consciously or not) to the imagination of the audience. The features are

perceived through the real-world experiences since the designers make decisions based on their real relationships in the physical world. Simon Provencher states the "Golden Rule" of worldbuilding as "unless specified otherwise, everything inside your world is assumed to behave exactly as it would in the real world". (Provencher, 2012: 1).

Video Game Architecture as Narrative Surrounding

Architecture, or space, is used for narrative purposes since ancient theaters, in terms of volume and scenery. In the last two and a half centuries, the film and television industry also heavily employed the architectural concept for storytelling purposes. And in the last sixty years, video games are introduced as a brand-new visual media. Architecture is also directly utilized in video games, such as the other similar media, however with a significant difference. The distinctive nature of the built worlds in video games as spatial environments is their availability to be interacted with and navigated, much like the real world. The audience, gamers in this case, are in full control of the environmental experience, against the other visual media evaluating them as passive spectators perceiving the space via the fixed perspectives. More, in linear storytelling of the previous media the story is straightforward and the ending is the same for everyone, whereas in the video games both the direction of the story and the destiny of its ending are personal since both are controlled by the players (Hryb, 2015: 18) with the aid of architecture.

Now it is the golden age of video game storytelling, and the designers of these games are treated like celebrities at the game conferences worldwide. Character design they put forward eases the storytelling by defining characters, where the world and structures they build do the same by describing the setting (Adams, 2002: 7). These built worlds are no doubt three-dimensional narrative spaces with obvious architectonic concepts offering new possibilities for interaction. And environmental storytelling is accepted as a key element in the success of a video game (Jason, 2022: 1). Many of these video games draw spatial inspiration from physical architecture (von Borries et al., 2007: 12) to create more accurate imaginary worlds.

The use of architecture in video games, obviously differs from any other visual media, especially in those three-dimensional open-world video games. However, comparing their worldbuilding with the real architecture, they somehow mimic or considered in a close relationship. Numerous similarities and plenty of differences as well, can both be figured out. Both the architects and game designers use the spaces and structures for the same purpose. Most of the time, real-world architecture acts as a reflection of the culture and history of the society while the same is true within the game worlds. When worldbuilding is successful, game architecture would be an embodiment of the morals and values of the fictional people who inhabit it (Zonaga and Carter, 2020: 81). And the architecture here helps players understand the built world as a storytelling element. The need of gamers to perceive architecture in video games comes from its real-world function (Çatak, 2003: 39) which the audience is already familiar with. In successful cases, the architecture makes the players believe as if they are in a real-world, rather than a fictional one. More, both the game designers and architects use similar working methods in their planning and development phases. They mainly work with the three-dimensional computer-generated models which is the fundamental interface between the two disciplines allowing the mutual exchange (Götz, 2007: 134).

The similarity between these two architectures is even converted to unity recently. Relatively new input devices like motion detectors and gesture recognizers hybridize virtual and real worlds (like Nintendo Wii and similar consoles). Away from this, video games migrated outdoors and integrated physical environment and game space via augmented reality (AR) solutions (like Pokémon Go). And it is now the threshold of a newer movement introducing three-dimensional virtual worlds focused on the social connection (metaverse as a buzzword) experienced via AR and VR (virtual reality) wearable technology controller inputs.

According to Ernest Adams, the rationale for architecture, in reality, is different from the reasons why architecture is produced in video games (Adams, 2002: 1). The main difference between virtual worlds and physical places is that the former is not real. They are maintained entirely by computers and exist only in the imagination (Bartle, 2007: 158). In the real world, the place is a natural consequence of space, whereas in the virtual worlds the space should be represented. To date, there have been three main representation formats: nodes for textual worlds, grids for isometrical worlds, and polygons for three-dimensional worlds. Polygons represent surfaces and the space becomes the apparent volume in between them (Bartle, 2007: 161). Therefore,

in video game environments, both structures and landscapes are abstractions of reality (Adams, 2002: 1). Since the entire world is in a computer-generated identity, even the rural and unsettled areas become artificial. Here, the wilderness is also a built environment or architecture made up of polygons.

Besides, neither gravity nor climate is the default in the virtual worlds (Lootsma, 2007: 404), unless defined. Therefore, the architectural concepts of load-and-support, climate responsive design, sustainability, and budget do not remain on the agenda of structure design. This reality no doubt unchains the limits of architecture, unlike the physical conditions. Architectural materials do not behave as in the physical world, since they are just bitmaps attached to the polygon surfaces. Jon Brouchoud (2013: 1) states "500 years from now, there is a good chance you will still be able to play an old copy of Skyrim, but what will be left of the physical city artifact that exists today? They will be ruins at best". The cosmetic identity of the materials in video game worlds only works in terms of meanings linked to them from real-life experiences. In architecture, materials have languages and architects use them as a design and evaluation mechanism (Karacalı and Urfalıoğlu, 2019: 67).

Another main difference between video game worlds is their quantity. Like a three-dimensional chatroom, they connect people from geographically disparate locations all over the world in real-time (Brouchoud, 2013: 1). However, they act more like a stage than a chatroom in that the actions of millions of other players are witnessed (Schmidt, 2007: 148). What happens when this population exceeds the carrying capacity of the virtual ecosystem? This world is cloned. In the physical environment, there is only one planet for people. However, exact copies of the entire game world can be easily created for offering overflow somewhere to go. Some games even connect these parallel worlds to separate servers of difficulty levels, player density, or any other game mechanic. Therefore, when game spaces are already a parallel world simulation for the physical environment (a fantastic escape from everyday life), it also has exact parallels either.

Video game architecture is heavily studied in the academic field, recently. To name a few, Espen Aarseth (2001: 154) claims that "the defining element in video games is spatiality". Wolf thinks that "the architecture is utilized in video games mainly in informing the players about the imaginary world of the game and therefore shaping their gaming experience" (Wolf, 2012: 180). Michael Nitsche (2008: 160) puts forward that "architecture can help describe how a game world can gain significance and a quality or place". Friedrich von Borries et al. (2007: 13) argue that "interdisciplinary exchange between architecture and game design is mutually beneficial" and suggest that "this would lead to a new form of interactive space". And Mark Bonner (2014: 4), in his studies, provides a foundation of an academic synthesis of architectural thought with game studies and discusses theories from architecture that describe and help us understand how architecture in games, like real architecture, uses styles and forms to refer their material entity to actual functions and internal contents.

Another study, Ernest Adam's (2002: 3), The Role of Architecture in Video Games sorts the primary and secondary functions of architecture in video games. The primary functions are listed as, "supporting gameplay", "establishing boundaries that limit the freedom of movement", "hiding valuable or dangerous objects from players and players from each other", "encouraging to jump across, climb, and avoid", "stimulating the exploration feeling" where the secondary ones were "giving clues through familiar spaces", "taking advantage of the ideas via referring real buildings", "creating a sense of unfamiliarity (as well, if needed)", "generating a sense of mystery", "fabricating a sense of danger", "designing a lighthearted and funny environment (if the game is not supposed to be wild)", "relying on clichés and stereotypes to set a scene and establish player expectations quickly".

Yet another study, Narrative Spaces by Henry Jenkins mentions the narrative side of the game architecture. According to him, environmental storytelling creates the preconditions for an immersive narrative experience in up to four different ways: "Evocative Spaces", when the game takes part within a larger narrative system of books, films, comics, and other media. Games here have an important role in their ability to give concrete shapes to their memories in which can be wandered and interacted. "Enacting Stories", when the spatial stories are brought together by defined goals and driven by the player's movement across the map. Here, the principles of environmental storytelling are utilized once more since the organization of the plot becomes a matter of designing the geography. "Embedded Narratives", when the game designers develop two kinds of narratives:

one is unstructured and controlled by the players as they explore the space, and the other is prestructured but embedded within the mise-én-scene awaiting discovery. And "Emergent Narratives", when the game is not of merely preprogrammed stories. So-called "sandbox" or "dollhouse" genres are examples of decent quality since the players define their own goals and write their own stories. Jenkins also summarizes these four ways as follows: In the case of evoked narratives, the spatial design either enhances the sense of immersion with a familiar world or communicates a new perspective on a known story through alternative details. In the case of enacted narratives, the story may be structured around the character's movement through space. In the case of embedded narratives, the game space becomes a memory that please user deciphers. And in the case of emergent narratives, game spaces should be designed to be rich in narratives for enabling the story construction activity of the players (Jenkins, 2003: 118).

In the study Viva Piñata, Tor Lindstrand puts forward that;

> *Working with architecture in virtual worlds means that the specific properties of those worlds should be researched, how they are constructed, how their site and subjects are conceptualized, and so on. (…) Whether like it or not, virtual architecture exists in this world, with or without the help of architects.* (2007: 356).

In recent years, the trend of game studios hiring formally trained architects is obvious. This helps in creating more authentic three-dimensional environments than those previously created by the level designers or art directors (Zonaga and Carter, 2020: 72). In an interview with ArchDaily, when the question "How does a degree in architecture contribute to a career like yours?" asked, Philip Klevestav, principal artist at Blizzard Entertainment answers;

> *As someone without an architectural degree myself, unfortunately, I think it can be very valuable to have architects on the team who knows the proper terminology. (…) I would say especially having worked closely with one person who held a degree in architecture, I learned a lot of things over the years and it also helped me gain a lot more interest in architecture in general.* (Stouhi, 2020: 1)

In another conversation with Space Time Play editors, architect Olivier Azémar, level designer at Ubisoft stresses that;

> *As an architect, I have to bring my spatial and design expertise to the production team while building maps and levels, just like the spatial distribution in a building, horizontal and vertical circulations, scale and dimension. (…) Architectural expertise has strongly influenced and will continue to influence the creation of the spatial experience, not only in the field of realistic representation but, above all, in the reinvention of video game spatial qualities and codes.* (von Borries et al., 2007: 133)

In yet another study, Jon Brouchod thinks that;

> *You may have the most impressive and carefully created castles in a medieval game or maybe a killer space station in a futuristic sci-fi game. You may have even thought about architecture and worked very hard to create realistic buildings. But that does not necessarily mean you have created architecture. Buildings are not always architecture. (…) Architecture can tell a story, evoke emotion and shape player experience more effectively than any other aspect of the game. You can have the best characters, storyline, and graphics, but without an equally considerate approach to architecture, your player experience will always fall short of its fullest potential.* (2013: 1)

And in the interview mentioned above, Philip Klevestav, principal artist at Blizzard Entertainment also puts forward;

> *As for the world of video games, it is not just about the quality of the graphics, but rather the immersive experience of visual designs and how the players are communicating with the virtually-built environment. (…) Before beginning to work on any map a lot of references are gathered and dominant and recognizable architecture for the area is tried to be found out. Cultural reference is also very important: what kind of food is popular here? What modes of transportation stand out? Are there any specific celebrations or festivals that are very local to this area?* (Stouhi, 2020: 1)

In another study, Manuel Saga thinks;

> *The building design should suit the style of the game. In Starcraft, for example, the Terrans are humans of the future with super-tech buildings that can fly. Meanwhile, the Zergs are an alien race based on organic matter,*

> *including, an infrastructure of living buildings. In both cases, the construction of both races should be easily recognizable by the players.* (2016: 1)

The architecture here finally breaks free from the bonds of physical and budgetary limitations of the real world and becomes wholly narrative. Especially for the game worlds of the fantastic genre, it is obvious that architecture has a leading role in identification. Since there is a high probability of the existence of non-human intelligent civilized races with distinct cultures, the architecture with no doubt has to serve in terms of its storytelling skills. The fictional identities of these constructed indigenous cultures cannot be told without the design of perfectly matched vernacular architecture.

Fictional Vernacular Architecture

Since the structures of the constructed cultures in video games are called vernacular architecture, first, this term should be defined in detail. Not all structures on the planet were designed by architects or specialized craftsmen. On the contrary, the percentage of the buildings created by these people is quite a few. According to numerous studies, 90 to 98 percent of the total building stock of the globe has a vernacular identity (Oliver, 2003: 15). However, this huge building collection was considered too low-level to evaluate by architectural history for a long time since they were not palaces or temples. The little reference of vernacular architecture to mainstream architectural styles or theories is another reason for this disregard. However, in the last 40 years, there is a growing academic interest in the study of the field, satisfyingly.

Definition of the term is still a little challenging and the Vernacular Architecture Forum (VAF) acknowledges that there have been and continue to be debates on defining vernacular architecture. The shortest (and the strictest) explanation is ‘architecture without the architects’. When the time comes for an expanded definition, exploration of the characteristic parts of the academic studies mentioned above can be useful. In Encyclopedia of the Vernacular Architecture of the World, Paul Oliver (1998: 111) puts forward “related to their environmental contexts and available resources, they are community built structures, utilizing traditional technologies” and “it includes the collective wisdom and experience of a society and the norms that have become accepted by the group as being appropriate to its built environment”. Oliver (2003: 15) also thinks, in Dwelling: The Vernacular House Worldwide, “it is the architecture of the people, by the people, but not for the people” since it is for themselves, and in Built to Meet Needs, “all types of buildings made by people in the tribal, folk, peasant and popular societies whereas an architect, or special designer is not employed” (Oliver, 2006: 4). According to Nezar Alsayyad (2006: 17), “they were produced without the need for imported components and processes built by the individuals who occupy it”. And for Marcel Vellinga (2006: 115), the field is a “more dynamic approach that explicitly focuses on building traditions rather than buildings”. Yet another definition, explained by Dell Upton (1983: 262), mentions “my preference is to define vernacular architecture not as a category into which some buildings may be fit and others not, but as an approach to architectural studies that complements more traditional architectural historical inquiries”.

Despite all these detailed definitions, there still are common misconceptions about vernacular architecture. First, the term is misunderstood as if it mentions primitive structures. However, they almost outperform modern structures even in the severest conditions. More, vernacular architecture is thought to be ancient. Though the building technique is traditional, the structures are still built and used at present. A third misconception scopes the idea that vernacular architecture belongs to the rural world. Despite being found in lesser quantities, they also exist in urban areas, especially in suburban immigrant settlements. The last wrong perception accepts all vernacular buildings as residences. However, vernacular architecture is not confined to just dwellings. There are many farm structures, shrines, shops, schools, and many other buildings with several functions fitting the definition of the term.

A definitive study, A Detailed New Method for Vernacular Architecture Research, investigating both the definitions and the misconceptions, focuses on the following synthesis: “Vernacular architecture is the architectural activity presented in a geography, over locally available materials and experienced technique, collaborating with local climate and running the cultural values, however without the employment of a professional designer”. The same study also structs abstract inputs and concrete outputs of vernacular architecture: climate, economy, and culture are the successive inputs whereas material, technique, and form are the outputs in order (Karacalı, 2020a: 16).

Climate is the genesis term in vernacular architecture design since the very first function of architecture is providing a shelter adapted to the climatic factors. According to the Köppen Climate Classification System, there are five main types of climate: Arid (hot-arid), Tropical (hot-humid), Temperate (warm-arid), Continental (warm-humid), and Polar (cold). Despite meager resources, vernacular structures successfully meet all the climatic conditions of these types (Fitch and Branch, 1960: 1) and the most enlightening solutions are found in those areas where the climate is the severest (Rapoport, 1991: 85).

In cold climates, structures become either smaller or in a compact identity to decrease the surface area so as not to lose heat. The well-known "igloo" can be a good example of this type. In desert climates, on the other hand, structures once again become smaller but this time not to gain heat. Cooling solutions as wind catcher chimneys and enclosed pooled courtyards were introduced. The "Bedouin tents" from the Sahara Desert and the "Harran houses" from Turkey are good examples. The other hard climate, but not extreme as the mentioned ones, is tropical. This time, the façades of the structures become permeable, or the structure overall is raised on piles, both to welcome wind to reduce moisture. Since also the sunlight is another major problem, here thick roofs with large eaves are observable. Scientists studying vernacular architecture name these structures "huge umbrellas". The "rumah adat" from Indonesia and the "ifugao" from the Philippines can be examples. In the last climates, the warm-arid and warm-humid, the climate is not a major problem, and builders can focus on the other inputs.

Certain climates create the distinct biomes of the planet. And these biomes facilitate habitats for certain endemic animals, plants, and fungi. Human, on the other hand, is the only creature that spread all these biomes. The amazing ability to manipulate all these organic entities and the inorganic material around them helped humans in creating economies. However, the "geographical determinism" denouncing human creativity and accepting mankind as passive robots helplessly programmed by climate, fauna, and flora is a misconception (Diamond, 2017: 14). Certain economies support limited populations and certain forms of social organizations emerge and social groups survive by their organization of labor and goods. These economy types can be listed as subsistence, nomadism, agriculture, and industry. The vernacular architecture can be observed in all these organizations.

In the subsistence economy, the "hunter-gatherers", are the people who do not produce food. They keep migrating to the next zone of resources when one gets empty, and they leave back the structures they built. The "Bambuti pygmy hut" from Congo and the "gunyah" from Aboriginal Australia can be good examples. The second economy is the nomadic one. Here, people follow specific routes together with their herds. And this time, the architecture adapts to the migration and becomes demountable and portable. The well-known "yurt" tent from Central Asia and the "black tent" from Tibetan China can be listed as examples. The third type of economy is agriculture. This time, people are settled farmers. They produce food both via horticulture (gardening) and husbandry. Approximately one-quarter of the world population, roughly two billion people are farmers, and their residences and outbuildings (farming structures) are the greatest part of the vernacular architecture stock. The last form of economy is the industry. Though many of the buildings in urban cities are designed by architects, vernacular architecture samples are observable mainly in the suburbs. Famous slums like the "favela" from Brazil and the "barriada" from Peru are perfect examples of this category.

While speechless creatures adapt distinct biomes via biological adaptation, humans, the only creature is known to be gifted with abstract thinking ability, can create cultures. Culture is the last input of vernacular architecture studies. Since certain economies can support certain populations, the social organizations mentioned above emerged. Erman Service (1962: 111) listed these sociopolitical typologies as bands, tribes, chiefdoms, and states. However, it is obvious that cultural zones are neither defined by nations, nor by the political borders. Cultural products of mankind are divided into two, intangible and tangible. When the intangible part covers the rituals, religion, music, mythology, language, and other similar entities, the tangible culture is of concrete things like tools, clothes, and architecture. Therefore, the tangible culture is also called "material culture". Since the distinct cultures have very different norms of cooking, dining, worshipping, working, gathering, and any other daily activity, the architectural needs, even for the same function, can be changeable in uncountable numerous ways. This alone can explain why there are countless distinct samples of vernacular architecture all over the world.

As mentioned before, the elements of material, technique, and form are the concrete outputs of vernacular architecture. The first one, material means the physical resource of construction, or in other words, what the structure is mainly made of. Most of the time, the vernacular builders face a challenging range of material choices, compared with the formal architects. Therefore, they tend to use the available material around them. They also push the limits of their structural features and achieve the most inspiring solutions. And their performances are also admirable in terms of sustainability as well. Vernacular architecture is built either from the ground or with the resources that grow. That means the vernacular building materials fall into two main groups: inorganic or earthen materials that include mainly the earth itself (mud, turf, soil, sand), and stone, metal (very few, since being an industrial product), and even snow, and the organic group consisting of mainly the plants (logs, branches, reeds, bamboos, grasses, fibers, leaves), and animal products in very few quantities (bones, hair, hide, horns, seashell, and even dung).

Earth is the widest used construction material in the world, in numerous sophisticated techniques. Earth is a compression material and can bear a considerable amount of vertical load. More, it has a very high thermal capacity. Unfortunately, the earth is non-renewable but reusable. “Taos Pueblo” from the United States can be a superior example of earthen vernacular architecture. Plants are the second most widely used building materials all over the world. Since there are plenty of plant species, techniques and forms are also numerous. The “mudhif” from Iraqi marshes and the “log cabin” from Northern European forests can be distinct examples. Needless to say, there are some mixed techniques of using both earth and plants together. Materials have meanings in architecture, this phenomenon is facilitated in terms of evaluation.

Building materials and construction techniques can be mentioned as inseparable. Certain materials allow certain forms of techniques. Earth is not available to stretch whereas piling up the hides also becomes useless in terms of architecture. Some materials, on the other hand, are available for different techniques and result in remarkably diverse solutions. Architecture mainly relies on the one simple relationship between the load and the carrier. All building elements have a weight affected by gravity. The design of the interaction between the load and the load-bearing element creates the rules known as the building technique. Vernacular building techniques are almost traditional. Each of them is a result of a very long time of trials and errors. This indigenous wisdom can also be called the “know-how” of what to do with the material around.

Earth material can be used in quite various techniques such as carving (as horizontal caves and vertical pits), building with wet mud (known as “cob” in English), cutting bricks out of turf, ramming earth (in a mold built beforehand), plastering (on a branch weaving, known as “wattle-and-daub” in English and “Baghdadi” in the Middle East), creating “superadobe” (filling bags with earth or sand, an unusual technique pushed by architect Nader Khalili), and prefabricating adobe. Adobe is considered the most sophisticated building method of earth and is of creating earth bricks in wooden molds, sundried or fired. Another inorganic material, the stone is available only in the piling up technique, either dry or wet with mortar. Plants, on the other hand, also display a great variety of building techniques. When ready in logs, they can either be piled up or used in a frame structure with local variations. Branches can be weaved as a basket and plastered with mud. Bamboos are again used in creating frames. Grasses and leaves are used as façade finishes or roof coverings (called “thatch”).

The final output is the form. In architecture, the term form refers to the physical plastic entity of the structure, or in other words, the geometrical reference of the building. Vernacular structures are rarely identical to one another, and they can also be categorized via their abstraction to basic geometric three-dimensional forms, such as cones, domes, cylinders, and cubes. The cone is one of the widest used forms in vernacular architecture. It is found either as the roof shape or as the structure itself (called “rooftecture” in architecture when there is no visual difference between the walls and the roof). The American “teepe” and the Siberian “chum” are conic vernacular structures. Dome, on the other hand, is the perfect geometry in terms of covering the maximum volume with minimum surface area. Therefore, it is used in climates with the minimum heat transfer desired, either inwards or outwards. The polar “igloo” and the Cameroonian “musgum” (actually a parabolic dome) are examples of decent quality. The cylinder, generally combined with a conic roof, is another vernacular form. It is a less popular option and various African “rondavels” can be exampled. And the cube, as the final vernacular form, is used rarely. Corners, in terms of load distribution, can be considered as the reason for this disregard. The “taos pueblo” can be an excellent example of this infrequent vernacular form.

Mentioned definitive study, A Detailed New Method for Vernacular Architecture Research, also covers the "other vernaculars" (Karacalı, 2020b: 57). The study lists the other vernacular as follows: the urban vernacular, the new vernacular, the museum vernacular, the kitsch vernacular, and the fictional vernacular. The urban vernacular term includes the suburban vernacular structures mentioned in the industrial economy. The new vernacular term covers the studies of formal architects that draw inspiration from vernacular architecture. Here, the works of Hassan Fathy, Geoffrey Bawa, and Charles Correa can be considered the pioneers. Museum vernacular is the concept of open-air museums for the sake of the romantic tourist appeal. However, examples are full of misconceptions like unrelated reconstructions and misleading images. Kitsch vernacular is a similar attitude with awful hotel concepts of mimicking the vernacular architecture. They are unfortunately nothing but cosmetic and exaggerated copies of vernacular architecture, built in formal methods.

The final and the most interesting "other vernacular" is the fictional ones. The term fictional here covers the unreal structures of novels, movies, and video games, especially the ones of the fantasy genre. Here, mostly nonexistent cultures of humans or other civilized races are shaped. And among other material culture entities, architecture has a leading role in terms of storytelling. Buildings of distinct universes (or built worlds) of Lords of the Rings, Star Wars, Avatar: The Last Airbender, and World of Warcraft franchises can be considered examples of superior quality. Whoever designs their structures, level designers, art directors, or formally educated architects, these people have a deep insight into vernacular architecture.

Structures from the World of Warcraft

World of Warcraft, as one of the mentioned titles considered worldbuilding epics, deserves to be studied in detail, especially in terms of the setting and the architecture. Warcraft is a franchise created by Blizzard Entertainment and consists of video games, novels, films, and other media. The first three installments were real-time strategy (RTS) games titled Warcraft: Orcs & Humans (1994), Warcraft II: Tides of Darkness (1995), and Warcraft III: Reign of Chaos (2002). The first two were two-and-a-half dimensional games on a grid map and the third was fully isometric. The fourth and best-selling title, on the other hand, is a fully three-dimensional (third-person view) massively multiplayer online role-playing game (MMORPG) called World of Warcraft (2004). Contrary to previous RTS games in which the players build structures and control armies, here the players create a single avatar and develop it (by levelling it up). Another installment, the Hearthstone, an online digital collectible card game, was released in 2014. And a currently a new mobile game, titled "Warcraft: Arclight Rumble" announced in May 2022, to be released. Also, one movie titled "Warcraft" (2016) and numerous novels were produced in the franchise.

World of Warcraft had been a major commercial success upon its original release in 2004 and rapidly became the most popular MMORPG of all time. The game had one hundred million player accounts (inactive ones included) in 2014 and the game had made over nine billion dollars in revenue (sold twenty-three million copies), making it one of the highest-grossing video games of all time. And at its peak in 2017, there were forty-six million active subscribed players. Since its launch, World of Warcraft had nine major expansion packs: The Burning Crusade (2007), Wrath of the Lich King (2008), Cataclysm (2010), Mists of Pandaria (2012), Warlords of Dreanor (2014), Legion (2014), Battle for Azeroth (2018), Shadowlands (2020), and the latest announced the Dragonflight to be released. Each expansion enlarged the game universe by adding new playable races and new settings to be explored.

The game is set in the high-fantasy world called Azeroth (The term "high-fantasy" stands for epic settings, characters, and plot whereas the "low-fantasy" is used for the ordinary worlds that magical events intrude on). Blizzard Entertainment focuses on the narrative of Azeroth together with polished gameplay. This is accepted as the main reason for its worldwide success. Creators spend a vast amount of time crafting the setting. Because they know that the players will develop a deep emotional connection to a game world that will keep them coming back again and again.

In the original release (called "vanilla" in the gaming terminology, which means the core game in its original release, without any expansion packs yet), the Azeroth was divided into two main continents: the Kalimdor in the west (mainly controlled by the Horde, one of the two factions of fictional races) and the Eastern Kingdoms (mainly controlled by the Alliance, the other faction). Later expansions enlarged the game map by introducing new continents, new planets, and alternative time travels. Azeroth is actually not a big planet, compared to the

Earth. A study calculated the distance between the north and south tip of the Eastern Kingdoms continent as thirteen kilometers (Aarseth, 2008: 116). However, all the civilizations, creatures, and lots of magic can fit into this relatively small built world.

Figure 1. Current map of Azeroth

The continents of Azeroth are divided into zones. Each zone has a uniquely rich variety of climate, flora, and fauna (and even a unique in-game soundtrack, as well) such as the marshes, wetlands, jungles, and highlands known in the real world. However, the climate is not accurate since icy zones can be found around the equator and the deserts can occupy the adjacent zone or the northern or southernmost territories. And there are urban spots in these zones occupied by the fictional races, as well as the mentioned rural settings. There are smaller villages and towns, and also the greater capitals of each race. The key design principle behind Azeroth is enjoyment, not geographic or material realism. The overall setting was designed and optimized for gameplay, and their real-world resemblance is a secondary feature.

World of Warcraft is a game in which all players try to develop their character (or avatar) via completing quests, fighting with monsters (and each other as well), exploring the Azeroth (navigating between zones by walking or on land or flying mounts), and unlocking new skills, weapons, and armors. At the very beginning of the game, the player creates an avatar by choosing a race and a class. In the World of Warcraft, the fictional races are divided into two enemy factions, the Horde and the Alliance. Races in the vanilla were the Orc, the Undead, the Tauren, the Troll for the Horde and the Human, the Dwarf, the Night Elf, the Gnome for the Alliance. Expansion packs introduced the new races of the Blood Elf and the Goblin for the Horde and the Draenei and the Worgen for the Alliance, and the Pandaren which can choose one of both factions later in the game. And the classes of the game are the Druid, the Hunter, the Mage, the Paladin, the Priest, the Rogue, the Shaman, the Warlock, the Warrior, the Monk, the Death Knight, and the Demon Hunter. Race means general looking of the avatar whereas class is for somehow the profession (for example, gaming mechanisms such as battling with magic or swords and wearing cloth or mail armor are shaped via these choices). The avatar has benefits both from its race and class. Not all races can choose all classes, and this dual choice shape the gaming experience.

Figure 2. Races of World of Warcraft

All races are common in their anthropomorphically bipedal design. In other words, they are all humanoids. However, as well as their physical experience, they display a vast variety of their unique cultures, each designed in detail. Some of them come forward with the design of their distinct material culture.

For example, the Orcs, also known from the Tolkien lore, are a muscular race with greenish skin and sharp teeth. It is known that their design has obvious Central Asian (Turkic and Mongolic) influence. Even the word "Horde" (the faction Orcs lead) is from the Turkic term "orda (or ordu)", meaning "camp", "headquarters", "army" and "tribe". They are displayed as somehow savage bloodthirsty warriors. Shamanism is a widespread life practice for them. Therefore, their material culture identifies these uncivilized features. The Taurens, on the other hand, are bovine ungulate humanoids with huge horns. They look like the monster Minotaur from Greek mythology. However, their culture has references from the Northern American Natives. They are organized in chiefdoms, dwell in teepees and there are lots of totem poles around their settings. They also wear war bonnets, headgear decorated with feathers, and play drums. Another race, the Trolls, who are also known from the European folklore, are differentiated by their huge fierce tusks and blueish skin tone. Organized in tribes, the troll culture has Aztec, Maya, and Inca references. They also practice voodoo worship, known to the African people. Their settings are full of masks, similar to the African and Polynesian cultures. Their overall tribal culture can be considered the Caribbean. Their architecture also shares features with the tropical real-world cultures.

The Humans of Warcraft can appear in any real-world skin tone. They wear clothes and armor and live in structures, both similar to the real world medieval culture. The Human settlings are generally in geometrical plan and of stone architecture. Fortresses, castles, and walls are common in their environments. The Dwarfs, on the other hand, are short and stubborn natives of Azeroth, with males having huge beards. They are somehow based upon Tolkien dwarf culture. Their physical appearance and in-game mythology can be considered Norse-based. However, they are also familiar with the cultural features known from the Irish and Scottish. Beer has a unique importance in their culture. Their economy is heavily based on mining and blacksmithing. They have a huge forge, carved in the mountains. The Night Elves are another ancient race with mystical features. They have very long and pointy ears and shiny eyes. They have a deep connection with nature and are very familiar with the magic. The Lunar Festival, based on the Chinese New Year is a very important celebration for them. Chris Metzen, the former Senior Vice President of Story & Franchise at Blizzard Entertainment, once told that the elven architecture draws influences from both Nordic and Japanese styles. Pagodas and torii gates around their settings are obvious evidences. They also built large domes, known from the Byzantine architecture. They also have many sacred trees and beautifully decorated pools.

Pandaren (humanoid pandas) are another ancient race of Azeroth with a deep history, love for nature, and again strong ale. Here, they present the East Asian cultures. They are monks skilled in the Martial Arts. They also have a vast collection of cuisine based on Asian cultures. And they herd dragons. And for architecture, the monasteries and palaces with hip-and-gable roofs and rich ornaments are common in their settings. They have huge walls mimicking The Great Wall of China and Zen gardens. Gongs, bells, and incenses around their shrines once again prove the Asian influence.

Many scientific studies focused on the fictional culture creation in the World of Warcraft. Some of them praise the attitude of Blizzard Entertainment, an American company in borrowing foreign cultural concepts from all over the world and melting them in a pot. According to these studies, features like Nordic gods, Chinese cuisine, and Egyptian architecture are blended into the lore (or story) of the game successfully. And those cultural elements encourage players in adapting to the game and becoming deeply attracted to it (Wu, 2020: 520). However, another set of studies does not hesitate in criticizing the storytelling of the game in terms of creating cultures. Many of them blame Blizzard Entertainment for whitewashing, in terms of ethnocultural racial stereotyping. According to them, the company has a Western perspective attitude in creating the races of the Horde and the Alliance factions. They put forward the detail of displaying the Alliance cultures as "WEIRD (western, educated, industrialized, rich, and democratic)", civilized and good, whereas the Horde cultures as savage, cruel, colonized, barbarous, dirty, disorganized, primitive (Langer, 2008: 91), and evil.

Another group of studies focuses deeply on the architecture of the Azeroth. First of all, the common perception offers that the stunning diversity of buildings of Azeroth secures it the top spot (Patel, 2009: 1), and making

World of Warcraft a worldbuilding epic. Intentional or not, many architectural solutions in the game work similarly to the real world (Ljungström, 2005: 1). More, the World of Warcraft privileges architecture as a spatial experience, in terms of moving, wayfinding, and the joy of exploring. Eskelinen (2004: 1) thinks that spatiality is an important factor in video games and that very fact makes architecture far more important to game scholars and designers. However, games utilize architecture and landscape for sake of the gameplay. The buildings and the rural settings are mainly used to provide attractive settings, what gamers call “eye candy”. And World of Warcraft proves this phenomenon in terms of its rich colorful surroundings. Many scholars agree that the Azeroth has nonrealistic but unique cartoonish graphics. More, the World of Warcraft simulates building materials in terms of their appearance. The wood or the stone do not actually behave like their actual properties in the real world (McGregor, 2006: 1). They exist just with their meanings. All these attitudes struct the architectural narrative. World of Warcraft, therefore becomes a visual storybook.

Another task of architecture in Azeroth is to differentiate between the opposing factions, according to their cultures mentioned above. The Alliance races tend to build in stone in strict geometrical plans with varying degrees of integration into the landscape whereas the Horde races prefer cloth and wood materials in looser organic plantype (McGregor, 2006: 1). Even for the urban design, the Alliance capitals of Stormwind (the Humans) and Ironforge (the Dwarfs) are in geometrical plantype whereas the Horde capitals of Orgrimmar (the Orcs) and Thunder Bluff (the Taurens) are organic.

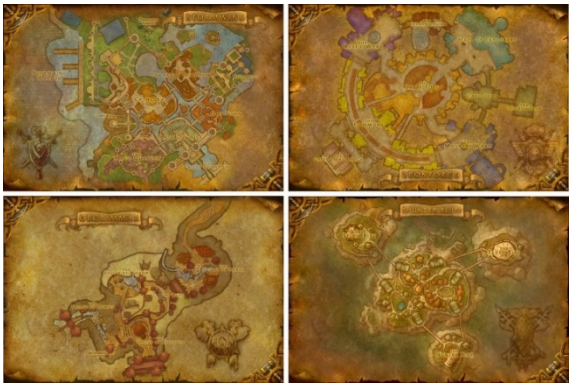


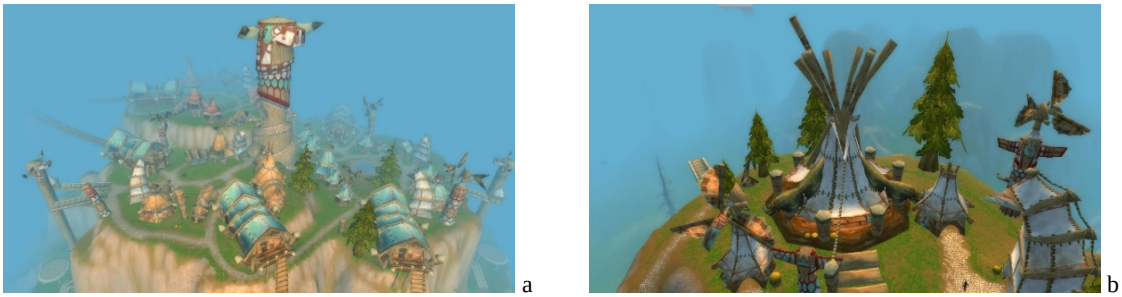
Figure 3. Maps of several capital cities (geometric plantypes above and organic ones below)

Below, there are in-game screenshots of different settings chosen from the mentioned distinct cultures of the races, those will help in understanding the role of the architecture of World of Warcraft, in terms of storytelling and worldbuilding. Since the Orcish culture was designed savage and bloodthirsty, the form and the material of their structures are quite offensive. Many of these organic buildings have long spikes, chains, and untidy war banners. For a realistic counterpart, they somehow remind the Turkish and Mongolic yurts in form resemblance, as expected.

a b c

Figure 4. Aerial view of the Orcish capital Orgrimmar (a), a close-up view of an Orcish structure (b), gates of the Orgrimmar (c)

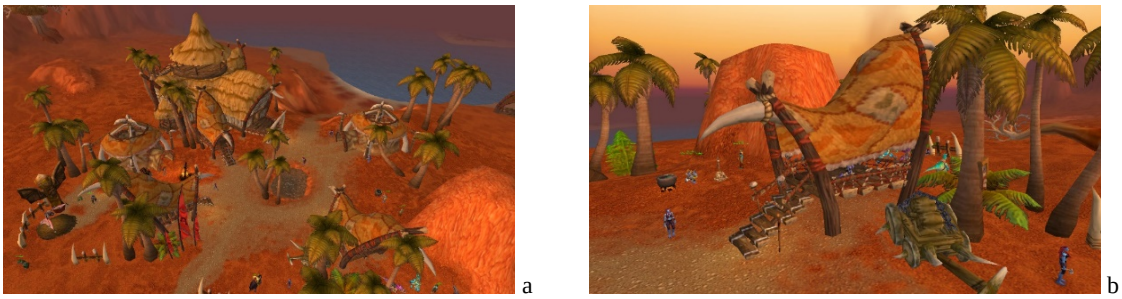
The Tauren culture has many obvious Northern American Natives influences, as mentioned above. They prefer to live in structures with the organic formed fabric tents and teepees of these real-world native cultures. And many totemic poles, as mentioned before, are visible around their settlings.



a b

Figure 5. Aerial view of the Tauren capital Thunder Bluff (a), a close-up view of a Tauren structure (b)

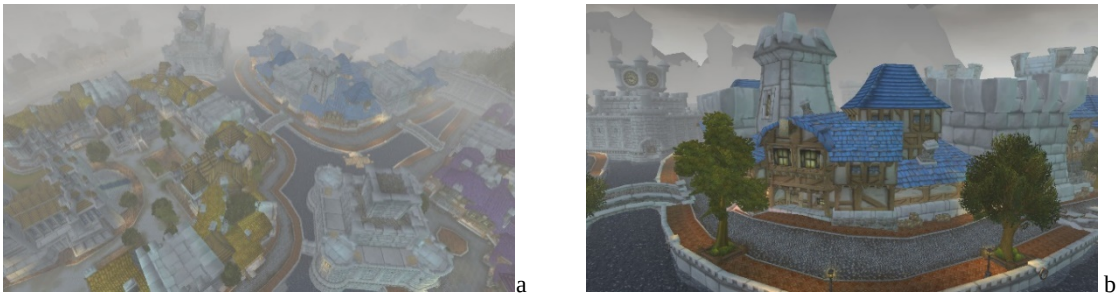
The Troll settings, on the other hand, directly remind us of the tropical real-world architecture risen on stilts, for maximum cooling. The materials such as structural tusks, stretched fabric, and thatched roofs also support this similarity.



a b

Figure 6. Aerial view of the Troll settlement Sen'jin Village (a), a close-up view of a Troll structure (b)

The Stormwind, the Human capital of Azeroth, has many stone walls, castles, towers, and a central cathedral. It is obvious that the city was designed with medieval architecture in mind. The geometrical organization known from the urban plan is also followed for the building design.



a b

Figure 7. Aerial view of the Human capital Stormwind (a), a close-up view of a Human structure (b)

The Ironforge, the Dwarven capital of the game, is a great forge carved in the mountains. Irish and Scottish influence is visible through the structures inside this cave. As an Alliance race, the strict geometry of both urban design and structure design is also applied here.

a b c

Figure 8. Interior view of the Dwarf capital Ironforge (a), a close-up view of a Dwarven structure (b), Gates of the Ironforge (c)

The main city of the Night Elf culture is Darnassus. This and any other Night Elf setting are full of shiny magical trees since the Night Elven culture is linked with nature. As mentioned above by one of the game designers, the influences of both Japanese and Byzantine architecture are clear. The Night Elves have either pagodas and torii gates or larger ornamented domes in their settings.

a b c

Figure 9. Aerial view of the Night Elven capital Darnassus (a), a close-up view of a Night Elven structure (b), Gates from a Night Elven setting (c)

Introduced in one of the later expansion packs, the Pandaren are another unique culture designed in detail. The Asian architecture was followed in the settlements of Pandaria, the main Pandaren continent in Azeroth. Almost every structure has a hip-and-gable roof, the main Asian architectural characteristic. More, there are huge temples, monasteries, and various pagodas with courtyards for meditation purposes. Almost everywhere in Pandaria is decorated with bells, gongs, and kites. There also is a great wall in between the Pandaria zones obviously mimicking The Great Wall of China.

a b c

Figure 10. A Pandaria settlement (a), a monastery structure from Pandaria (b), a bridge structure from Pandaria (c)

For an overall evaluation of World of Warcraft architecture, several determinations can be put forward. However, before they are introduced, the overall analyses of storytelling and worldbuilding of World of Warcraft should be put forward.

CONCLUSION

Blizzard Entertainment created deep lore and a wonderfully detailed constructed world for the Warcraft franchise. And they keep telling us stories within these lore and setting, in each new installment they publish in this franchise. For worldbuilding purposes, there is a unique map covering the continents, oceans, and climate. Each zone has a different set of flora, fauna, and civilized inhabitants. And for civilized inhabitants, the designers created equally detailed races with unique material cultures. They all have clothes, tools, and architecture in a variety of distinct appearances. Since architecture is the key element in material culture with its storytelling skills, the creation of structures for each distinct culture obviously was studied in detail.

For the video gaming architecture, in the narrative experience scale of evocative / enacting / embedded / emergent spaces, the World of Warcraft displays an umbrella stance, rather than sampling one of them. The design of Azeroth is evocative, in terms of being a part of a greater ecosystem of several books, games, and other media, known as the Warcraft franchise. It is also enacting, in terms of gathering people together for similar purposes. For embedded spaces, the game presents a prestructured mise-én-scene for players to explore. And for emergent spaces, the game gives freedom to its players to define their own goals and write their own stories.

Finally, the structural creation in World of Warcraft can be considered successful for a bunch of reasons. First, since the Azeroth is a three-dimensional built world, the structures stand with their spatial identity both indoors and outdoors. Some games, on the other hand, evaluate the structures with their abstract meanings (as an example, in Age of Empires, an isometric real-time strategy franchise, when lumberjack villagers drop off the wood to a storehouse structure, the resource becomes invulnerable, since it is not an actual architectural storage). However, the World of Warcraft utilizes the architecture for similar purposes to the real world. Second, in terms of the vernacular architecture, the game becomes an excellent example of the structural identity of fictional cultures. In terms of the identification of distinct cultures and the differentiation of their appearance, architecture here plays a critical role. The structures of Alliance races look similar to the real world formal architecture whereas in the design of Horde races' buildings, a more vernacular identity is preferred. This alone proves the critics of the Western attitude. The Alliance races were designed with industrialized cultures in mind, whereas the Horde races look similar to the alien cultures of somehow third-world countries. Third, as well as the building forms, also the building materials work for storytelling. Neither stone, nor wood, nor spikes is actual materials. However, they ease the perception of the fictional cultures, either savage or industrialized. Fourth, the cartoonish atmosphere preferred while building the Azeroth indicates that the setting was optimized for the gameplay. Structures and cities in World of Warcraft prefer a unique appearance, and this is not a realistic one. Therefore, the storytelling function of the architecture here is the main goal of worldbuilding. Azeroth is a fantasy world, and this dissimilarity seems working successfully.

After an overall evaluation of the architecture of the Azeroth, it can be confidently stressed that, for the features of being not a photorealistic environment but narrative, and pushing the limits of storytelling of architecture, the World of Warcraft should be accepted as another worldbuilding epic. And the use of vernacular architecture here singlehandedly takes control of much of the storytelling function of the game world. Since the number of this much detailed game worlds with this much cultural variety is limited, the evaluation of storytelling features of architecture in World of Warcraft can be considered somehow unique and the leading example. And therefore, the Azeroth can be named a very successful fictional world which has been built from scratch.

Authors' Contributions

The author contributed to the study 100%.

Competing Interests

There is no potential conflict of interest.

Ethics Committee Declaration

Ethics committee declaration was not required for the study.

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Figure References

Figure 1: Wowpedia. (n.d.). Current map of Azeroth. https://wowpedia.fandom.com/wiki/Azeroth (07.04.2022).

Figure 2: World of Warcraft. (n.d.). Races of World of Warcraft. https://worldofwarcraft.com/en-us/game/races (07.04.2022).

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Review Article

Otizmli çocuklara eşleme becerilerinin öğretiminde somut kullanıcı arayüzü tasarım kriterlerinin belirlemesi

Determining tangible user interfaces in teaching matching skills to children with autism

Res. Asst. Dr. Gizem Hediye Eren[1*], Asst. Prof. Dr. Füsun Curaoğlu[2]

[1]Eskişehir Technical University, Faculty of Architecture and Design Department of Industrial Design, Eskişehir, Turkey.
gheren@eskisehir.edu.tr

[2]Eskişehir Technical University, Faculty of Architecture and Design Department of Interior Design, Eskişehir, Turkey.
fcuraoglu@eskisehir.edu.tr

*Corresponding Author

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Özet
Otizmli çocuklarda görülen temel eksikliklerden biri sembolik düşünme eksikliğidir. Sembolik ve soyut kavramları anlamadaki zorlukların üstesinden gelmede; nesneler arasındaki benzerlik ve farklılıkları idrak etme, parçaların oluşturduğu bütünü kavrama, eksik parçanın bir örüntü içindeki yerini tamamlama becerisi, kazandırılması gereken ilk beceriler arasındadır. Günümüzde tablet bilgisayarlar eğitim ve öğretimde önemli erişilebilir teknoloji araçları arasındadır. Çalışmanın amacı, özel bir kullanıcı grubu olan otizmli çocuklara kazandırılması gereken temel becerilerinden biri olan eşleme becerisinin öğretiminde somut arayüzlerin (TUI), bu becerinin pratiğine yönelik destekleyici niteliklerini tartışmak ve tasarım kriterlerini belirlemektir. Otizmli çocukların çeşitli öğretim aktivitelerinde tablet bilgisayar kullanımının yaygınlaştırılması çalışmaları, yapılan araştırmalar içerisinde önemli bir yere sahiptir. Yöntem olarak, aynı konuda yapılmış çalışmaların sonuçlarının özetlenerek sentezlenmesi amacıyla geliştirilen araştırma yöntemi olan derleme yöntemi kullanmış, konu ile ilgili alanyazın taraması yapılmış, benzer çalışmalar neticesinde bulunan veriler derlenmiştir. Bu kapsamda, somut arayüze sahip cihazlar ve bileşenlerinin otizmli çocukların okul öncesi dönemde kazanması gereken temel becerilerden biri olan eşleme becerileri öğretiminde kullanımının, kullanıcı deneyimi açısından destekleyici nitelikleri üzerine bir değerlendirme sunulmuştur. Öncelikle teknolojik araçların kullanımının otizmli çocukların çeşitli becerilerinin öğretimine katkıları alanyazın üzerinden değerlendirilmiştir. Sonuç kısmında, somut arayüze sahip cihazlardan erişilebilir teknoloji bağlamında tablet bilgisayarların ve eşlik eden somut bileşenlerin, otizmli çocuklara eşleme becerileri öğretiminde katkı sağlayacak nitelikleri irdelenmiş ve bu ürünlerin tasarım kriterleri ortaya konmuştur.
Anahtar Kelimeler: Otizmli Çocuk, Ürün Tasarımı, Somut Kullanıcı Arayüzü, Tablet Bilgisayar, Eşleme Becerileri.

Abstract
One of the primary deficiencies in children with autism is the ability of symbolic thinking. For overcoming difficulties in understanding abstract concepts, recognizing the similarities and differences between objects, comprehending the whole and its parts, completing the missing pieces in a pattern, are the first skills necessary to be taught. In our present day, tablet computers are among the important accessible technologies in education and training. The study aims to focus on the supporting qualities and design criteria of tangible user interfaces (TUI) for practising matching skills, one of the basic skills that children with autism should acquire. Popularizing tablet computers in various teaching activities of children with autism is important in researches. As a methodology, a literature review was conducted to synthesize and summarize the results of studies on this subject. Regarding this, an evaluation of the supportive qualities of using devices with tangible interfaces and their components in teaching matching skills, one of the basic skills that children with autism should acquire in the preschool period, is presented in regard to user experience. First, the contribution of technological tools in teaching various skills to children with autism was evaluated. The qualities of the devices with TUI, the tablet computers in the context of accessible technology and the accompanying tangible widgets that would contribute teaching matching skills to children with autism were examined and the design criteria of these products have been revealed.
Keywords: Children with Autism, Product Design, Tangible User Interface, Tablet Computer, Matching Skills.

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GİRİŞ

Çocuğun yaşadığı dünyayı anlama ve öğrenmesini sağlayan aktif zihinsel faaliyetlerdeki gelişime bilişsel gelişim adı verilir. Çocuklarda algısal dönüşümde önemli bir süreç olan okul öncesi dönemde sembolik düşünme gelişir (Singer ve Revenson, 1996: 33-40). Bir nesne veya eylemin içeriğini anlayarak, karşılaştırarak, karmaşık ilişkiler kurarak, bunlardan birinin diğerini temsil etmesiyle birlikte sembolik düşünme becerileri gelişir. Nesneler ve durumlar birbirinin yerini tutarken, temsilî anlatım için çizimler ve konuşma dili kullanılır (Wadsworth, 1996: 56). Otizmli çocuklar, etrafındaki dünyanın zihinsel şemalarını oluşturma gibi sembolik ve soyut düşünme durumlarında zorlanırlar. Bunun yerine nesneleri döndürme ya da sallama gibi tekrar eden eylemler, ya da nesnenin bir parçasına odaklanma gözlemlenebilir (Wing, 2012: 153). Erken çocukluk döneminde kazanılan beceriler duyusal-motor eylemlerden, temsilleri kavramaya ve soyutlamalara dönüşmektedir (Fischer, 1980: 479). Bilginin edinimi basit olanı anlamaktan karmaşık olanı kavramaya, somut olandan soyut olan ve bunları deneyimlerken zamanla kullanılan duyu organlarının azalmasıyla ilerler (Dale, 1969: 42). Erken çocuklukta öncelikle somut nesnelerle etkileşim yoluyla fiziksel bilgi edinilir (Piaget, 1952: 23). Çocuğun somut nesnelerle etkileşimi, etrafındaki dünyanın zihinsel temsillerini inşa etmesini ve fiziksel olaylar hakkında bilgi oluşturması destekler (Bruner, 1973: 92). İlerleyen süreçte çocuk, nesneleri sınıflama, sıralama, uzamsal ve maddi (temporal) ilişkiler kurma gibi daha soyut ve mantıksal bilgileri edinir (Fischer, 1980: 479). Eşleme becerileri, soyut ve sembolik düşünme, dış dünyanın temsillerini oluşturmada önemli bir yer tutar. Otizmli çocukların sembolik ve soyut kavramları anlamada güçlükler yaşamasından dolayı, bu beceriye yönelik çalışmalar, öğretimde ilk aşamada yer alır (Millî Eğitim Bakanlığı, 2013: 108).

Birçok eğitsel aracın yanında teknolojinin yaşamı donatmasıyla, bilgisayar destekli çözümler otizmli çocukların eğitiminde yer almaya başlamıştır. Teknoloji ile eğitim araçları çeşitlenmiş ve geleneksel araçların yanında bilgisayar tabanlı araçlar da eğitimde yerini almıştır. Robot, akıllı tahta ve tablet gibi farklı teknolojik araçların olumlu katkılarını ortaya koyan çalışmaların yanında, bu tür araçların öğretimde kullanımı hakkında tartışmalar da bulunmaktadır. Bu gelişmeler ve farklı görüşlerin sentezi çerçevesinde, bu tür araçların tasarımlarının nasıl olması gerektiği konusu da önem kazanmaktadır. Bu çalışmanın amacı, teknolojik araçlardan somut kullanıcı arayüzlerinin (TUI), otizmli çocuklara eşleme becerilerinin öğretiminde kullanımı için tasarım kriterleri açısından bir değerlendirme yapmaktır. Araştırma soruları aşağıdaki gibidir:

- Özel bir kullanıcı grubu olan otizmli çocuklara kazandırılması gereken temel becerilerinden biri olan eşleme becerisinin öğretiminde somut arayüzlerin (TUI), bu becerinin pratiğine yönelik destekleyici nitelikleri nelerdir?
- Bu nitelikler kapsamında somut arayüzlerin (TUI) tasarım kriterleri nelerdir?

Çalışmada yöntem olarak derleme yöntemi kullanılmıştır. Otizmli çocuklara kazandırılan eşleme becerileri öğretiminde teknolojik arayüz kullanımında göz önünde bulundurulması gereken tasarım kriterleri, eşleme becerilerini geliştirmek için kullanılan yapboz aracını sunan bir arakesit olarak, somut kullanıcı arayüzleri ve ilişkili araçların nitelikleri üzerinden değerlendirilecektir.

Otizmli Çocuklar

Otizm, tanısal nörolojik hastalık kategorisinde "Yaygın Gelişimsel Bozukluklar (YGB)" altındaki beş bozukluktan biridir. Sosyalleşme, iletişim, eğlence veya oyun etkinlikleri dâhil olmak üzere birçok temel işlevin gelişiminde gecikmeler görülen beş grubu içermektedir. Otizmli çocuklar arasında semptomlardaki geniş çeşitlilik, Otizm Spektrum Bozukluğu (OSB) kavramını oluşturmuştur (Amerikan Psikiyatri Birliği, 1994: 3). Otizmin tanımını genişleten "otizm spektrum" kavramını açıklayan Wing ve Gould (1979: 27), gözlemledikleri çocukların hepsinin karşılıklı sosyal etkileşimde yetersizlikleri olduğunu, bu yetersizliğin iletişim, sembolik ve soyut düşünme yetersizlikleri ile birlikte gözlendiğini ifade etmiş, Wing (1981: 37) bu durumu "Üçlü Yetersizlik (Triad of Impairments)" olarak kavramsallaştırmıştır.

Otizmli çocukların karşılaştığı zorlukların önüne geçmek için eğitime otizme özgü en temel yetersizlik alanlarından başlanır. Otizmli çocuklara uygulanan eğitimin ilk aşamalarında, daha karmaşık diğer becerilere temel oluşturan becerilerin kazanımı hedeflenir. Otizmli çocukların çalışılan becerileri edinimlerinde istekli olmaları önemlidir. Bu ise çocuğun kendisinden beklenen görevleri gerektiği gibi yerine getirebilmesiyle

ilişkilidir (Malone ve Lepper, 1987: 226). Çocuk, önüne konulan araçla etkileşim kurmak istemezse hedeflenen beceriyi kazanması zorlaşacaktır. Bu nedenle aracın çocuğa en uygun performansı sağlaması ve hedef beceriden öte herhangi bir ek zorluk barındırmaması gerekir.

Otizmli Çocuklara Kazandırılan Temel Becerilerden Eşleme ve Sınıflama

Toplumsal yaşama hazır olmak için gerekli olan sosyal etkileşim, öz bakım, sembolik ve soyut düşünme becerileri gibi becerileri kendi başlarına edinemediğinden, otizmli çocuklara öncelikli olarak kazandırılması gereken beceriler vardır. Bu becerilerin kazandırılmasında amaç, çocuğun bilişsel beceri düzeyini geliştirmeye bir temel oluşturmaktır. Temel becerilerin kazandırılmasında yer alan öğretim alanları şunlardır: Nesneleri eşleme ve sınıflama, karşıdakinin davranışını taklit etme, oyun oynama ve başkalarının dediklerini anlama (Tekin-İftar ve Değirmenci, 2012: 273).

Bireyde tepkiye neden olan uyaranlar takımına kavram denmektedir. Nesneler, boyut, renk, şekle sahip olmaları ve yapısal olarak malzemeden oluşmaları bakımından ortak özelliklere sahiptir. Bu özellikler kavramın farklı olmasını sağlamakta ve kavram örneklerinin sayısını artırmaktadır. Örneğin, "kare" kavramı için yorumlanması gereken ilk şey, şeklidir. Kare şekli farklı nesne ve renklerle gösterildiğinde kare kavramı netleşir (Özyürek, 1983: 349). Eşleme ve sınıflama, nesneleri, insanları ve olayları, kavramları çeşitli özelliklerine göre bir araya getirerek gruplandırmaya ve düzenlemeye yönelik temel bir yöntemdir. Eşleme ve sınıflama becerileri günlük yaşamda farklı işlevlerle karşımıza çıkmaktadır. Örneğin; dil ve okuryazarlık becerilerini zihinsel eşleme ve sınıflama etkinlikleri sonrasında öğrenilmektedir. Karşılaşılan nesneleri, olayları ve çeşitli durumları belirli özelliklerine göre isimlendirmek, renk, kontrast, nicelik gibi kavramları belirlemek, seslerle eşleştirilmiş nesneleri ve eylemleri ifade etmek, okuma ve yazmada seslere karşılık olan harfleri öğrenmek gibi eylemlerde eşleme ve sınıflama becerilerinden faydalanılmaktadır (Tohum Otizm Vakfı, t. y.).

Otizmli çocuklarda görülen temel yetersizliklerden biri sembolik düşünme yetersizlikleridir (Wing ve Gloud, 1979: 26). Bu eksikliklerin giderilmesinde eşleştirme becerileri önceliklidir. Otizmli çocukların sembolik ve soyut kavramları anlamadaki yetersizlikleri aşmada eşleme çalışmaları önemli bir yer tutmaktadır (MEB, 2013: 145). Bu çalışmalar, nesneler arasındaki farklılık ve benzerlikleri tanıma, parçalardan oluşan bütünü kavrama, bir örüntüdeki eksiği tamamlama gibi becerileri öğretir. Nesneler arasındaki bu ilişkiler benzerlik ve farklılık, bütün-parça, zemin-şekil ilişkileridir. Nesneler arasındaki bu ilişkiler kurulurken eşleme, sınıflama gibi zihinsel faaliyetler gerçekleşir (MEB, 2013: 190). Bu zihinsel etkinlikte renk, şekil, boyut ve malzeme gibi fiziksel niteliklerden yararlanılır ve iki nesnenin aynı-farklı olduğu değerlendirilir. Çocuklar eşlemeyi öğrenirken renkleri, şekilleri, boyutları ayırt edebilme becerisi edinir; nesneleri renk ve şekillerine göre eşleştirebilir, işlevlerine göre gruplayabilir (Boyd ve Bee, 2009: 67).

Otizmli Çocukların Eşleme Becerilerinin Geliştirilmesine Yönelik Kullanılan Araçlar

Otizmli çocuklarda eşleme becerileri ilk kazandırılması gereken beceriler arasında olup, öncelikli olarak renk ve şekil eşleme becerileri ile başlanır ve daha sonra daha karmaşık ve soyut eşleme becerilerinin kazanımına geçilir. Renk ve şekil eşleme, çocukların erken yaşta kazandıkları temel becerilerden biridir ve bu ilişkileri anlamaları, eşleme ve sınıflama gibi zihinsel faaliyetlerini destekler. Somut nesneler arasındaki benzerlik ve farklılıklar, parça ve bütün, bir örüntüdeki eksik gibi ilişkileri kurmak için temel araçlardan biri şekil-zemin ve parça-bütün ilişkilerini kurmaya yarayan yapbozlardır (MEB, 2013: 191). Yapbozlar görsel algıyı geliştiren ve eşleme becerilerinin gelişimine yönelik eğitsel oyun araçlarıdır (Görsel 1). Bu özellikleri bakımından eğitimde uzun zaman önce yerini almışlardır. Renk ve/veya şekil eşleme yapbozları oluşturulurken nesnelerin ayırt edici nitelikleri olan rengi, şekli ve boyutundan faydalanılarak eşleştirilecek parçalar oluşturulabilir. Bu nitelikler ile nesnelerin benzer ya da farklı, bir parçada bütün, bir örüntüdeki eksik kısım olup olmadığına karar verilir. Bu çalışmalara yönelik araçlar eğitmen tarafından hazırlanabildiği gibi endüstriyel olarak üretilen örnekleri de mevcuttur. Endüstriyel araçlara yapboz oyuncakları, şekil kutuları ve iki boyutlu basılı araçlar (kartlar) örnek verilebilir (Tohum Otizm Vakfı, t.y.).

Tipik gelişim gösteren çocuklara bakıldığında duyu-motor dönemde yapboz gibi araçları boşluklara uygun şekilleri yerleştirmek gibi amacına uygun, otizmli çocuklardaysa bu birimler vurma ve ses çıkarma gibi tekrarlı bir eylem için kullanılabilir (Wing, 2012: 52). Eşleme becerisi kazanımı etkinliklerinde, alıcı dil becerilerinin

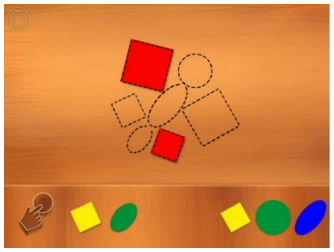
ve ortak dikkatin oluşturulması da amaçlanır. Bu nedenle bu tür çalışmalar eğitmenler ve velilerin eşliğinde gerçekleştirilmektedir. Çocuğa fiziksel bir ipucu ile doğru hareket gösterilirken, her doğru cevap için pekiştireç sağlanır. Çocuğa takdiri ifade eden sözleri yüksek sesle söylemek, yüzüne ve eline dokunmak sunulan pekiştireçlere örnektir.

Görsel 1. Renk ve şekil eşleme yapbozu

Otizmli çocukların eğitim araçlarını akranları gibi bağımsız ve amacına uygun olarak kullanabilmeleri, kullanılan aracın çocuğa yanlış süreci göstermesi, tekrar denemeye teşvik etmesi ve konsantre olmasını sağlaması önemlidir. Eğitim aracı bunları karşıladığında eğitimci ve ebeveyn, çocuklar için önemli olan diğer beceriler olan alıcı dil becerileri ve ortak dikkat oluşumuna daha kolay odaklanabilir. Son zamanlarda teknoloji üzerine yapılan araştırmalar, bilgisayar ortamlarının otizmli çocuklar için avantajları olduğunu ortaya koysa bile bunların dezavantajları da tartışma konusudur. Sanal ortamda çalışan bu beceri için araçların avantajlarıyla beraber dezavantajları da dikkate alınacak tasarım kriterleri için belirleyicidir.

Yeni Teknolojiler

Eşleme becerilerine yönelik olarak uzun zaman önce eğitimde yerini almış olan yapboz araçlarının teknolojik bir arayüzde olumlu bir kullanıcı deneyimini desteklemesi, bu becerilerin doğru bir şekilde kazandırılmasında önemlidir. Yapbozun kullanımında teknolojik arayüz bir arakesit olduğunda, bunun avantajları ve dezavantajları tasarım açısından önemli kriterler sunmaktadır (Görsel 2). Çalışmada genelden özele bir bakış açısıyla, teknolojik araçlara yönelik yapılan çalışmalar ve bu çalışmaların bulguları doğrultusunda, teknolojinin olumlu ve olumsuz yönleri irdelenmiş, teknolojik araçların erişilebilirlik kapsamında çeşitli örnekleri incelenmiş ve eşleme becerilerinin çalışılabileceği araçlar özelinde bir değerlendirme yapılmıştır. Bu becerilere yönelik yapboz gibi eğitsel araçlar ile ilişkiler kurulurken düşünülmesi gereken tasarım müdahaleleri teknolojik aracın özellikleri ve kazandırılmaya çalışılan beceri olan eşleme becerileri üzerinden bütüncül bir yaklaşımla ele alınmıştır.



Görsel 2. Tablet bilgisayar üzerinden sunulan bir şekil eşleme yapbozu

Otizmli çocukların eğitiminde sanal ortam kullanımına odaklanan araştırmalar duygusal ifadeli avatarlar aracılığıyla duyguları anlama (Fabri, 2006: 13; Gerhard, 2003: 42; Grossard, 2017: 16; Kellems vd., 2020: 58; Lorenzo vd., 2016: 21) kurgusal bir sosyal durumun tanınması ve karakterlerin davranışlarının çocuklar arasında tartışılması (Moore vd., 2005: 240; Hopkins vd., 2011: 1550; Broussard vd., 2012: 479; Parsons vd., 2006: 201; Kumazaki vd., 2019: 1703) gibi daha çok sosyal becerilere yönelik çalışmalara rastlanırken, bilişsel becerilerin de çalışılmasında bu ortamların faydalarını sunan çalışmalar bulunmaktadır. Dikkat (Ramloll vd., 2004: 24; Mohamed, 2006: 195; Zheng vd., 2015: 727), algı (Bonneh vd., 2008; 647; De Jaegher, 2013: 9; Hill vd. 2012: 295), yürütücü işlevler ve günlük rutinler (Camargo vd., 2019: 62; De Oliveira Barros vd., 2014; 451; Hirano vd., 2010: 1635) bilişsel becerilere yönelik araştırmaların odağındadır. Bu çalışmalar inceledikleri hedef becerileri kazandırmada teknolojik müdahalelerin sonuçlarını sunmaktadır. Otizmli çocukların

eğitiminde sanal ortam kullanımı ile ilgili birçok çalışmayla birlikte tartışmalar da sürmektedir. Sanal ortamlar üzerine çeşitli görüşler, olumlu ve olumsuz yönleri bakımından aşağıdaki gibi gruplandırılabilir.

Sanal ortamların avantajları:

- Otizmli çocukların çoğunlukla görsel uyaranlara yönelmesi ve tepki vermesinden dolayı, görsel uyaranların kullanıldığı bilgisayar teknolojilerinin etkili olabileceği düşünülmektedir (Hart, 2005: 141; Çuhadar, 2008: 1055).
- Otizmli çocukların dikkatlerinin kolayca dağılabilmesi, organizasyon becerilerindeki zayıflık ve ayrıntılara takılabilme durumundan ötürü bütünü veya deseni görmede zorlandıklarından, bilgisayarlar onlar için daha anlaşılır bir organizasyona yardımcı olma potansiyeline sahiptir (Hardy vd., 2002: 35).
- Bilgisayarlar gerçek dünyanın çoklu duyusal girdilerinin sadeleştirilebileceği bir ortam sundukları için çeşitli becerilerin geliştirilmesinde etkili olabilecekleri düşünülmektedir (Parsons ve Mitchell, 2002: 442).
- Bilgisayarlar, çocuklar için başarısızlık hissinden arınmış, yaratıcılık ve hayal gücünü tetikleyen, çocuğun kendine has etkileşim yollarını bulabileceği ve güvenle keşfedebileceği alanlar sunabilir (Dix, 2003: 8).
- Bilgisayarlar, sosyal talepleri olmayan, öngörülebilir ve tutarlı varlıklar olduklarından iletişimin ilk aşamasında daha verimli etkileşimlerin oluşmasını sağlar (Battocchi vd., 2008: 130).
- Bilgisayarlar, aktiviteleri özelleştirme, tekrar sunabilme, gerçek hayatta güvensiz veya kabul edilemez olan durumları güvenli bir sanal ortamda taklit edebilme; zorluk, hız, duyusal uyaranların çocuk için özelleştirilebilir olması gibi nitelikleri bakımından çocuklar tarafından daha rahat kontrol edilebilir ve odaklanmayı arttırırken dikkatin dağılmasını azaltabilir (Bosseler ve Massaro, 2003: 360; Dautenhahn, 2000: 155; Parsons vd., 2006: 435; Putnam ve Chong, 2008: 7).
- Geçicilik bilgisayar teknolojisinin en önemli özelliği olduğundan çocuklar hatalarını kolayca düzeltebilir; böylece birimler daha az çaba ile düzenlenebilir, değiştirilebilir ve yeniden düzenlenebilir (Hardy vd., 2002: 30).

Sanal ortamların dezavantajları:

- Gerçek hayatta kullanılan, fakat sanal ortamda aktif olmayan kaslar, öğrenmeye katkıda bulunan ipucu içermektedir. (Allahyar ve Hunt, 2003: 270).
- Sanal ortam, hareket algısında görsel ve uzamsal algının karışmasına neden olabilir (Allahyar ve Hunt, 2003: 271).
- Fiziksel ortamların sunabileceği kişiye özgü ve açık uçluluk, teknolojik deneyimin sınırlı ve tekrarlanan operasyonel eylemleriyle engellenebilir (Levin ve Rosenquest, 2001: 245).
- Çoğu aktivite, küçük bir ekrana yerleştirildiğinden, nesnelerin keşfi fiziksel dünyadakinden farklıdır (Levin ve Rosequest, 2001: 244).
- Sosyal geri çekilmeyi (Bernard-Opitz vd., 2001: 380) ve kompulsif davranışları tetikleyebileceğinden (Powell'dan akt. Ramdoss vd., 2011: 59) eğitimde sanal ortam kullanımında endişeler bulunmaktadır.

Alanyazında tartışıldığı gibi sanal ortamların eğitimde kullanımının bilişsel, duyusal ve psiko-motor gelişime dair etkileri bulunmakta, bu etkilerin olumlu katkıları olmakla beraber bazı durumlarda olumsuz tesirleri de bulunmaktadır. Bu ortamların bilimsel olarak tartışılmakta olan olumlu ve olumsuz nitelikleri, onu bir arayüz olarak kullanacak olan eğitsel araçların tasarımında dikkat edilmesi gereken evrenin de bir parçasını oluşturmaktadır. Sanal ortamla etkileşimi artırmak için çeşitli teknolojiler geliştirilmektedir. Örneğin; sanal ortamda nesnelerin keşfiyle çocukların gelişimine daha uygun görülen fiziksel dünyadaki nesnelerin keşfi arasındaki farkı azaltmak amaçlanmaktadır. Söz konusu teknolojiler, nesneleri fiziksel özellikleriyle keşfetme olanağı sunmaktadır (O'Malley ve Stanton Fraser, 2004: 9). Bilgisayara bilginin girdisi ile bilgisayarca bilginin sunumu arasındaki farkı aşmayı amaçlayan bu teknoloji "somut kullanıcı arayüzleri (tangible user interfaces, TUI)" olarak adlandırılmaktadır.

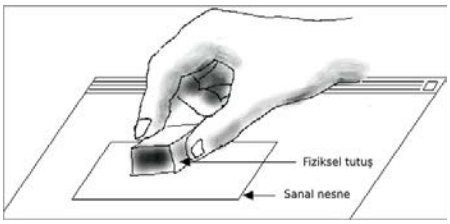
Somut Kullanıcı Arayüzleri (Tangible User Interface: TUI)

Somut kullanıcı arayüzleri (TUI) insan-bilgisayar etkileşiminde somut nesnelerle soyut nesnelerin temsil edildiği kullanıcı arayüzleridir. Bu kavram, 1990'larda Hiroshi Ishii ve ekibinin MIT (Massashusetts Institute

of Technology)'deki çalışmalarıyla alanyazına girmiştir. TUI'nin ana fikri, dijital ögelere insan algısı için doğrudan ve kolay erişilebilir olmaları için fiziksel bir form vermektir. (Ishii, 2008: 33). Somut kullanıcı arayüzleriyle, fiziksel ve dijital ayrımı zayıflatmış, etkileşimli akıllı tahtalar ve dokunmatik ekranlar, daha somut etkileşim biçimlerine yönelik fırsatlar sunmaya başlamıştır (Keay-Bright, 2008: 3). Geleneksel grafik kullanıcı arayüzündeki (GUI) manuel fiziksel girdi aracı (örneğin fare tıklaması) ile çıktı aracındaki (ekran) dijital temsilî sonuç arasındaki ilişki dolaylı ve zayıf olsa da, somut bir kullanıcı arayüzünde (TUI), manuel girdinin algılanan çıktı ile yakın bir ilişkisi vardır (O'Malley ve Stanton Fraser, 2004: 12).

İşlev ile eylem karşılıklıdır ve bu durum ekranda görülen sembollerin yorumlanmasındansa çıktının doğrudan algılanmasına izin verir (Ishii ve Ullmer, 1997: 235). Kullanıcı, kontrol araçlarındansa kendi eylemlerine odaklanabilmekte ve daha somut deneyimler oluşmaktadır (Dourish, 2001: 139; Fishkin, 2004: 348). Somut kullanıcı arayüzleri, özellikle uzamsal duyunun (vücudun konumu ve hareketi hakkında duyusal farkındalık) katılımını sağlayarak, herhangi bir yetişkin müdahalesi olmaksızın çocukların bu arayüzlerle etkileşiminde doğal akışı besler (Keay-Bright, 2008: 9).

Somut teknolojiler, somutluk derecelerine göre değişkenlik gösterir. Dokunmatik ekranlı cihazlar, somutluk açısından fare ile kontrol edilen bir bilgisayardan daha somut bir etkileşim sağlar. Somut olma derecesi, girdi sağlayıcının azalan rolüyle ilgilidir. Daha somut teknolojiler üzerine yapılan diğer çalışmalar, sensör teknolojisi ile birlikte bilgisayar destekli somut faaliyetleri konu alır (Görsel 3). Örneğin; kavranabilir elektronik arayüzler (tangibles), bilgisayarın etkisini ve görünürlüğünü olabildiğince azaltan sanal ortamlarla etkileşimli fiziksel nesnelerdir (O'Malley ve Stanton Fraser, 2004: 9).



Görsel 3. Kavranabilir kullanıcı arayüzleri

O'Malley ve Stanton Fraser (2004) tarafından yayımlanan eğitsel amaçlı somut (tangible) teknolojilerin bir alanyazın taraması niteliğinde olan raporda, bu teknolojinin nasıl çalıştığını örnekleyen bir çalışmada arakesit bileşen, çocuğun gerçek dünyadaki dokuları ve renkleri keşfederek seçebileceği ve bunlardan resimler yapabileceği bir fırçadır. Ryokai vd. 2004'te yaptıkları deneysel çalışmada I/O Brush'ı kullanan çocukların, bununla somut nesnelerin renkleriyle soyut çizimler yaptıklarını gözlemlemiştir (Görsel 4).

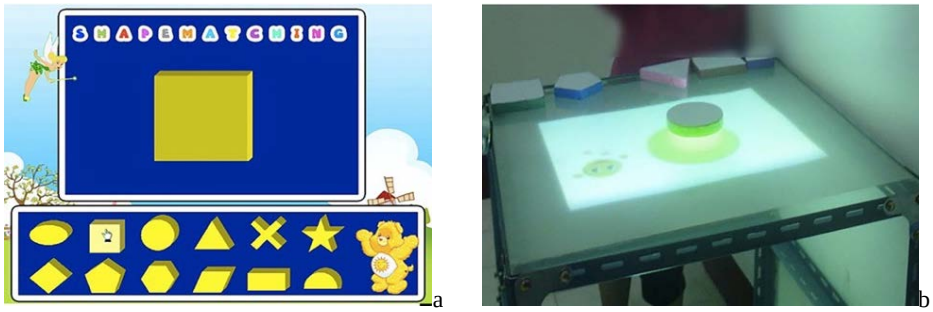
Görsel 4. "I/O Brush" sistemi

Otizmli çocukların çeşitli becerilerini somut teknolojiler kullanarak geliştirmeye yönelik çalışmalar da yapılmıştır. Örneğin, otizmli çocukların sosyal becerilerini artırmak için küçük grup iş birliğini desteklemeye yönelik, çok kullanıcılı dokunma ve hareketle etkinleştirilen ortak konumlu (co-located) arayüzler kullanılmış ve etkinliğin çocuklarda sosyal etkileşimi artırdığı gözlemlenmiştir. Çocukları çiftlere ayırarak hikâye anlatma etkinliğinde birlikte hareket etmelerini sağlamak için "Hikâye Masası Arayüzü" oluşturulmuştur. Masa, katılımcıların atılacak adımlar üzerinde anlaşmalarını ve hikâye oluşturma sırasında kritik noktalarda ortak hareket etmelerini gerektirir. Çalışma sonunda arayüzün, çocuklar arasındaki sosyal etkileşime katkı sağladığı raporlanmıştır (Görsel 5-6). Bu etki, kullanılan arayüze özgü çoklu kullanıcı hareketleri ve çocukların bazı görevleri birlikte yapmaya teşvik edilmesi kaynaklıdır (Bauminger vd., 2007: 19; Gal vd., 2005: 322).

a b

Görsel 5. Takımlar için çoklu kullanıcılı jest etkileşimi (a), öykü tablosunu kullanan ikili (b)

Sitdhisanguan vd. (2007) otizmli çocukların grafik kullanıcı arayüzü ve somut kullanıcı arayüzünün kullanımı arasında karşılaştırmalı bir çalışma yapmış, bunun için temel şekil eşleştirme görevini bir vaka çalışması olarak seçmiştir. Grafik kullanıcı arayüzü için işaretle ve tıkla etkileşim stili seçilirken, somut kullanıcı arayüzü için elle kavra ve taşı stili benimsenmiştir. Her iki sistem de rastgele seçilen bir geometrik şeklin bir resmini gösterir ve ardından kullanıcıdan ekranda gösterilen nesnenin şekline uyan, sağlanan şekillerden birini seçmesi istenir. Çalışma, otizmli çocukların davranışlarının GUI tarafından kısıtlandığını, böyle bir etkileşim tarzının kolaylıkla can sıkıntısına yol açabildiğini göstermiştir. Aynı zamanda, otizmli çocuklar GUI'de işaretle ve tıkla eylemlerini gerçekleştirmede zorluklar yaşamış, TUI'yi kullanırken, arayüzü manipüle etmede daha çevik davranmışlardır (Görsel 7-8). Çalışma ayrıca otizmli çocukların fiziksel aktiviteleri destekleyen bir teknoloji olan somut kullanıcı arayüzden keyif aldıklarına da işaret etmektedir (Sitdhisanguan vd., 2007: 4).



a b

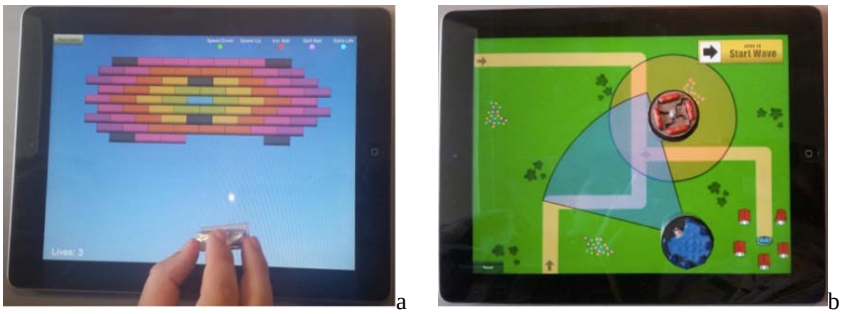
Görsel 6. Otizmli çocukların grafik kullanıcı arayüzü ve somut kullanıcı arayüzünün kullanımı arasında karşılaştırmalı çalışmada GUI arayüzünden bir kesit (a), TUI arayüzünden bir kesit (b)

Tablet Bilgisayarlar ve Somut Bileşenler

Tabletler, ivmeölçerler ve küresel uzamsal sistemler (GPS) içeren ve en belirgin bileşeni jestler olan dokunmatik arayüzlere sahip elektronik cihazlardır. Bu cihazlar, somut etkileşime olanak sağlamaktadırlar. Tabletler tarafından sağlanan bu teknoloji, masaüstü bilgisayarlara göre daha somut sanal ortamlar yaratır. Bunu iki şekilde başarır: İçindeki izleme bileşenlerini kullanarak ve dokunmatik ekranıyla. Kullanıcıların uzamsal etkileşim için onu eğmesi, sallaması ve kullanıcıların tablet ekranındaki sembolleri kontrol edebilmesi için somut olarak ellerini ve parmaklarını kullanmaları, daha somut etkileşimlere olanak tanımaktadır. Bu sistemler genellikle uzamsal veya dokunmatik girdi kullanırken aynı zamanda çeşitli duyulara hitap eden çıktıların sunulduğu cihazlardır. Ekranda gösterilen öge bir sembol iken aynı zamanda kontrolün de kendisidir (O'Malley ve Stanton Fraser, 2004: 2).

Bununla birlikte bu cihazlar, somut bileşenler (tangible widgets) olan bileşenlerle daha somut kullanıma da olanak tanımaktadır. Somut bileşenler dokunmatik bir ekran tarafından tanınabilen küçük kavranabilir fiziksel nesneler olarak tanımlanır. İnsanlar fiziksel nesneleri hareket ettirmeye, sanal nesnelere göre daha aşina olduğu için, elle tutulur bileşenlerin daha iyi kavrama sağladıkları ve parmak dokunuşunu kullanmaktan daha sezgisel bir etkileşim yöntemi olduğu varsayılmaktadır (Bock vd., 2014: 755). Cihazla etkileşimde bulunmak için, parmak yerine bir masa oyununun fiziksel parçasına benzer bir somut bileşenin kullanıldığı örnekler üzerine bir çalışma yapan Bock vd. (2015: 183), bu etkileşimi oyunlar için bir metot olarak kullanmışlar; bu bileşenlerin oyun etkileşimi deneyimini artırmada etkisini araştırmışlardır. Ekran üzerindeki hareket için

bileşenlerin kullanımının, dokunmaya kıyasla daha kolay ve sezgisel olduğu, öte yandan bu bileşenlerin kullanmanın ekranı kapatması, parçacığı tutmayı zor bulma gibi sınırlılıkları olduğu tespit edilmiştir. Bu çalışmaların sonucunda Bock vd. (2014; 2015), somut bileşenlerin ilginç ve yararlı bir etkileşim aracı olabileceğini; farklı boyutlar, malzemeler ile somut bileşenleri ve bunun kullanıcı deneyimi üzerindeki etkisinin araştırılmasının önemini belirtmişlerdir (Görsel 9-10, 11-12).



a b

Görsel 7. Somut bileşenlerin kullanımı için geliştirilen oyun Bricks oyunu (a), Kule Savunma oyunu (b)

a b

Görsel 8. Dokunmatik etkileşim yöntemiyle bir oyun, oturum sırasında ekran görüntüsü (a), oyunun iki somut bileşenleri kullanılarak karşılıklı oynanması (b)

Çocuklar ve gençlerle sosyal hizmet uygulamalarını geliştirmek için bir eko-harita oluşturma sürecinde bilgi toplamak için Heller vd. (2016: 82), onların deneyimlerini ön plana çıkaran ilişkileri değerlendirmek adına tablet bilgisayarlardaki somut etkileşim potansiyelinden yararlandığı bir uygulama geliştirmiştir. Aile ve topluluk üyeleri arasındaki kişilerarası ilişkileri değerlendirmek için, Hayatımdaki Kişiler (People in My Life) adlı uygulamanın ilk prototipi ile somut etkileşimin faydalarından yararlanmak için somut bir arayüz kullanılmıştır. Uygulama içinde sosyal hizmet uzmanları, çocukları, hayatlarındaki önemli insanlarla ilişkilerini canlandırmak için tabletlerdeki interaktif figürleri kullanmaya teşvik etmektedir. Bu figürler ayak izlerine göre izlenip, tartışma sırasında arkadaş, baba gibi farklı roller atanır. Tablet üzerindeki göreceli konumlarındaki herhangi bir hareket ve değişiklik, seans sırasında kaydedilir ve seanstan sonra analiz için gözden geçirilir. Bu ölçümler psiko-sosyal uyum ve kişilerarası yakınlık gibi verilerin değerlendirilmesinde kullanılır (Görsel 13-14).

a b c

Görsel 9. Hayatımdaki Kişiler (People in My Life) bileşenler olarak figürler (a), uygulama ve bileşenlerin kullanımı (b), Disney Cars 2 AppMATes uygulaması ve arabaları (c)

Tablet Bilgisayarlar ve Otizmli Çocuklar

Somut kullanıcı arayüzüne sahip tabletler, erişilebilirliği ve sezgisel kullanımı sayesinde otizmli çocukların eğitim programlarında yer almaya başlamıştır (Kagohara vd., 2013: 148). Ayrıca tablet bilgisayarlar ve ilgili cihazlar eğitim uygulamalarında kullanılmaktadır (Shuler vd., 2012: 18). Nitekim özel çocukların eğitim programlarında kullanılmak üzere sunulan uygulamaların sayısının giderek arttığı görülmektedir. Kagohara vd. (2013: 148) gelişen bu alanyazın ışığında, otizmli çocukların akademik, iletişimsel, sosyal ve diğer uyum becerilerini artırmak için tablet bilgisayarlar ve ilgili cihazların kullanıldığı 15 çalışmayı sistematik olarak gözden geçirmiştir.

iPad kullanımını içeren çalışmalarda bu cihazların kullanımına ilişkin iki ana yöntem izlendiğini bulmuşlardır. Bunlardan ilki çocuğa video aracılığıyla bilgilendirici talimatlar vermek (kelimelerin nasıl hecelendiğini, cihazın nasıl kullanılacağını, yer temizleme, çöp atma, banyo temizliği gibi görevlerin nasıl yapıldığını gösteren eğitici videolar) ve diğeri çocuğun tercih edilen uyaranlara (müzik, video, resim) erişmesi için tabletin konuşma üretme cihazı olarak kullanılmasıdır. Kagohara vd. (2013: 155), inceledikleri çalışmalarda müdahalelerin iPad'in geçerli bir yardımcı teknoloji olduğunu gösterdiğini belirtmişlerdir. Shuler vd. (2012: 26-27) bu görüşü desteklemekle birlikte bu çalışmalarda okuma, eşleme ve aritmetik gibi akademik becerilerin kazandırılmasına yönelik çalışmalardaki boşluğa dikkat çekmiştir.

Tohum Otizm Vakfı otizmli çocuklara yönelik olarak evde, okulda veya serbest zamanda, kavram öğretimi, anlama ve dinlemeyi destekleyecek uygulamalar geliştirmiştir. Tablette çalışan uygulamanın öğretim oturumlarında kullanılması sırasında fiziksel ipucu sağlayan ve etkileşim başlattığı iki kişinin bulunmasının önerilmesi, zamanla temasın azaltılarak çocuğun bağımsız olarak etkileşime geçmesi hedeflenir. Tohum Eğitim Uygulamasında çocuğa, eşleme becerilerini çalışırken doğru seçenek için olumlama, doğru olmayan seçenek içinse bunu ifade eden görsel ve işitsel geri bildirimler ile doğru seçenek belirginleştirilerek sunulmaktadır (Yılmaz ve Merinoslu, 2020). Tablet bilgisayarların çeşitli becerilerin öğretiminde yerini aldığı görülmektedir. Somut teknolojiler, fiziksel dünyadaki etkileşime yakın bir deneyim sunmakla birlikte, bu teknolojinin en erişilebilir güncel örneği tablet bilgisayarlardır. Dışarıdan eklenen somut bileşenlerle bütünleştiğinde tablet bilgisayarların otizmli çocuklar için daha zengin uyaranlar içereceği söylenebilir.

YÖNTEM

Çalışmada yöntem olarak derleme yöntemi kullanılmıştır. Derleme çalışmaları aynı konuda yapılmış çalışmaların sonuçlarının özetlenmesi ve sentezinde kullanılmak üzere geliştirilen bir araştırma yöntemidir. Konuyu tanımlar, ana konuları özetler ve ilgili örnekler verir (Burns ve Grove, 2009: 27-28; Gerrish ve Lacey, 2010: 287; Karaçam, 2013: 27; Moule vd., 2017: 258). Belirli bir konudaki çalışmaların değerlendirmesi şeklinde hazırlanan derleme çalışmalar, araştırma soruları kapsamında düzenlenir. Var olan yayınların sentezlenmesi ve yeniden düzenlenmesi esastır (Herdman, 2006: 2).

Araştırma soruları kapsamında, yapboz aracını sunan bir arakesit olarak somut kullanıcı arayüzleri ve ilişkili araçların otizmli çocukların eşleme becerilerini geliştirmek için destekleyici nitelikleri ve bu tür arayüz kullanımında göz önünde bulunması gereken tasarım kriterlerinin neler olduğu hakkında alanyazındaki çalışmalardan bir sentez yapılmıştır.

BULGULAR

Otizmli çocukların çeşitli becerilerine yönelik araçlar için, teknolojinin de eğitimde yerini almasıyla tasarım kriterleri çeşitlenmeye başlamıştır. Bu kriterler, çoğunlukla dışarıdan bir yetişkin müdahalesi olmadan çocuğun hedeflenen beceriyi zorlanmadan ve motivasyonunu kaybetmeden çalışması için destekleyici niteliklerin ele alınmasına yöneliktir. Eşleme becerilerinin geliştirilmesine yönelik kullanılan araçlarının tasarımında kullanıcı deneyimini olumlu kılmak, ürün tasarımı açısından öncelikli bir yaklaşımdır. Öğretim aracının hedef beceri olan eşlemeyi etkili bir şekilde ele alabilmesi için, sunulan araçtan kaynaklanan zorlukların en az olması beklenmektedir.

Eşleme Becerileri Öğretiminde Tablet ve Somut Bileşenlerin Destekleyici Nitelikleri

Tablet ve somut bileşenler aracılığıyla yapbozu bir eşleme becerileri öğretim aracı olarak sunmak için alanyazındaki bilgiler ışığında göz önünde bulundurulması gereken destekleyici nitelikler; somuttan soyuta geçişi destekleme ve çok duyulu (multi-sensory) etkileşim modları olan uzamsal, görsel, dokunsal ve işitsel uyaranları içerme temaları altında toplanabilir. Bu nitelikler aynı zamanda çocukların eğitim sürecindeki deneyimlerinin olumlu olması için, kullanılacak aracın tasarımı açısından göz önünde bulundurulması gereken özelliklerdir.

Somuttan Soyuta Geçişi Destekleme

Diğer teknolojilere göre daha erişilebilir olmasından dolayı somut kullanıcı arayüzüne sahip tablet bilgisayarlar eğitim alanında daha sık kullanılmaktadır. Bu sebeple eşleme aracını sunan bu arakesitin özellikleri, tasarım kriterlerine önemli bir girdi oluşturmaktadır.

Çocuğun gelişimin ilk aşamalarından itibaren somut nesnelerle etkileşim ile dünyayı algılaması, sembolik ve soyut düşünmeye geçiş ve ardından problem çözme becerisinin gelişimi arasındaki ilişki uzun zamandır bilinmektedir. Çocuğun bilişsel gelişimi, onun somut nesnelerle etkileşimiyle başlar ve çevresinin zihinsel temsillerini inşa etmede ve olaylar hakkında bilgi oluşturmada bu etkileşimin katkısı büyüktür.

Öğretim araçlarında dikkat edilecek önemli hususlardan biri eşleme becerilerinin öğretiminde izlenecek sıralamadır. Eşleme ve sınıflama becerileri günlük hayatta farklı işlevlerde karşımıza çıkmaktadır: Okuma-yazma için hangi harflere hangi seslerin karşılık geldiğini öğrenebilmek; nesneleri, olayları ve karşılaştığımız çeşitli durumları belli özelliklerine göre isimlendirmek; renk, zıtlık, miktar gibi kavramları fark etmek; konuşurken kullanılan sesli sözcükler ile eşlenmiş olan nesneleri ve eylemleri ifade etmek için eşleme ve sınıflama becerilerinden faydalanılmaktadır (Lovaas, 2003: 117).

Somut kullanıcı arayüzünde, eylem ile sağlanan girdiyle oluşan işlev arasındaki yakınlık sayesinde kullanıcı bu ilişkiyi doğrudan algılayabilir. Çocuk, kendi eylemlerine odaklanarak bu etkileşimi somuta yakın bir biçimde tecrübe ederken, duyuların, özellikle uzamsal duyunun etkileşime dahil olması bu etkileşimin doğal akışını besler. Bu özellikleri bakımında somut kullanıcı arayüzleri hem somut hem de soyut evrene ait nitelikler barındırmakta, somuttan soyuta uygun bir geçit sağlayabilmektedir. Somuttan soyuta geçişte bu teknolojilerin sağladığı kullanıcı algısı ve etkileşim biçimleri, tasarım kriterleri açısından önemli ipuçları sunmaktadır. Somut nesneler aracılığıyla başlayan eşleme becerileri daha sonra sanal ortamda daha üst seviyede yaşamsal becerilere yönelik sunulan bir eşleme çalışmasıyla devam edebilir. Başlangıç aşamasında daha somut ögelerin dahil olduğu bileşenlerle entegrasyonun zamanla bu etkileşimi sanal ortamın kendine bırakabilmesi, bu teknolojilerin eşleme becerilerinin öğretiminde kademeli olarak kullanılacak araçların birlikte sunulmasını avantajlı hale getirmekte, sembolik ve soyut düşünmeye geçişte fırsatlar sunmaktadır.

Çok duyulu (Multi-sensory) Etkileşim Modlarını İçerme

Psiko-motor eylemlerin temsillere, sonrasında ise soyutlamalara dönüşmesi kademeli olarak çocukta bilişsel becerileri oluşturur. Çocuk, gelişim aşamalarında basitten karmaşığa, somuttan soyuta, çok sayıda duyu organı ile edinilenden az sayıda duyu organıyla edinilene doğru bilgi edinir. Somut nesneler ve soyut durumlar arasındaki ilişkileri kurmak için eşleme ve sınıflama gibi zihinsel etkinlikler gerçekleşir. Renk, şekil, boyut ve malzeme gibi fiziksel nitelikleriyle nesneleri ayırma, gruplama, sıralama çalışmaları eşleme becerisi öğretiminde ilk aşamadır. Daha sonra daha soyut anlamdaki kavramsal ilişkiler öğrenilir. İlerleyen yaşlarda yaşamsal uyumu artıracak olan işlevsel becerilerin öğrenilebilmesi için eşleme ve sınıflama becerileri önkoşuldur. Çocuk "Beyaz tişörtünü giy" ifadesinden önerilen tişörtü zihninde bir şema oluşturarak bulabilecektir. Somut kullanıcı arayüzleri ve ilişkili bileşenleri, renk, şekil, boyut ve malzeme gibi çeşitli niteliklerle etkileşimlere katkıda bulunabilecektir. Çok duyulu uyaranları barındırabilme özelliğiyle, çocuğun eşleme becerisine yönelik daha karmaşık adımlara geçişinde arakesit bir destekleyici araç olma potansiyeline sahiptir.

Uzamsal Uyaranların Kullanımı

Çocukluk döneminin ilk aşamalarında somut nesnelerle etkileşim fiziksel bilgiyi, ilerleyen aşamalarda edinilen bu fiziksel bilgi ise nesneleri sınıflama, sıralama, uzamsal ve maddi ilişkiler kurma gibi daha soyut ve

mantıksal bilgiler elde edilmesini sağlar. Somut nesnelerle etkileşimde uzamsal eylemler önemli bir yere sahiptir. Eşleme becerilerinin kavranmasında kullanılan aracın da dokunsal bir ekran ile birlikte, çeşitli uzamsal jestler ile etkileşime olanak tanıyabilmesi, eşleme becerileri öğretiminde aşamalı kullanımına olumlu bir katkı sağlayacaktır. Bu uzamsal ve dokunsal ilişkilerin eşleme becerileri öğretiminde kademeli olarak kurgulanması önemli bir tasarım kriteri olarak karşımıza çıkarmaktadır.

Görsel Uyaranların Kullanımı

Çocuklar, fayda-yarar, beyaz-ak gibi eş anlamlı; yaz-kış, sağ-sol gibi zıt anlamlı kelimeleri zihinsel şemalar oluşturarak öğrenirler. Bu şemaların oluşmasında görme duyusunun etkin bir rolü vardır. Bu nedenle öğretim araçlarını seçerken ve kullanırken dikkat edilmesi gereken konulardan biri de görsel niteliklerdir. Ayrıca otizmli çocuklarla eğitsel amaçlara ulaşmak için, onların görsel detayları fark etmedeki başarılarının değerlendirilmesi öğretimi kolaylaştıracaktır. Yetişkin müdahalesini azaltmak ve bağımsız çalışmayı artırmak için doğru olan işlemin çocuğa gösterilmesi ve verilen doğru cevap için pekiştireç sağlanması, görsel uyaranlar bakımından bu teknolojik cihazları potansiyel araçlar haline getirmektedir. Müdahaleyi azaltma ve pekiştireç için görsel uyaran kullanımının kurgulanması diğer bir tasarım kriteri olarak değerlendirilebilir.

Dokunsal Uyaranların Kullanımı

Öğretim araçlarını seçerken ve kullanırken dikkat edilmesi gereken hususlardan bir diğeri dokunsal niteliklerdir. İşlemi yaptıktan sonra çocuğa geri bildirimde bulunmak, doğru olan işlem için takdir etmek, yanlış işlem içinse tekrar denemeye teşvik etmek için dokunsal uyaranlar kullanılabilir. Titreşim bu uyaranlara birer örnek olarak verilebilir. Bununla birlikte, çocuk öğretime dikkatini yöneltmek yerine dokunsal olarak bu nesneyle ilgilenmeye yöneldiğinde, bu durum öğretim sürecini güçleştirebilir. Böyle bir durum, çocuk elindeki nesneyi bırakmak istemeyeceğinden,davranış sorunlarını da tetikleyebilir. Çocukların bu araçları öğretim sürecinde kullanırken dokunsal uyarıcı niteliklerinin, kazandırılması gereken becerilerin önüne geçmemesi gerekliliğinden dolayı, özellikle ilişkili bileşenler için malzeme seçimi dikkat edilmesi bir tasarım kriteri olmalıdır.

İşitsel Uyaranların Kullanımı

Öğretim araçlarının seçim ve kullanımında dikkat edilmesi gereken bir diğer husus da işitsel niteliklerdir. Takdir etmek, pekiştirmek ve tekrar denemeye teşvik etmek için işitsel geri bildirimlerden faydalanılabilmektedir. Bilindiği gibi öğretim sırasında doğru eylemin ardından eğitmenin çocuğa yüksek sesle takdir edildiğini ifade eden sözler söylemesi çocuk için önemli bir pekiştireçtir. Kullanılan aracın da sesli geri bildirimler sağlayabilmesi, olumlamaya katkısı bakımından işitsel uyaranların niteliklerini gözetilmesi gereken bir tasarım kriteri olarak sunmaktadır.

SONUÇ

Eşleme becerileri otizmli çocuklara kazandırılması gereken temel becerilerden bir tanesidir. Yapbozlar, nesneler arasındaki benzerlik ve farklılıklar, parça ve bütün, bir örüntüdeki eksik gibi ilişkileri kurmaya yarayan temel araçlardan biridir. Yapboz parçaları şekil, renk, boyut, malzeme gibi çeşitli nitelikleri değerlendirilerek ilişkilendirilirken, eşleme ve sınıflama gibi zihinsel etkinlikler gerçekleşmektedir. Bu zihinsel etkinlikler gerçekleşirken kullanılan öğretim araçlarının tasarımı, çocuğun öğretim sürecindeki deneyimlerini pozitif yönde etkilemek açısından önemlidir.

Teknolojik araçlar çoklu etkileşim modlarına uygun, çeşitlenebilir, bununla birlikte tutarlı ve kontrollü duyusal uyaranlar sağlama ve çocuğun bireysel öğrenme hızına uyumlanma gibi birtakım avantajları bakımından ön plana çıkmaktadır. Bu sebeple bu araçların tasarımı üzerine yapılan çalışmalar giderek önem kazanmaktadır. Bu çalışmada destekleyici nitelikleri nedeniyle somut kullanıcı arayüzü, bu arayüze sahip cihazlarda çalışan uygulamalar ve ilişkili bileşenlerin avantajları üzerinde durulmuş, bu araçlar arasından erişilebilir ve kullanıma hazır bir teknoloji olması bakımından tablet bilgisayarlara odaklanılmıştır. Çocuklara kazandırılması öncelikli olan eşleme becerileri çalışmanın kapsamını oluştururken, araç olarak da bu becerilerin çalışılmasında sık kullanılan eşleme yapbozları ele alınmıştır. Öncelikle bu araç, teknolojik bir arakesit ile sunulduğunda karşılaşılabilecek olumlu ve olumsuz durumlar alanyazındaki bilgiler ışığında tartışılmış; bu bağlamda

erişilebilir teknoloji olarak tablet bilgisayarlar ve onunla ilişkili kullanılacak bileşenler için tasarım kriterleri önerilmiştir. Çocuğu eşleme çalışmalarında teşvik etmede somut kullanıcı arayüzlerin olumlu katkıları olacağı, dolayısıyla ona özgü niteliklerin avantajlarının tasarımda da göz önünde bulundurulması gereken kriterlere bir çerçeve çizdiği söylenebilir. Bulgular kısmında detaylandırılan ve somuttan soyuta geçişi destekleme ve çok duyulu etkileşim modları olan uzamsal, görsel, dokunsal ve işitsel uyaranları içerme temaları altında değerlendirilen bu nitelikler, somut kullanıcı arayüzü tasarım kriterlerini belirlemede etkili olmuştur. Alana katkı sağlayacak sonuçlar olarak çalışmada sunulan bu kriterler;

- Somut kavramlardan başlayarak soyut kavramlara geçme,
- Çoklu etkileşim modları ile deneyimi zenginleştirme,
- Uzamsal, görsel, dokunsal ve işitsel uyaranları bir arada kullanarak çocuğa farklı kanallarla daha sürükleyici bir ortam sunma,
- Dokunsal bileşenler (tangibles: fiziksel tutuş, kavrama) aracılığıyla kinestetik duyular denen, kaslarda, tendonlarda ve eklemlerde bulunan duyu reseptörlerini etkileşime dâhil etme; bir eylemi gerçekleştirirken kinestetik duyunun aktif kullanımı,
- Bir eylemi görsel uyaranlar (sanal obje) ile yönlendirme ve eylemin sonucunun hatalı olması durumunda tekrar denemeyi teşvik etme ve doğru gerçekleştiğinde de pekiştireç sunma,
- Bir eylemi işitsel uyaranlar ile yönlendirme ve eylemin hatalı olması durumunda tekrar denemeyi teşvik etme ve doğru gerçekleştiğinde de pekiştireç sunma olarak sıralanabilir.

Somut kullanıcı arayüzleri ve bileşenlerden faydalanılmasının eşleme becerilerinin otizmli çocuklarla çalışılmasında pozitif etkiler sağlayacağı; önerilen kriterlerin ise, tabletlerin ve bileşenlerin arayüz olarak kullanıldığı araçlarda dikkate alınmasının, bu yaşamsal becerilerin kademeli olarak kazanılmasına katkı sağlayacağı düşünülmektedir.

Araştırmacıların Katkı Oranı Beyanı

Yazarlar çalışmaya eşit katkıda bulunmuştur.

Destek ve Teşekkür Beyanı

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Çatışma Beyanı

Olası bir çıkar çatışması yoktur.

Etik Kurul Beyanı

Çalışma bir derleme makalesi olduğu için etik kurul onayı gerektirmez.

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