SEMIOTIC APPROACH IN INDUSTRIAL DESIGN PRACTICE: APPROPRIATION OF SEMIOTICS BY TURKISH INDUSTRIAL DESIGNERS

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in Industrial Design

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ABSTRACT

SEMIOTIC APPROACH IN INDUSTRIAL DESIGN PRACTICE: APPROPRIATION OF SEMIOTICS BY TURKISH INDUSTRIAL DESIGNERS

Industrial design has become a well-known and important discipline today. Industrial design is a truly interdisciplinary field, encompassing engineering, social sciences, economics and basic sciences. Overtime, the dynamics that affect the design discipline have become more oriented towards user and product. As the technology and the market develop, it has become ever increasingly difficult to impress the user with the designed product.

It is necessary to give correct signals to the user with the designed product in order to attract their attention. It is a difficult but important step to bring the user and designer together at the same point. Accordingly this study thrives to explore whether semiotics have been integrated into the industrial design profession and to what extent. To this end, a survey with professional industrial designers in Izmir has been conducted to understand their use of semiotics in their practice.

Keywords: Semiotics/Semiology, Industrial Design, Product Design, Education, Industrial Design Proffesion

ÖZET

ENDÜSTRİYEL TASARIM PRATİĞİNDE GÖSTERGE BİLİMSEL YAKLAŞIM: GÖSTERGE BİLİMİN TÜRK ENDÜSTRİYEL TASARIMCILAR TARAFINDAN KULLANIMI

Endüstriyel tasarım günümüzde iyi bilinen ve önemli bir disiplin haline gelmiştir. Endüstriyel tasarım, mühendislik, sosyal bilimler, ekonomi ve temel bilimler içeren, gerçek bir disiplinler arası alandır. Gün geçtikçe tasarım disiplinini etkileyen dinamikler kullanıcı ve ürün odaklı olmaya başlamıştır. Teknoloji ve market geliştikçe tasarlanan ürün ile kullanıcıyı etkilemek zorlaşmaya başlamıştır. Tasarlanan ürün ile kullanıcıya doğru sinyaller vermek ve ilk görüşte etkileyerek ürün üzerine dikkat çekmesi gerekmedir. Kullanıcı ve tasarımcıyı aynı noktada buluşturmak zor ama önemli bir adımdır. Bu amaçla, bu adımın gösterge bilim ile sağlanabilir düşüncesini kanıtlamak için, bu tezde ürün tasarımına gösterge bilimsel bir bakış açısı sağlanmaya çalışılmış ve İzmir'deki profesyonel endüstriyel tasarımcıların semiyotik bilgisi üzerine bir çalışma yapılmıştır. Bu çalışma, göstergebilimin endüstriyel tasarım mesleğine entegre edilip edilmediğini ve hangi ölçüde olduğunu araştırmaktadır.

Anahtar Kelimeler: Göstergebilim, Endüstriyel Tasarım, Ürün Tasarımı, Eğitim, Endüstriyel Tasarım mesleği

To my parents Çiğdem and Murat Kartalkaya and my grandmother Yüksel Turhal,

Always and forever.

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CHAPTER 1

INTRODUCTION

1.1. Problem Definition

This study focuses on the subject of semiotic approach in industrial design by testing the hypothesis of semiotics should be subtopic of industrial design education and practice.

The study particularly pleads importance of creating products that could communicate with potential users more effectively then the manufactured products observed around the sector. In this respect, this thesis investigates whether Turkish industrial designers who took courses on semiotics during their industrial design education can use their skills that gained during their education in their professional lives.

The relevant research questions are as follows:

1. How can industrial designers use their knowledge about semiotics in their professional life?
2. Is semiotics/semiology education useful for industrial designers in their profession?
3. If industrial designers can use their skills gained during semiology/semiotics education, to what extent they can incorporate their knowledge to their practice?

1.2. The Purpose of the Study

This study aims to examine semiotics/semiology knowledge on industrial designers and how they can use their knowledge in practice. It also aims proving following arguments;

1. Semiology/Semiotics should be an integral part of industrial design education and practice.
2. It is not incorporated into the industrial design practice as much as it should have been.

3. Transferring semiology/semiotics knowledge into the design processes would create better products that are able to communicate with the users more effectively.

1.3. Methodology

Three main strands of methodology has been employed to conduct this study: literature review; questionnaire and focus group study including face to face interviews. The fact that the researcher herself is a professional industrial designer helped her gain more insight into the issue and read out colleagues in industry.

The data which is obtained from the literature review includes concept of industrial design, history of industrial design, industrial design in Turkish context, history and consept of semiotics/semiology and semiotics/semiology approach in industrial design.

Literature review is used for prepare the conducted questionnare and interview questions. Questionnaire was prepared considering specific criterias like candidates should be professional industrial designers, work in different firms and pursuing MSc/MA. Focus group created with candidates who applied questionnaire to get effective results.

1.4. Thesis Structure

This thesis consists of five chapters as Introduction, Industrial Design in Turkey, Semiotics/Semiology in Industrial Design Practice, Case Study and Conclusion.

This study will first describe the purpose of thesis in general terms, mentions about arguments and aims of this thesis. After the introduction, next chapter particularly examines the state of Industrial Design practice, culture and education in the Turkish context in addition to the general explanation of the concept of industrial design. Also this chapter mentions about design thinking process method in industrial design. Third chapter deals with the concept of Semiology/Semiotics, its historical development, fundamental terms, and its integration into the Industrial Design education. Semiotics/Semiology is searched by the value in Turkey. Case Study chapter includes the most important part of thesis with the literature review, questionnaire and focus group.

Products analyzed considering semiotics/semiology approach. Also a specific product analyzed with focus group participants. This chapter followed by the methodology chapter which introduces methods: a questionnaire with the professional industrial designers and focus group with the candidates who chose considering answers of questionnaire.

Finally, this thesis concludes with the analysis of the answers, opinions and findings obtained and key points to employ for the possible new application.

CHAPTER 2

INDUSTRIAL DESIGN IN TURKEY

In this chapter, before researching the industrial design in Turkey, the concept of industrial design in general, its history, and design methods will be mentioned. General information about industrial design communities will be given. Then, the focus will be on the information that separates industrial design from the concept of design in general. In the remainder of this section, industrial design concept will be discussed in terms of Turkey with reference to the leading industrial designers, industrial design education, the professional practices in relation with industrial design education, the industrial design community and design competitions in Turkey.

2.1. Concept of Industrial Design

In general, we can say that design plays a significant role in our daily activities. It affects our daily lives directly or indirectly in many ways that increase the quality of our life practically or aesthetically. Designing is an ability which separates us from the other living creatures and according to this situation we can say that everyone is a designer. However, design as a discipline which has its own work processes, methods, technologies, relationships and statements, is beyond this situation. Although design is an expression of human mind, creativity and imagination, it also is a cultural object of society and innovation tool for global economy. Heskett, who is an English author and on industrial design educator, emphasizes the importance of design as follows; "... if considered seriously and used responsibly, design should be the crucial anvil on which the human environment, in all its detail, is shaped and constructed for the betterment and delight of all" (Heskett 2002).

Industrial design or industrial product design is a profession that designs innovative products which take into consideration the consumer needs and demands as well as the conditions of the manufacturer. Besides, it should also involve creativity, and

regard production techniques and cost, ergonomics, technical and aesthetic features, material selection.

If we refer to the basic meaning of industrial design in terms of lexical explanation Britannica Dictionary defines industrial design as "the design of mass-produced consumer products"(John, n.d.). Oxford Dictionary describes industrial design as "the art or process of designing manufactured product"(Oxford, n.d.).

According to World Design Organization, industrial design is a strategic problem-solving process that drives innovation, builds business success, and leads to a better quality of life through innovative products, systems, services, and experiences (WDO 2017).

The Industrial Designers Society of America (IDSA) describes industrial design as a professional service that optimizes "function, value, and appearance for the mutual benefit of both user and manufacturer (Kuen and King 2016). According to IDSA, Industrial design is bridging relationship between objects, humans and spaces by studying form and function.

The Turkish Patent Institute (TPI) published the Decree Law on the Protection of Industrial Designs in 1995. According to this decree law;

> Design means the entirety of the various features such as lines, color, texture, shape, sound, elasticity, material or other characteristics perceived by the human senses of the appearance of the whole or part of a product or its ornamentation. Product means any industrial or handicraft item, parts of a complex system, sets, compositions of items, packaging, get-ups, graphic symbols and typographic typefaces, excluding the computer programs and semi-conductor products (TPI 1995).

Industrial Designers Society of Turkey describes industrial design as a profession that develops products which are suitable for mass production for the end user considering criteria such as features of the target group and user needs. It establishes the relationship between humans and objects which produced by industrial methods. In its widest sense, industrial design is the humanization of technology. Industrial design is a professional service which optimizes the appearances of products, functions, values and systems by developing new concepts and definitions for this process which involves favor of both the manufacturer and the user (ETMK 2016).

In the *Guide Book of Industrial Design*, industrial design is described as not just a way of making products more beautiful, but also as a method of doing better in every

sense. Industrial design is defined as an industrial activity involving creativity and encompassing all kinds of perceptual, physical and functional relations between the user and the product. It is an important part of the industrial activity defined as a new product development (ER et al. 2003).

As we can see above, industrial design is described in a myriad of ways. If one wants to underline a common denominator based on abovementioned descriptions, it can be said that it is a discipline that creates contact between users and designers who aim to answer user's demand. Industrial design presents a wide range of design issues and provides innovative, practical and suitable products for manufacturing. None of the above mentioned descriptions refer to semiotics or its importance in the design process. However, the emphasis on the inherent connection between the product and user at well as the role of well dues and systems in manufacturing a product implies signification creating meaning. And this is where semiotics come to the fore in industrial design profession.

2.1.1. History of Industrial Design

Design is as old as the mankind. People have always found a way to make their daily life easier with tools or products. This situation has always been like this since the first ages. For example people sculpted the rocks in order to defend themselves or to gather food in Paleolithic Age (Figure 2.1.). "Placing design objects and practices within the context of history helps discern where design has been, where it might be going, and how its past can be rethought" (Broody and Clark 2009).

Like inhabitants of the cities, cities have their own characteristics and divergence, identifiable elements and features that help us distinguish one from the other, features that are unique to them (Oktay 2002; Ward Thompson 2002). Cities gain an identity through the features of the environment and their interaction (Raja 2004; Padua 2007). Anything designed for the urban space should be coherent to the existing urban identity (Lynch 1977; Barış, Uslu and Uckac 2009).

With rapid urbanization in the 1950s and irregular, unplanned, unaesthetic structuring process, number of stereotyped cities in Turkey began to increase. As an outcome of socio-economic and political changes, urban culture and identity were

distorted and started to vanish. This caused an identity crisis in many cities (Barış, Uslu and Uckac 2009).

Figure 2.1. Tools in Paleolithic Period ("The Paleolithic Period," N.d.)

As mentioned in the article *The Axiological and Epistemological Foundations of a PDE Program*, "design is perhaps one of the most ubiquitous activities of modern societies. Practically everything that surrounds us is the product of a design process" (Restrepo et al 2004).

The emergence of the term "industrial design" and its use as an independent term from the general concept of design has been associated with the industrial revolution. The Industrial Revolution (1760-1840) caused a significant transformation across the world with a shift from production facilitated by human and animal power to standardized mass production based on machinery (Güzel 2014:158). This also meant rapid urbanization, preparing workforce for the newly developed urban industry. As described in the Britannica Dictionary, the Industrial Revolution "is the process of transition from the agriculture and craft economy to the dominance of industry and machinery manufacturing in modern history (The Editors of Encyclopaedia Britannica 2018). With the Industrial Revolution in the eighteenth century, industrial design started to gain momentum and importance. Industrial Revolution brought industrialization and mechanization and introduced factories and mass production.

According to the research conducted by Kuen Chang and Simon King, the Industrial Revolution led to radical shift to mass production of identical goods with improvement of manufacturing capabilities. Thus, the act of design became separated from the act of making for the first time (Kuen and King 2016). The rise of industrialization changed the point of view to production, production techniques enlarged the markets, and new production demands occurred. With the industrial and technological changes, industrial design field begun to appeal to a wide variety population. In 1851, Europe met with modern and mass production of America by the Great Exhibition in Britain. *Industrial Design* book was established by Jacques-Eugene Armengaud in 1853 and this book was about the complete course of mechanical, engineering, and architectural drawing. This book showed people techniques about machinery production and design.

Deutscher Werkbund was founded in 1907. It is a German association of designers, artists and architects ("Basic Information of Deutscher Werkbund," n.d.). This association played a big role for the development of industrial design and Bauhaus Design School. In 1919, Joseph Clause Sinel, who was a New Zealand designer, used "industrial design" as a term for the first time. Following this term, mass-producing goods such as trains, automobiles or electrical appliances were started to be designed by industrial designers. In 1926, first design offices were created by Walter Dorwin Teague (Gantz 2014).

Industrial designers were forced to make their production methods more cost-effective during The Great Depression between 1930 and 1950. In 1934, a breakthrough was experienced by industrial designers. Herbert Read asserted the first and important principle which a factory should conform to the personality of an artist but not vice versa. Matsushita Electric Industrial Co. Ltd. Founded a production design department in Japan in 1951 (Kuen and King 2016).

Industrial Designer's society of America (IDSA) was founded in 1965. Technological developments and the rise of the internet were helpful for the profession of industrial design to push forward from the 1980s to the 2000s. In 2015, the definition of industrial design definition was updated by The Professional Practice Committee as follows: "industrial design is a strategic problem-solving process that drives innovation, builds business success and leads to a better quality of life through innovative products, systems, services and experiences (Lindsay, n.d.)

2.1.2. World Design Organisation (WDO)

The World Design Organization (WDO), founded in 1957 under a different name Council of Societies of Industrial Design (ICSID), can be defined as the international design organization which is to increase the awareness to design subject. The Organization's own definition in their website (World Design Organization, 2019) about their work is:

> "The World Design Organization (WDO), formerly known as the International Council of Societies of Industrial Design (ICSID), is an international non-governmental organization founded in 1957 to promote the profession of industrial design, and its ability to generate better products, systems, services, and experiences; better business and industry; and ultimately a better environment and society ("WDO About" 2019)."

Following paragraphs was written to purpose of briefly explain the historical events in the World Design Organization.

In 1953, the idea behind the World Design organization was presented by Jacques Vienot and ICSID was founded after 3 years, on 1957 in London but the organization was originally registered in Paris under the name of International Council of Societies of Industrial Designers. The World Industrial Designers Day is celebrated internationally on 29 June every year, since 2007, in dedication to foundation day of the World Design Organization. The name of the organization was changed to International Organization of Societies of Industrial Design in 1959 and by then it had grown to 23 members from 17 countries.

By the end of the decade, in early 60s ICSID had grown rapidly with its 40 members from more than 30 countries. UNESCO special consultant status was granted ICSID in 1963. Four seminars regarding the issues of academic standards about design subject was held by ICSID between 1964-1968 in 4 different countries (Argentina, USA, Germany, and Belgium). The aim of these seminars was standardization of the applications and recommendations in the profession of Industrial Design.

Figure 2.2. ICSID's logo from 1970 to 1980 (World Design Organization, 2019)

In 1971, ICSID's first international seminar was held and this seminar brought professional industrial designers from all around the world together with new type of seminar called Interdesign workshop, the workshop was placed in the Minsk. Interdesign workshop is a critical point in World Design Organization's history as in terms of creating a collaboration environment for Industrial Designers and this workshop was the origin for many workshops organized since. In 1973, Western and Asian design cultures was brought together by ICSID worlds together for the first time when the Japan Industrial Designers' Association held the Kyoto Congress. 2 thousand participants were attended.

Figure 2.3. ICSID's revised logo (World Design Organization, 2019)

In 1981, ICSID, International Council of Graphic Design Associations (ICOGRADA) and the International Federation of Interior Architects/Designers (IFI) held their first joint congress in Helsinki and agreed to keep closer relationship in future. In 1985, ICSID, ICOGRADA and UNESCO organized the first joint Interdesign for designing basic medical equipment for developing countries.

In 90's, ICSID continued its work in international stage, hosted congresses and Interdesigns all around the world. For the first time, they started to excogitate about intellectual property and design protection.

In 2003, International Design Alliance (IDA) was established by ICSID and ICOGRADA. Later on, International Federation of Interior Architects/Designers (IFI) joined to this alliance in 2008.

As a celebration of ICSID's 50th anniversary, World Industrial Design Day has been celebrated on June 29th since 2007 to underline the impact of industrial design in economic, social, cultural and environmental development.
In 2008, The World Design Capital designation program was launched. The title was for celebrating the achievements of the cities that have used design to better the life quality of its citizens and create solutions to economic, social, cultural and environmental issues. Torino was named as the first World Design Capital.

Organization launched another prize: the World Design Impact Prize at 2012 to encourage industrial design projects that impact on quality of lives of many people around

the world. The first World Design Impact Prize was given to the Community Cooker project.

International Design Alliance (IDA) was separated in 2013 and ICSID focused on cultivating innovative models for international collaborations with organizations which are closely working with the industrial design profession. In 2016, World Design Talks were launched as workshops that focus on local challenges, such as rapid urbanization, climate change and migration, with a design perspective.

ICSID changed its name officially to World Design Organization on January 1st, 2017. As changing its name from International Council of Societies of Industrial Design to World Design Organization, WDO redefined its vision and mission. They defined their vision as: "To create a world where design enhances the economic, social, cultural and environmental quality of life" and their mission as "advocating, promoting and sharing knowledge of industrial design driven innovation that has the power to create a better world (World Design Organization history, 2019)."

For this vision and mission, WDO united the international community of industrial design in collaborative efforts: such as World Design Capital (WDC), World Design Talks (WDT), World Industrial Design Day (WIDD), World Design Partners (WDP) and many other.

World Design Organization is getting supported by lots of organizations who share the same vision with them, such as Autodesk, Mercedes, Continuum, Compal, Microsoft, MIT Press, Montréal International, Nestlé, New Cities Foundation (NCF), Rado, Tupperware and University of Brighton ("WDO, Community, World Design Partners" 2019).

At the same time, World Design Organization continues to work on the definition of the profession of Industrial Design and its code of professional ethics. Their professional ethics guideline contains 5 important titles: Benefit the client, benefit the user, protect the earth's ecosystem, enrich cultural identity and benefit the profession.

With the "designing for better environment and society" goal in their mind, World Design Organization indigenized United Nations Sustainable Development Goals ("Sustainable Development Goals: Sustainable Development Knowledge Platform" 2019) which has a set of 17 goals with 169 corresponding targets, agreed by UN member countries for solving some of the biggest challenges of the world: like preventing poverty and hunger, providing the access to education to all, reducing inequality and fighting with climate change. With every passing day, not just countries and governments but also

society and the private sector are embracing these goals and contemplating ways to increase common wellness and life quality.

Today, after 62 years, the organization contains more than 140 members from 40 nations. Turkey has 13 members and this makes Turkey the largest group in the organization. Their core values shaped through the years to inspire, mobilize and activate the designers. The goal of the organization changed to "designing a better environment and society" by adopting the United Nations Sustainable Development Goals.

2.2. Design Thinking Procfess and Methods in Industial Design

A Design is a process that meets the demand of the market by designing a finished product or design solution. Design process is described in the book of *Design Thinking* as follows;

> The design process engages a high degree of creativity but in a way that controlled and directed by the process so that it is channeled towards producing a viable, practical solution to the design problem, meeting or excelling the stated aims of brief (Ambrose 2010:10-11).

In this section, design thinking process and methods which are used in the design process will be mentioned.

Figure 2.4. Design Thinking Process (Academy, n.d.)

2.2.1. Emphasize

Empathyis crucial to a human-centered design process such as Design Thinking, and empathy allows design thinkers to set aside their own assumptions about the world in order to gain insight into users and their needs.

Once the brief is defined and accepted, a designer starts searching for information that can be fed into the creative process at the ideate stage. This search can be quantitative with statistical numbers or qualitative with collected information about consumes of target user. Used methods can be either desk research or field research. These researches are made to specify the concept with the information like customer profile, collected benchmarking data, production techniques (ER et al 2003:21)

We can separate research into two parts as primary research and secondary research. As a primary research source, feedbacks can be obtained from projects that were previously done to the same customer or similar customers. These feedbacks provide a starting point for what works and what does not work in the designated target group.

2.2.2. Define

Industrial designers consider the design problems and the user needs when they are starting design process. Before starting the design process, first of all, design problem should be determined both in education and in professional life.

Industrial designers often begin the design process according to customer demands and user needs or, if they want to present an idea from scratch, they focus on the design problem they find. It is very important to understand customer demands correctly. In line with this issue, industrial designers can use several methods like brainstorming or observation. In general, the main method applied by all designers is the method of observation because observing the design problem in the field is an important aspect for design process. During the define stage, designers put together the information they have created and gathered during the Empathise stage.

Also brainstorming method plays an important role in design process. Designers can meet each other or they can create groups for brainstorming. Thus, designers can create a design brief before starting a design process. On the other hand, client can give a brief that includes client's requirements. A brief should include aim, usage, geographical locations, target audience, identity keys of client such as nouns, colors, adjectives (Ambrose 2010:14).

2.2.3. Ideate

Information which gathered from researches by designers in previous step turns into visual thoughts in ideates stage. During the Ideate stage, designers are ready to start generating ideas because they got information in emphasize amd define stage. They can use gatherings in this stage. In *An Introduction to Design Thinking: Process Guide* this stage is described as;

> Ideation is the mode of the design process in which you concentrate on idea generation. Mentally it represents a process of "going wide" in terms of concepts and outcomes. Ideation provides both the fuel and also the source material for building prototypes and getting innovative solutions into the hands of your users (Plattner 2010).

Ideate is a procedure of design process of one's concentration on an idea. It is a process of going wide for concepts and outcomes which provides support for building prototypes and solutions for designers. Designers need to identify problems to create innovative solution for ideate. İdeate provides support for designers' to understand problems and design imagination to create solutions. Especially, it widens users imagination to generate early design projects and finds best solution to iron out problems..

Mentally, users mind and their rational thoughts with imagination generate ideates. During the ideate stage, designers draw sketches (figure 2.5.) to make the ideas more realistic. Sketches provides feedbacks from customer thus, avoid having a problem with the customer.

2.2.4. Prototype

The prototype mode is repetitive of generation to get designers closer to their final solution of problems. The prototype mode provides support in early stages to narrow their

problems down to generate solution. Designers can make anything into a prototype to provide support.

Designers need to use their ideate to star building without spending too long time on one prototype. However, designers need to identify their test with each prototype to have answers for test questions. Building their ideate and answering test question will provides support for designers to receive feedback in testing phase.

Prototypes, which are inexpensive and scaled down versions of the actual product, may be shared and tested within the team itself, in other departments, or on a small group of people outside the design team. This is an experimental phase, and the aim is to identify the best possible solution for each of the problems identified during the first three stages.
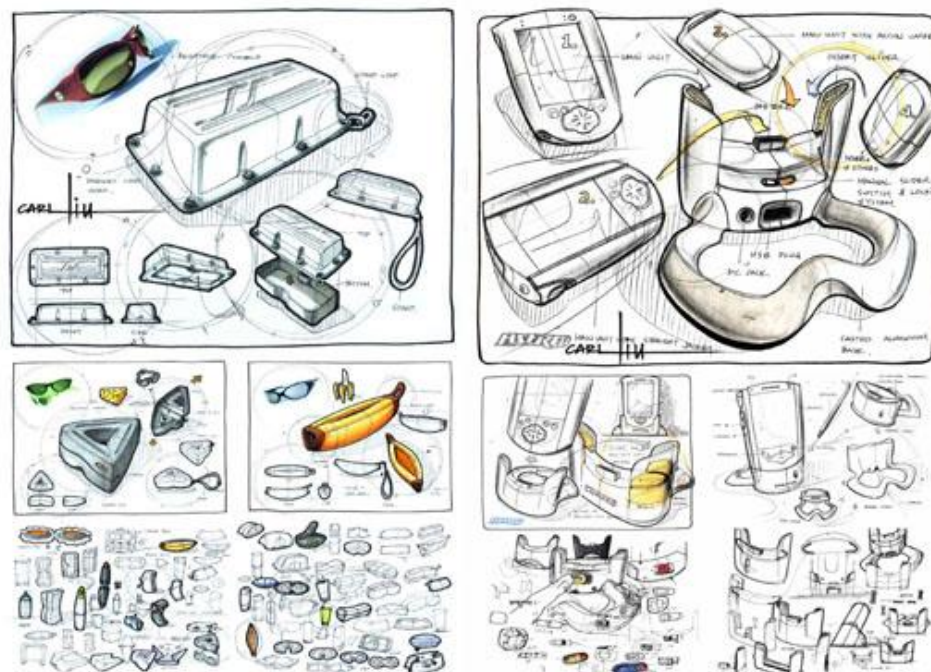
Figure 2.5. Ideate Sketching (Liu 2011)

2.2.5. Test

The Test mode gives feedback for prototypes to designers helps them to gain empathy for users and another opportunity for their designs. Testing their next repetitive of prototypes provides gain empathy concerning user experience.

Designers or evaluators rigorously test the entire product using the best solutions identified during the prototype phase. This is the final stage of the 5-stage model, but in

an iterative process, the results during the testing phase are often used to redefine one or more problems and to let users know the conditions of use, how people think, act, feel and empathize. Even at this stage, changes and improvements are made to rule out problem solutions and to understand the product and its users as deeply as possible. In shortly, designers or evaluators rigorously test the complete product using the best solutions identified during the prototyping phase.

2.3. Industrial Design in Turkey

Design in general, and industrial design in particular, is perceived as an element of making a difference with innovation by across the world. Nowadays, Turkey is playing an important role between among countries due to the added value of our national development and targeted export policies to increase our export manufactured products of high quality. In order to achieve this goal, the share and importance of investments and supports in the development of high technological products in national industrial policies are increasing. For example, nineteen firms took the government incentive in 2018 in Turkey. Most of these firms have design and R&D departments. It appears that the Turkish companies want to become strong in the international competition of trade by improving their ability to design. Traditional techniques are not enough anymore because advanced technology, are influencing the production techniques. Due to the pressure caused by low-price products especially produced by China with low labor costs, as well as relatively high input costs, the impact of low level of value-added production and technology, product and production dependency on the production equipment has increased in recent years. This situation hinders the economic development of our country. Thus, Turkey is forced to change and transform.

As a result, Turkey is searching for new strategies about production. One of the most important indicators of these strategies is the change of code about Supporting Research and Development Activities for R&D as introduced by the Law on Supporting Research, Development and Design Activities. Thus, the scope of the support given has been extended to support the design and development activities (Republic of Turkey Ministry of Industry and Trade, 2014).

Turkey works to increase added value products. R&D, design and product development are the most important activities related to competencies which should be

emphasized and not easily obtained in order to protect the competitive advantages of the companies. To be able to make valuable production, brand positioning, designing original products, producing technology, industrial product design / utility model / providing intellectual rights protection with patent, marketing, product development, production etc. require innovation in processes. Making valuable production is a special area of expertise to realize a design that will create a value, to fulfill the functions expected of, and to use the design tools effectively. Here industrial design plays an active role because of that it is not only visual design, industrial designers should appropriate a holistic approach considering the manufacturing technique and the material to be used to reduce the cost in design process (Vayvay 2016).

Industrial design creates make a chance to decrease the costs of production by providing advantage in competition, it increases customer satisfaction, royalty of customers, creates new products, that come to forefront in the market. Effective product design solutions are directly connected with designers who, analyze user tendencies with reality who are the followers of global and regional markets.

Industrial Design comes to the front as an encompassing field. For example, industrial design includes product design, furniture design, shoe design, system design or car design etc. This situation provides that industries need designers specializing in the field. Within each passing day, world, people and technology is developing. Industries have to be different and unique in order not to get lost and industrial designers can provide this uniqueness and difference.

These uniqueness and difference can be protected by several ways such as utility model, patent or trademark registration. Protection of industrial design in Turkey is regulated by Decree-Law No. 554 which came into force in 1995. According to the Decree Law no. 554, the product must be new and distinctive in order to be given an industrial design registration. If a design is not submitted to the Turkish Patent Institute before its application date, it is considered to be new. Disclosures or presentations made to the public within 12 months of the date of application shall not affect this innovation. The difference between the overall impression that design creates on the informed user and the overall impression created by any known design in this user means that it has a distinctive character. The protection provided by industrial design registration covers 25 years with a 5-year renewal period from the date of application. Industrial designs provide protection only for the countries where they are registered. In this respect, an industrial design has been registered in Turkey is valid only within the borders of Turkey. If the

applicant is sending his / her specially designed products abroad, he / she should have a design registration in those countries. (TPI 1995)

2.3.1. Industrial Designers Society of Turkey (ETMK)

ETMK is an industrial designer's professional organization which works about industrial design areas was founded at Ankara in 1988. There are almost 500 members as abroad and domestic of ETMK which was founded from a group of industrial designers in the middle of 1989's. Branch offices were opened in İstanbul 1998, in İzmir 2010 and in Ankara in 2012 (ETMK 2016). ETMK logo designed by the member of ETMK, Ali Bakova in 1988 and revised by Eray Makal (ETMK 2006).

The defined aim of the organization defined by the organization itself in their website with the definition stated below: ETMK aims to take action about design with colleagues, manufacturers and users in joint platforms through the exhibitions it has opened, competitions it has organized and supported, books and catalogues it has published, panels and training sessions it has realized until today. The primary goals of ETMK are to show the increasing importance of industrial design within the local and international markets, and to share experiences and contributions of Turkish designers, by reaching out to various sections of the community and the industry. To accomplish these goals, each year ETMK organizes many activities and documents them.

Figure 2.6. ETMK logo (ETMK 2006)

Turkish Design Advisory Council prepared and November 2014 entered into force on Design Strategy specified in the Document and Action Plan, "the preparation of Turkey's design inventory" study Turkey Chambers and Stock Exchanges Union (TOBB)

and the Industrial Designers Society (ETMK) is carried out under the responsibility. Aim of the inventory is;

- measure volume of industrial design activities as human source and economical way
- investigate the sectors in which activities are distributed
- looking how industrial designers perform their jobs
- search industrial designers fields of expertise and their income

The inventory to be prepared will serve as a basis for government grants, tax incentives and work to be carried out at the Turkish Design Advisory Council.

2.3.2. Industrial Design Education

As mentioned in "History of Industrial Design" part, industrial design became part of people's lives with the industrial revolution. In Turkey, it first occurred in academia. In 1957, Prof. G. Holmes Perkins, who had worked as an advisor for Middle East Technical University (METU), suggested a development program which will include the industrial design department in Turkey under the Architecture Faculty. This development program is the first document whereby an industrial design department mentioned as a university program in Turkey (Payaslıoğlu 1996). In the fall 1969, David K. Munro 'who is an American industrial designer' joined the METU's academic staff of Architecture Faculty by the support of AID-Agency for International Development for the aim of building an industrial design program. He opened elective courses in Industrial Design Department and even developed a master program. The courses which were opened by Munro in 1969 are known as the first courses in the field of industrial design education. METU academic members worked for opening an Industrial Design Department until 1979 and the department was founded in that year (Asatekin and Mutaf 1978).

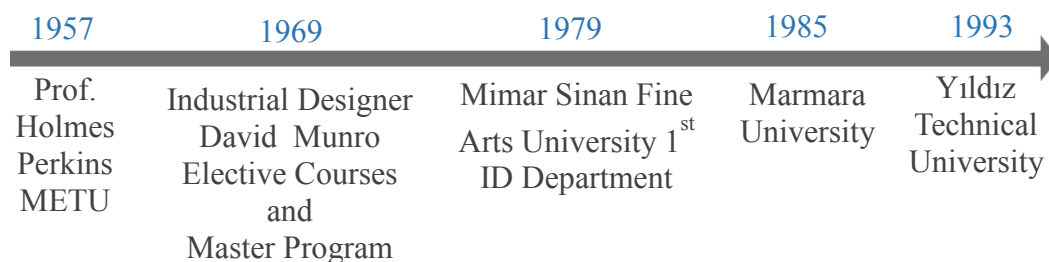| 1957	1969	1979	1985	1993
Prof. Holmes Perkins METU	Industrial Designer David Munro Elective Courses and Master Program	Mimar Sinan Fine Arts University 1st ID Department	Marmara University	Yıldız Technical University

Figure 2.7. Industrial design education progress

Despite the initial efforts of METU for the industrial design field, the first departmental foundation was by the State Academy of Fine Arts, which later acquired the name Mimar Sinan Fine Arts University in the early 1970s. After the first Industrial Design lecture was given at Mimar Sinan Fine Arts University, several universities started to give an education in the field of industrial design in coming years. Marmara University in 1985 and Yildiz Technical University in 1993 started to accept students for industrial design undergraduate education. In the first twenty five years of industrial design education, industrial design undergraduate program was opened in just four public universities until Yeditepe University Fine Arts Faculty introduces its industrial product design undergraduate program. This marks the date the industrial design education was given in Foundation University for the first time. (Enşici, n.d.)

While some universities used the term "industrial design", several others preferred the tittle "industrial product design" term. The reason for this is that industrial design is also known as industrial product design. These terms are often used interchangeably such difference is probably the result of translating names of departments from foreign universities. Nowadays, Industrial Design term is accepted in general term.

UNIVERSTY	FACULTY	DEPARTMENT
ATILIM ÜNİVERSİTESİ (ANKARA)	Fine Arts, Design and Architecture Faculty	Industrial Product Design
BAHÇEŞEHİR ÜNİVERSİTESİ (İSTANBUL)	Architecture and Design Faculty	Industrial Product Design
BEYKENT ÜNİVERSİTESİ (İSTANBUL)	Engineering and Architecture Faculty	Industrial Product Design
BİLECİK ŞEYH EDEBALİ ÜNİVERSİTESİ	Fine Arts and Design Faculty	Industrial Product Design
DOĞUŞ ÜNİVERSİTESİ (İSTANBUL)	Art and Design Faculty	Industrial Product Design
GAZİ ÜNİVERSİTESİ (ANKARA)	Architecture Faculty	Industrial Product Design
HALİÇ ÜNİVERSİTESİ (İSTANBUL)	Architecture Faculty	Industrial Product Design
İSTANBUL AYDIN ÜNİVERSİTESİ	Architecture and Design Faculty	Industrial Product Design
İSTANBUL BİLGİ ÜNİVERSİTESİ	Architecture Faculty	Industrial Product Design
İSTANBUL MEDİPOL ÜNİVERSİTESİ	Fine Arts, Design and Architecture Faculty	Industrial Product Design
İSTANBUL OKAN ÜNİVERSİTESİ	Fine Arts, Design and Architecture Faculty	Industrial Product Design

İSTANBUL TEKNİK ÜNİVERSİTESİ	Architecture Faculty	Industrial Product Design
KADİR HAS ÜNİVERSİTESİ	Art and Design Faculty	Industrial Product Design
KARABÜK ÜNİVERSİTESİ	Fine Arts and Design Faculty	Industrial Product Design
MARMARA ÜNİVERSİTESİ (İSTANBUL)	Fine Arts Faculty	Industrial Product Design
MİMAR SİNAN GÜZEL SANATLAR ÜNİVERSİTESİ (İSTANBUL)	Architecture Faculty	Industrial Product Design
ONDOKUZ MAYIS ÜNİVERSİTESİ (SAMSUN)	Fine Arts Faculty	Industrial Product Design
ORTA DOĞU TEKNİK ÜNİVERSİTESİ (ANKARA)	Architecture Faculty	Industrial Product Design
ÖZYEĞİN ÜNİVERSİTESİ (İSTANBUL)	Architecture and Design Faculty	Industrial Product Design
SELÇUK ÜNİVERSİTESİ (KONYA)	Fine Arts Faculty	Industrial Product Design
YEDİTEPE ÜNİVERSİTESİ (İSTANBUL)	Architecture Faculty	Industrial Product Design
İZMİR YÜKSEK TEKNOLOJİ ENSTİTÜSÜ	Architecture Faculty	Industrial Product Design
TED ÜNİVERSİTESİ (ANKARA)	Architecture Faculty	Industrial Design
ESKİŞEHİR TEKNİK ÜNİVERSİTESİ	Architecture and Design Faculty	Industrial Design
IŞIK ÜNİVERSİTESİ (İSTANBUL)	Architecture and Design Faculty	Industrial Design
İSTANBUL ŞEHİR ÜNİVERSİTESİ	Architecture and Design Faculty	Industrial Design
İSTANBUL TİCARET ÜNİVERSİTESİ	Architecture and Design Faculty	Industrial Design
İZMİR EKONOMİ ÜNİVERSİTESİ	Fine Arts and Design Faculty	Industrial Design
TOBB EKONOMİ VE TEKNOLOJİ ÜNİVERSİTESİ(ANKARA)	Architecture and Design Faculty	Industrial Design
YAŞAR ÜNİVERSİTESİ (İZMİR)	Art and Design Faculty	Industrial Design

Table 2.1 Universities with industrial design departments

There are thirty industrial design departments commonly active in Turkey according to OSYM-Assessment Selection and Placement Center in data of 2018 (Table.1). Industrial design departments are generally subsumed under the Faculties of

'Fine Arts, Design and Architecture', 'Design and Architecture', Engineering and Architecture', 'Fine Arts and Design', 'Art and Design', 'Architecture', 'Fine Arts, Design and Architecture' and 'Fine Arts' in Turkish universities (Table 2.3.). Ten of these universities are public whilst the rest are known as Foundation Universities (Table 2.2.).

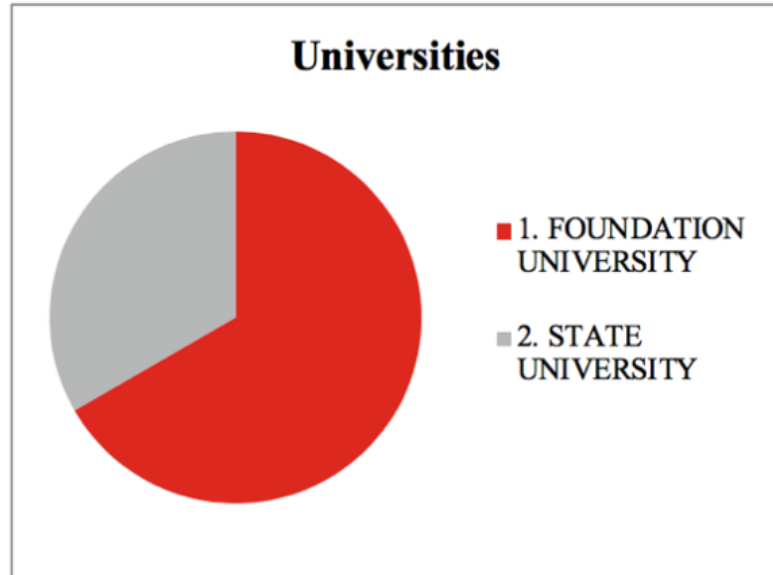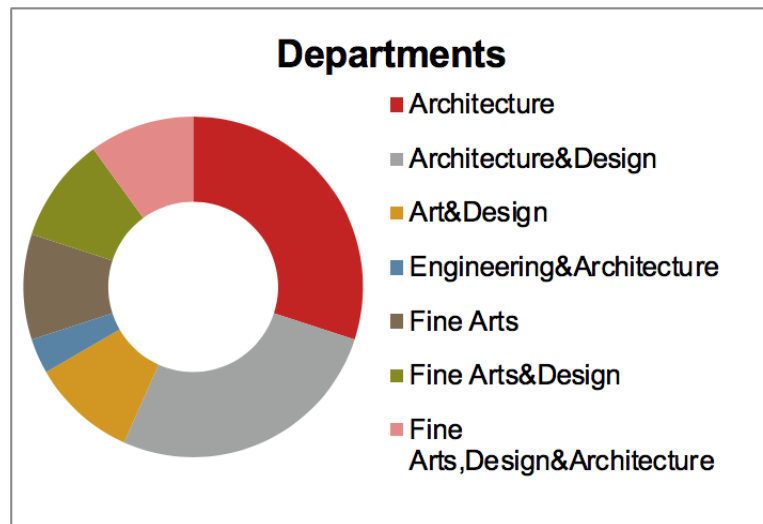Table 2.2. State and Foundation Universities

Table 2.3. Departments

In the last decade, industrial design education has become an important subject which deals with the development of countries in terms of market, industries, technology and innovation. Such encompassing and interdisciplinary scope causes industrial design departments to expand in education. Industrial design education in Turkey usually lasts

for four years in all universities that have established industrial design departments. Four years of design education consists of theoretical courses such as art history, aesthetics, innovative products, new materials to product design as well as practice-based studio courses.

According to the department programs collected from thirty universities that have industrial design or industrial product design departments; the design education starts with basic design in first year, where the lecturers explain the principles of basic design. Department presents basic design learning program with 'basic design studio course' which provides students with the main principles to make sense of design language and develop hand and mind skills about the design thinking. 'Drawing and representation' is another course whereby hand drawing and observation skills are taught. As a method, emphasis is placed on the techniques of conceptual drawings by freehand. 'The sketching and rendering techniques in industrial design course' supports the drawing and representation course by way of freehand drawings of variety products with rendering techniques in order to comprehend material, scale, texture and compositions. Students also develop their hand skills with 'model making course'. Course expects quality models from students with foam, wood or cardboard. With the 'computer aided drawing course', students learn to apply drawing techniques that they learned with freehand to computer this time. At the same time, program offers opportunity to learn history of design and art.

Second year is the year when fundamentals of product design, production techniques, material choosing and advanced presentation techniques with the 'product design studio', 'materials for industrial design', 'history and theory of industrial design', 'advanced computer aided drawing' and 'production technologies' courses are thought.

Third year gives industrial design students an insight into creating concepts and gives them opportunities to students to explore new working fields and choose their own elective courses about their interests. Students can choose among categories such as design management option or product design. Design management option aims to provide a stage which can conduct professional product/service design processes with different aspects of processes identify with marketing strategies, needs and demands of use and manufacturing features.

On the other hand, the product design option expects solutions for design problems by understanding practice of industrial design in a detailed way. Finding design problems and solving design problems, creating design briefs, systematic design for needed products are expected from students working together. Third year includes

'furniture design', 'product design', 'design project management', 'design research' and 'applied workshop' courses.

Final step of the education is the fourth year where the courses prepare the students to working life and industry. All of the aspects of a product should be handled in this step. Students should apply all techniques, terms and lessons learned through of the years at this final stage. All students have to choose a graduation project and graduation thesis. In the end of the year, department organize exhibitions to display student's projects.

In addition to the four year of industrial design education, department offers elective courses from other departments. Students can develop themselves with the courses that they will choose according to their interests. Students learn to be confidence under the favor of juries which are arranged for course grades at the end of each semester.

2.3.3. Discrepancy between Industrial Design Education and Practice

Alpay Er, who plays an active role in Turkish design society and also an instructor in industrial design department, underlines the importance of industrial design among sectors as follows: "While industrial design provides for a meaningful construction of all kinds of perceptual, physical and functional relations between products and people, it tries to realize this within the sectorial context and within the market mechanism. With all these qualities, industrial design as a profession and a discipline is now understood to be a strong expression of human intelligence, creativity and imagination into a concrete product" (Er 1998).

In the 'Better by Design' conference in 2005, John Heskett shared his opinion about the significance of design arguing that the companies which want to come to the forefront have to appeal all levels of design. He emphasizes that the design has wide variety competencies and an important factor for companies which want to rank in the market (Heskett 2005).

Authors of the article titled "The development of a suite of design methods appropriate for teaching product design" discussed the subject of design methods to teach in education process can be summarized as product development process, as product planning, task clarification, concept generation, evaluation and refinement, detailed design of preferred concept, communication of results, and preparation for production. Also in the same article the authors mentions the need to employ designers who can

contribute to the corporate goals and strategies alongside with the skill of product development (Green, L. et al 2002).
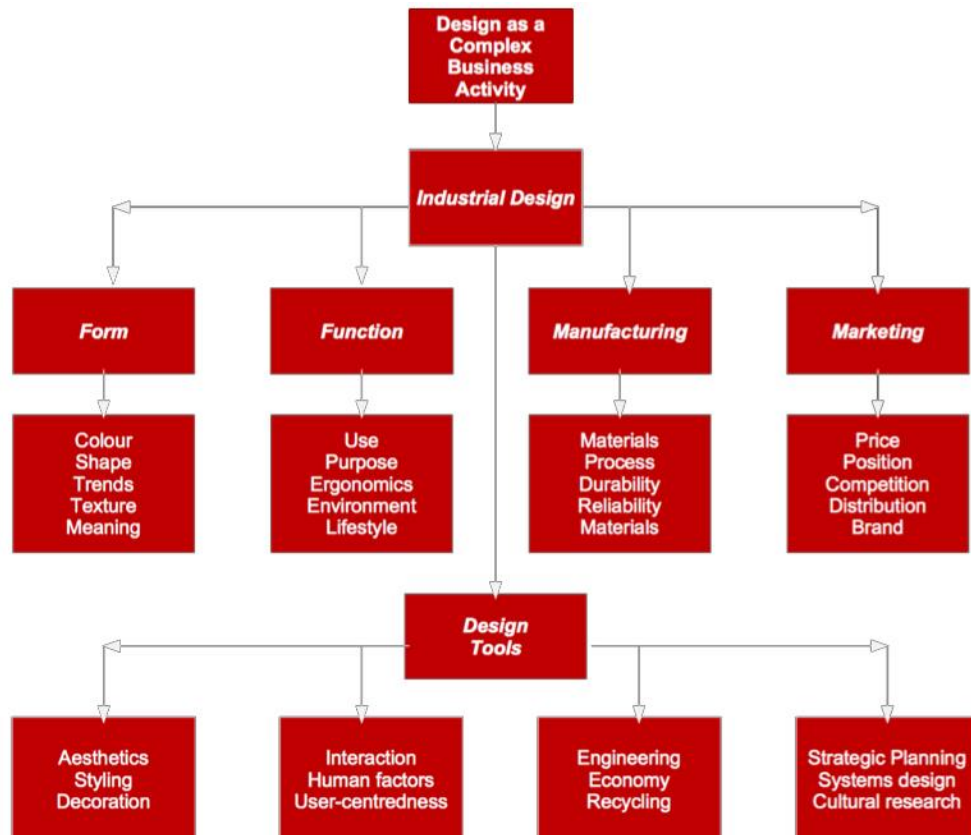
Table 2.4. Design as a Complex Business Activity (Heskett, 2005).

In Turkey, Industrial design department is developing day by day conducted the development of industry, technology or needs for the innovation. Industrial designers started to work more effectively as professional. Although this is the case, industrial designers cannot effectively use the qualified training they receive during their education. The reason for this situation is the low cost, high production, we can count the serial production factories who want to make.

The international market competitions and more-educated/selective consumers force the manufacturing companies to be more speed and unique considering innovati and creative features. According to Von Stamm quotes, the necessity of design and designers for the organizational competence as:

Design is a potent strategic tool that companies can use to gain a sustainable competitive advantage yet most companies neglect design as a strategic tool. What they don't realize is that good design can enhance products, environment, communications and corporate identity (Von Stamm, 2003: 13).

Von Stamm (2003) also explores that designers play a key role in innovation and contribute greatly to improving the innovation process and can be valuable members of innovation teams. Brief description of the industrial designer is the person who creates and produces designs for commercial and industrial products. They also make models and prototypes of these designs for mass production.

CHAPTER 3

SEMIOLOGY/SEMIOTICS IN INDUSTRIAL DESIGN PRACTICE

As is known, design is an important part of our daily lives. There is design inside of things that catch our attention and affect us at first sight. Design is all about things easy on the eye.

The concept of design and vision are interrelated. From a scientific point, seeing is an action that gets our eyes and brains working as partners in order to reflect what is around us. We recognize and identify things we face by way of seeing. In fact we sometimes can feel them by seeing. According to John Berger; "Seeing comes before words. The child looks and recognizes before it can speak" (Berger 1972:7).

In design, the first impression is fundamental. Design is a subjective and relative concept that changes from person to a person. If we look at the mean of relative; it may vary depending on the situation, situation, event or time. Everything which is made by design fact can be reflected as a different idea, situation, signal or sign.

Products that are designed by a designer do not always give same feeling or same thought to user and designer. There is a scientific field that would help, designers to catch potential users' attention and to convey the intended meaning to them via their product. This scientific field is semiology.

This chapter will provide a description of the concept of semiology/semiotics, fundamentals and concepts of semiology/semiotics, semiology/semiotics education for industrial designers and semiotic approach for product design as forms, colors, symbols and materials.

3.1. Concept of Semiology

In today's world the concept of semiotic/semiology gained importance since it is crucial in terms of bestowing things with meaning. The word semiology is inspired by the word linguistique in French. It is also expressed as "semiotique or semiologie" taken from French. Since the word linguistique is defined as a branch of science that examines

languages, the concept of semiotics can be inserted into a simple pattern as a branch of science that examines the indicators. However, the concept of semiology cannot be defined only by the meanings of the indicators and the words of science. Semiology represents a philosophy that goes far beyond these concepts. For this reason, the success of sciences such as linguistics, communication theory, formal logic and structural human science has increased the possibility of analyzing in the area of semiotics. Therefore, the semiology that emerged as a result of the need for interpretation is in parallel with the needs of the modern world and the modern world people rather than the enthusiasm of several researchers. Of course, studies in the field of semiotics have increased and the development of this science has accelerated.

The concept of indicator constitutes the basis of semiotics and therefore it would be useful to explain this term first to understand semiotics/semiology (Vardar, 1988: 111). Put simply, indicator refers to the languages that people created and used to deal with each other on a daily basis, various gestures (hand, arm, head movements), deaf-mute alphabet, traffic signs, pennants used in some occupational groups, advertising banners, fashion, architecture Arrangements are composed of various units such as music, writing, images and music (Karaman, 2017:27).

Some of the indicators are relatively easy to interpret and place in a meaningful way, it doesn't take long to understand them. Among the indicators that we all can perceive and interpret in a short time are traffic signs, deaf mute alphabet, sailor flags, gestures, signs of railway and airport officials, clearing or maintenance instructions of a fabric. It is easier to examine and understand these indicators within the context of society. In fact, we can easily understand the meaning of these lean indicators by our observations and the contribution of natural languages to us. These simple concepts just follow the definition of science that examines the indicators we have done above. This approach is expressed as communication semiotics.(Rifat 2009)

However, not every indicator is as easily understood as the above indicators and cannot be interpreted similarly. Some literary texts and fashion concepts, as well as numerous paintings and architectural works, can be given as examples. These types of indicators can be interpreted differently by each and no common result can be reached because these indicators have very complex and different structures. Although we believe that we understand these structures, they have the features that allow them to move to new meanings and different approaches and interpretations. Some concepts such as

science and technology can evolve, and as the human mind differs, it can evolve with these concepts. For this reason, the description method used to describe simple indicators does not work in such indicators.

As Erkman puts it, different perception levels such as perception by senses, perception by knowledge, perception by moral values, perception by figures, perception by aesthetics should be revealed (Erkman, 1987: 13). For the analysis of these indicators, it will be necessary to create a comprehensive, simple and productive model which is an epistemological, methodological, and descriptive model, which is also referred to as semiotics of meaning. As can be seen from the definition of meaningful semiology made by Rifat, this science is a branch of science that examines indicator strings, except for the semantic sum of its constituent words, and explores and reconstructs the meaning of the indicators as well as the notion of meaning (Rifat 1998).

There are similarities in the definitions of indicators made in the literature. In general terms, items such as form, object, and phenomenon that replace something else, or rather indicate something other than them selves, are called indicators. However, the process of evolving the indicator from the realm of consciousness to the real science field was realized in the ancient Greek period. In the Corpus Hippocraticum, one of the main texts of the ancient Greek period, the notion of the indicator was used for the first time to describe the healing process for the treatment of a disease (Manetti, 1993: 35).

Among the work which can describe the theory of indicators at the beginning period, language theory has been on the lead. No cultural and social phenomenon that is not related to communication is unthinkable and language is the most advanced form of communication. In addition, all non-language communication types are language-related in one way or another (Erkman, 1987: 79).

Many things can be incorporated into the concept of indicators. In the words of Rifat, colors or figures in a painting table can be called indicators, however, in a written text, the aims, behaviors or clothing of the hero can be considered as an indicator (Rifat, 1992: 6). In other words, when the indicator is explained, it is expressed as some distinctive feature that it has different relations by different elements. On the other hand, the basis of semiology is common elements and common meanings. Semiotics includes common values, indicators that everyone knows what it means, is presented to the audience, and indicators are taught to people by repeating them, and as a result, it becomes a common code to be understood by all (Gürsözlü, 2006: 14).

Peirce, an American philosopher, logician, mathematician, and scientist, sometimes known as the father of pragmatism, is one of the most involved in the concept of indicator. In the definition he made in 1982, he defined the indicator as a thought (Peirce, 1982: 339), which made a substitute for something or produced it. In this definition, the characteristic of the indicator is replaced by another feature. Over the years, Peirce began to refer to different concepts in defining the indicator. In another definition made by Peirce in 1984, the indicator was expressed as something for someone to hold a particular interest and capacity (Peirce, 1984: 228). Although the concept of retention or substitution has been used in this indicator definition, the indicator has been given a more comprehensive meaning by using the expressions in terms of both interest and capacity.

Umberto Eco, one of the most famous names in semiotics, is one of the most famous researchers who recently contributed to the renewal and effect of semiotics. According to him, semiotics is a spectrum ranging from the most natural and spontaneous communication systems to the most complex cultural strings. However, when we define this definition a little, Semiology counts and examines all the cultural phenomena, the situations in which people who relate to each other on the basis of all social compromises, are among the communication processes (Erkman, 1987: 31).

Ferdinand de Saussure, reknown Swiss linguist, argued that linguistics is part of the science of general indicators. However, nowadays, social life has changed so much that there is no clarity about the fact that there are indicators of a certain width other than human languages. When a more complex and real phenomenon is shifted from simpler concepts such as traffic rules and transportation indicators, the phenomenon of language will be encountered again. In other words, anyone who deals with semiotics will be confronted with a language phenomenon at the end even if they are interested in subjects other than language. But the language to be encountered is no longer the language of the linguists, but a different language. This new language will make reference to objects that have meaning under the language but which can never be without it or to small minor events (Erkman, 2005:114).

3.1.1. History of Semiology

Man lives in a very complex universe. In the universe surrounding man, natural languages are a very important source of communication. However, before languages

were born, people could come to terms through certain concepts. For this reason, natural languages are not a source of communication alone. Many meaningful units, such as passions, movements, beliefs, political regimes, advertising, painting, sports, music, cinema, and literature, along with natural languages, are among the items used for communication. Semiology, whose emergence, design and naming are based on ancient times, is used to grasp and interpret the meaningful strings mentioned above. In line with this goal, we provide a model of analysis and restructuring to teach us the techniques to help us understand the meaning of life.

The historical background of semiotics as a discipline dates back to ancient times. However, it has become one of the methods frequently used in text analysis after the second half of the 20th century. Semiology has become an independent science after 1960, with works by Ferdinand de Saussure, a Swiss linguist, and American logician Charles Sanders Peirce. Researchers such as Louis Hjelmslev, Roland Barthes, Claude Levi-Strauss, Julia Kristeva, Christian Metz, Algirdas J.Greimas and Jan Baudrillard have reflected the European tradition developed by Saussure. Researchers such as Charles W. Morris, Ivor A. Richards, Charles K. Ogden, Umberto Eco, and Thomas Sebeok have adopted the American tradition based on Peirce. (Rifat 2009)

Semiology has gained respect as science in recent years and this concept goes back to Plato and Aristotle, the ancient Greek philosophers who started discussions between facts and idealism. (Erkman-Akerson, 2005: 49-51) B.C. In the 3rd century, it was the first time that Stoics had been interested in the subject within the framework of logic theory and then semiology became the main subject of philosophy. (Güneş, 2012: 33). The contributions of the Stoics in this area have been focused on understanding the differences between "indicative" and "shown". In the Middle Ages Nominists examined the concept of the indicator, Leibniz explained the indicators mathematically, and Condillac showed interest in this issue through the language.

In the works of scholastic philosophies in the middle Ages, opinions about the forms of meaning were put forward and the relations between form and content were tried to be revealed. For example, Roger Bacon wrote a book called De Signis, which revealed that the relationship between smoke and fire was different from other indicators. Bacon introduced the triad semiotic model (indicator, indication and, interpretation of the indicator) and this model is still used. John Poinsot, for example, based his work on this triad model, and in his article Tractatus de Signis published in 1612, he introduced a basic science of indicators (Deely, 1990: 112).

The 17th and 18th centuries are known as the time when the theory of indicators came into question and was now being expressed in a serious way. The English philosopher, John Locke, published the work "An Essay Concerning Human Understanding" in 1690 and was the first to use the term "semeiotike" which means the teaching of indicators. In this work, he first considered the concept of semiotics among the sciences. In this book, J. Locke wrote a chapter on the division of sciences which he named after, and divided science into three classes. The first class of the sciences is called Physike or the philosophy of nature, the second is Praktike or Ethics, and the last one is named Semeiotike ie Indicators or Logic.

The French mathematician Jean Henri Lambert is known as the most important representative of the theory of signs after Locke. In 1764, Lambert completed his four-part book called Neues Organon, which he divided a chapter into a semiotic, which he called the doctrine about the demonstration of ideas and objects (Rifat, 1998: 113). With these two books known in the world of philosophy and these two world-famous philosophers, the concept of semiotic has become a known phenomenon. However, after these sources, semiotics provided the development of a philosophy of language rather than a science.

Joseph Marie Hoene-Wronski, who appeared on the stage after these names, stated in his Philosophie du langage (Philosophy of Language) published in 1879, that "perfection of indicators" was the subject of Semiology. The Czech philosopher Bernhardt Bolzano, in his book "Wissenschajtslehre" (Science Doctrine), which he published in 1837, referred to the term Semiotics as "the doctrines of indicators" ("Zeichenlehre") and has mentioned extensively. Then the echoes of the semiotic concept spread to Germany. In 1890, the German philosopher Edmund Husserl, in his work "Zur Logik der Zeichen (Semiotics)" (The Logic of the Indicators), shared the general observations of semiotics/semiology.

The progress of general semiotics in the modern sense has been the two leading names that lived in the same period. These are the Swiss linguist Ferdinand de Saussure and the American philosopher, logician and mathematician Charles Sanders Peirce . Peirce's works and ideas have made significant contributions to the fact that Semiology is an independent branch of science. Saussure, like Peirce, focused on the fact that semiotics and linguistics should be independent and different disciplines. In this way, semiotics has been accepted as an independent science especially after the 1960s .

Famous linguist Ferdinand de Saussure drew attention to the societal aspect of Semiology, and he described the notion of semiotics as a branch of science that studied the life of indicators in society (Guiraud, 2016: 17). Peirce studied the events with his philosopher identity and was interested in understanding the experience and understanding of the world that surrounds man, while laying the foundations of logical semiotics with his works on the meanings he believed to be formed in the structural relationship between the indicators, people and objects. (Fiske, 2014: 124).

When we consider the contributions of Peirce and Saussere to semiotics, it is necessary to talk a little more about them selves. Peirce, in his studies, generally stated that logic and semiotics are equal. According to him, grammar, logic criticism and rhetoric are three main parts of semiotics. However, Peirce emphasized the most logic criticism of these three chapters. In his works, Peirce examined the logical function of the indicators, and stated that it would be possible to classify semiotic facts as a system of indicators with sixty-six classes. Among these indicators, the most widely accepted and categorized are indice, visual indicator (icone) and symbole (3), which are used to classify the indicators in terms of their objects in terms of their existence, similarity, or counting logic (Vardar, 2001: 86).

Peirce, in the framework of the theory of logic, expresses the visual representation, directly representing what he states. For example, if there is a trace of lead in a piece of fabric, it indicates that the fabric has been fired. So, this is a symptom of fire. As seen, the symptom is due to the association between the two elements. Instead of a certain connotation, the symbol is revealed by the reconciliation between people depending on the interpretations (Öztokat, 2005: 61).

Saussure is a linguist and therefore primarily interested in language. Rather than the relationship of indicators (or words) with objects such as in Peirce, he focused more on the relations with other indicators and on the social functions of the indicators. He stated that semiotics will teach us what features the indicators contain, which laws are related, and that linguistics may be part of this general science (Saussure, 1985: 46). Saussure formed its work on the basis of indicative (fr. 33rganized33t) and shown (fr. Signifié). Saussure, who conducted important researches on linguistics, stated that linguistics had two principles under the headings of language indicator, Causality of Indicator and Line of Indicator (Saussure, 1916/1998).

As a discipline, the historical background of semiotics dates back to ancient times. However, it has become one of the methods frequently used in text analysis after the

second half of the 20th century. As can be seen, Saussure and Peirce were the pioneers of semiotics. Semiotics has become an independent science after 1960, with works by Ferdinand de Saussure, a Swiss linguist, and American logician Charles Sanders Peirce. Researchers such as Louis Hjelmslev, Roland Barthes, Claude Levi-Strauss, Julia Kristeva, Christian Metz, Algirdas J.Greimas and Jean Baudrillard have reflected the European tradition developed by Saussure. Researchers such as Charles W. Morris, Ivor A. Richards, Charles K. Ogden, Umberto Eco and Thomas Sebeok have adopted the American tradition based on Peirce.

In 1943, Louis Hjelmslev completed his study of Prolegomena to a Theory of Language, and in 1943, Eric Buysens attempted to establish a basis in the theoretical plane of semiotics by using Les Langages et le Discours. Barthes with his books Mythologies (Contemporary Sayings, 1957), Eléments de Sémiologie (Principles of Semiotics, 1965), Introduction á l'Analyse Structurale des Récits (Introduction to Structural Analysis of Narratives, 1966), Système de la Mode (Fashion String, 1967) developed the method of structural analysis.

In his work, Barthes examined the meaning imposed on the indicators by Saussure and allowed the boundaries of this meaning to develop. Barthes, in his *The Principles of Semiotics*, states that "the sole purpose of the principles is to elicit a solution based on linguistics" (Barthes, 1979: 1). While Barthes was one of the representatives of the Saussure tradition, in contrast to Saussure, he argued that linguistics should not be a part of semiotics but that semiotics should be part of linguistics (Erkman, 1987: 28).

Russian researchers, except Sauusure and Peirse, are among the names who have important contributions in the history of semiotics. The most important of these is Vladimir Propp, author of the book Morphology Skazki (Morphology of the Tale, 1928). Propp has identified 31 basic functions in his remarkable Russian folk tales and proved that there is a unchanging unified structure under which the tales seem to be multifaceted (Moran, 2009: 215).

French anthropologist Claude Lévi-Strauss is one of the names that follow Propp. İn his books; Mythologiques; le Cru et le Cuit (Mythological; Raw and Cooked, 1964), Du Miel aux Cendres (Honey to Ash, 1967), Les Origines des Manières de Table (Origins of Table Rules, 1968) he used Propp's method, and then applied Saussure's approach to linguistics to anthropology and argued that culture could be treated as a language of meaning like language (Aktulum, 2004: 5).

Algirdas-Julien Greimas, who was also one of the names like Propp, worked in the field of lexicology in the beginning, and later he got into semiotics, especially literary semiotics by his books: Sémantique Structurale (Structural Semiotics, 1966), and Du Sens (1970) (Greimas, 1966: 21).

Russian Tzvetan Todorov has written the following books: Littérature et Signification (1967), Grammaire du Décaméron (Grammar of Decameron, 1969), Introduction à la littérature fantastique (Introduction to Fantastic Writing, 1970), Poétique de la Prose, 1971), Poétique (Literatology, 1973), Théories du Symbole (Theories of Symbol, 1977), Les Genres du Discours (Types of Discourse, 1978). Together with these works, he developed a narrative analysis model that will examine texts by using linguistics categories, and he also attracted attention with his literary criticism and essays.

Michael Riffaterre, a famous researcher and critic, has received much attention in the field of semiotics with some of his works. Particularly in the works of Semiotics of Poetry, and La Production du Texte (Production of the Text, 1979), he investigated the dynamism in the production of meanings in the poem, emphasized that the poem tells us something and said something else, and stated that the readers perceive a text with the expansions of their own cultures (Rifat, 1992: 34).

One of the most famous names in 35rganized is Umberto Eco, an Italian semiotics scientist. Umberto Eco studied the reception semiotics and allowed for the recognition of semiotics in a wide reader environment (Rifat, 2000: 287). The pioneers of the societal semiotics model, which explores the relationship between the indicator value and the world and demonstrates that the indicator consists of a signifier, is Hjelmslev together with Umberto Eco. In his work, Hjelmslev states that the concept of the indicator consists of "narrative" (indicative) and "content" (shown) (Gottdiener, 2005: 49-50).

As it is seen, there are a lot of studies on indicator and semiotics. The studies are enriching the literature day by day. After these efforts to the scientific world, the number of studies on this subject is increasing. Whether it is the science of indicators or the science of meaning, semiotics is in a contradictory situation: semiology is not without indicators, but a theory that does not lead to debate on the indicator has not yet been established (Aktulum, 2004: 9). In brief, semiotics/semiology is the study of sign processes, signs and symbols, or signification and communication. It is usually divided into the three following branches: 1) Semantics: Relation between signs and the things to which they refer; 2) Syntactics: Relations among signs in formal structures; and 3) Pragmatics: Relation between signs and their effects on the people who use them. The

latter is the main interest for the purposes of this study. Normally we do not express ourselves by using single linguistic sign, but groups of signs, 36rganized in complexes which themselves are signs (de Saussure, 1983). Structuralists study texts as syntagmatic structures. The syntagmatic analysis of a text -whether it is verbal or non-verbal- involves studying its structure and the relationships between its parts (Chandler, 2013).

3.1.2. Fundamental Terms and Elements of Semiology

Saussure calls the basic elements of a language signs. Western thought has generally considered any instance of representation by dividing it into three components:
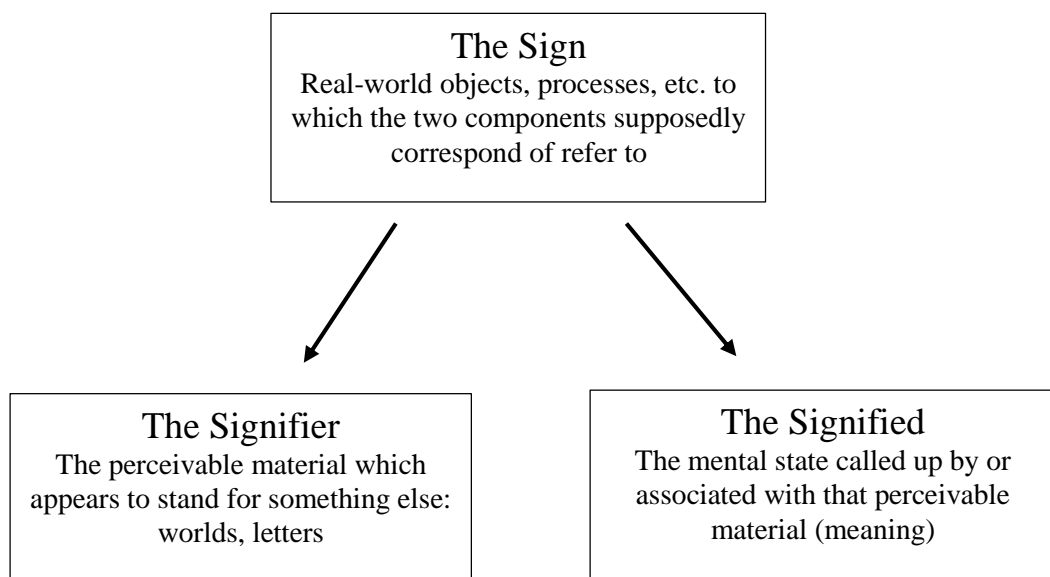
```
                    ┌─────────────────────────────┐
                    │          The Sign           │
                    │ Real-world objects,         │
                    │ processes, etc. to          │
                    │ which the two components    │
                    │ supposedly correspond of    │
                    │ refer to                    │
                    └─────────────────────────────┘
              ↙                               ↘
┌───────────────────────────┐     ┌───────────────────────────┐
│      The Signifier        │     │       The Signified        │
│ The perceivable material  │     │ The mental state called up │
│ which appears to stand    │     │ by or associated with that │
│ for something else:       │     │ perceivable material       │
│ worlds, letters           │     │ (meaning)                  │
└───────────────────────────┘     └───────────────────────────┘
```

Figure 3.1. Basic elements of Sassure (Rosen, 1986)

Saussure argues that in verbal language the connection between signifier and signified is virtually always arbitrary; that is, while a sign is a unity of signifier and signified, there is no natural connection between the two (Rosen, 1986). The Saussurean model supports the notion of arbitrariness of the sign by proposing the autonomy of language in relation to reality. Its emphasis on internal structures within a sign system assumes that language does not reflect reality but rather constructs it (Frank Nack).

Having argued that signs are not determined by their concrete, positive qualities such as a specific relation to a referent but by their position in the system as a whole, Saussure traces out implications. A signifier has linguistic value only in relation to other signifiers, that is, to what in the linguistic system it is not; a sign is defined negatively.

On this relational account, signification is determined not just by what is present in an instance of parole, but what is not said, is absent. These negative relations, absences, dominate language (Rosen, 1986).

Peirce has a different interpretation from Saussure because he divides it into two parts as objects (fr. objet) and interpretations (fr. interpretant). According to Peirce, a sign may be simple or complex. Unlike Saussure, Peirce does not define the sign as the smallest unit of signification. Anything or phenomenon, no matter how complex, may be considered as a sign from the moment it enters into a process of semiosis (Deely, 1990: 115).
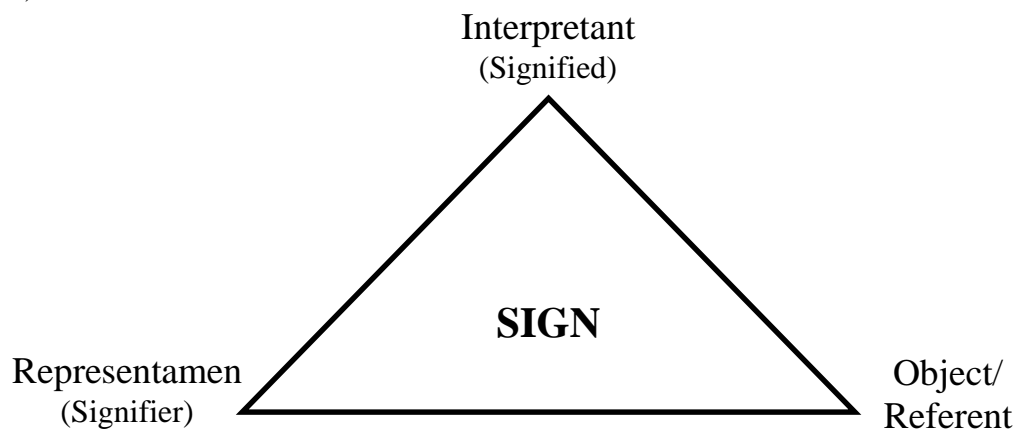
Interpretant
(Signified)

SIGN

Representamen
(Signifier)

Object/
Referent

Figure 3.2. Basic elements of Pierce (Deely, 1990: 115)

The process of semiotics/semiology involves a triadic relationship between a sign or representamen (a first), an object (a second) and an interpretant (a third). The representamen is a thing that represents another thing: its object. Before it is interpreted, the representamen is a pure potentiality: a first (Tomaselli, 1981).

As stated earlier, "indicative and shown" constitutes the concept of the indicator and there is a direct relationship between them. In short, semiotics should be mentioned; it is formed by means of a indicative and shown, and an indicator emerges. Saussure even calls languages an indicator and, according to him, languages emerge from the relationships they establish. The linguistic indicator is formed by the fusion of conceptual elements and a visual image, these two features in the General Linguistics Courses are called the indicative and shown (Rifat, 2005: 26).

In an indicator, establishing the relationship between the signifier and the signifier is called signification. When we see or hear a demonstration, what is meant, ie what it means, occurs in our minds. The understanding process also begins. According to Barthes, there are two levels of semiotics: denotation and connotation. According to

Roland Barthes's theory, the most important field of semiotics is the denotation and connotation (Barthes, 1984:149).

Denotation consists of the narrative plane or display and explains what an indicator represents. Connotation refers to the content plane or the display and relates to how the display represents it (Çeken, 2016:12).

The first string in denomination (in Hjelmslev) forms the denotation plane. The second string, which includes the first string, forms the connotation plane. Large rhetorical pieces of structured compositing can form a single unit of the compose sequence. In Barthes's theory of meaning in images, the basic idea is about how the meaning is spread in denotation and connotation. The denotation, which is the meaning dimension in the first plane, indicates who or what is shown in an indicator. In the connotation which expresses the meaning that does not appear under the view as the second plane of meaning, it is determined which values, opinions and ideas are found (Parsa, 2008).

Indicators are a form of meaning used to understand and interpret the truth behind what we see and sighted (Agocuk 2013: 31). Peirce, who has made a name for himself with his contributions to semiology, examined the concept of the indicator and examined it with triple distinctions as in many other explanations. According to Peirce, the reason for this is that the ranks of logic in the functioning of the mind include a ranking as the first, second and third places. If the logic is based on this triad, and if the logic is a formal indicator, then the indicators must be divided into three (Peirce, 1984: 227). This classification is not intended solely to establish a logic operation. Peirce predicts that even emotions can be conceptualized by this triple mechanism. As Merrel points out, Peirce has developed these categories to explain, sense, experience, and the conceptualization of indicators (Merrell, 2000: 32).

In describing the concept of the indicator, Peirce formed the triad where he divided the indicator into three parts. Qualitative indicator, unique indicator and rule indicator for the first trio; the second trio, icon, signs and symbols; and in the third trio, the statement, indicative and evidence indicator types and the indicator were explained. Researchers interested in semiotics have generally emphasized the second trio. Therefore, we will try to explain the visual indicator, image, index and symbol that make up the science of the indicator.

Visualization (Icon): In general, the visual feature used in the visual field is characteristic of what it represents. For this reason, the concept of a visual indicator or

icon should be considered to be largely a physical similarity. Peirce defines it; First, Likenesses, or as I put it, the pictorial indicator used the expression as similar to its object (Peirce, 1984: 460-461). The best example is the passport photograph. A person who has a passport photo has a self-image indicator. This photo is physically similar to that person, can represent it; but he cannot replace him.

Although it cannot be explained physically by similarity, in the literary works, the icon definition can be used to describe the order of events. As it is seen in the literary texts, if the order of the events is explained in order of realization, then the actual order of the events represented by the text representing it is similar (Erkman, 2005: 114).

Index: Secondly Peirce described the index: A symptom is an indicator that loses its attributes when the object disappears (Peirce, 1984: 304). According to him, there is a direct relationship between symptoms and objects, through an invisible necessity (Peirce, 1984: 306). In this process, the function of the interpretation concept will be revealed. For example, if there is a smoke in the environment, smoke is a symptom; however, without the interpretation of smoke, the indications of the symptom type cannot be solved and it will not be an indicator of fire.

Symbol: When describing the Symbol, two different comments were made by Peirce himself. In the first symbol definition, Peirce treats the symbol depending on the receiver. According to this definition, Symbol is the indicator (Peirce, 1984: 274), which is dependent on the interpretation of the representation. In the second definition, he emphasized that the object is generally a common or general idea, and expressed the symbol as an indicator that refers to the object expressing the partnership of ideas (Peirce, 1984: 292). Carefully, it is seen that every word in the dictionary is accepted as a result of a compromise. Therefore, all words are symbols. With this feature, the icon is also a conceptual, ie a rule-making indicator (Erkman, 2005: 115).

A general semiotic theory should include not only a theory of how codes may establish rules for systems of signification but a theory of how signs may be produced and interpreted. A theory of codes may clarify aspects of signification, while a theory of sign-production may clarify aspects of communication. Eco defines 'signification' as the semiotic event whereby a sign 'stands for' something and he defines 'communication' as the transmission of information from a source to a destination. Communication is made possible by the existence of a code, or by a system of signification. Without a code or a system of signification, there is no set of rules to determine how the expression of signs is to be correlated with their content (Eco, 1976).

3.2. Semiology Education for Industrial Designers in Turkey

Semiology as a course is given several universities which are listed in table 2.1. in chapter 2. Ten of these universities which have industrial design department have semiotics/semiology course in their syllabus. Although %33.3 of universities, which has industrial design education in Turkey, have semiotics/semiology course in their syllabus; %66.7 of these universities do not give semiotics/semiology education (Table 3.1.). List of universities which have semiology education in industrial design department's syllabus were given in table 3.2.

Also, two of these universities which, were given table 3.1., give semiotics/semiology lecture in their postgraduate programs (Table 3.3.).
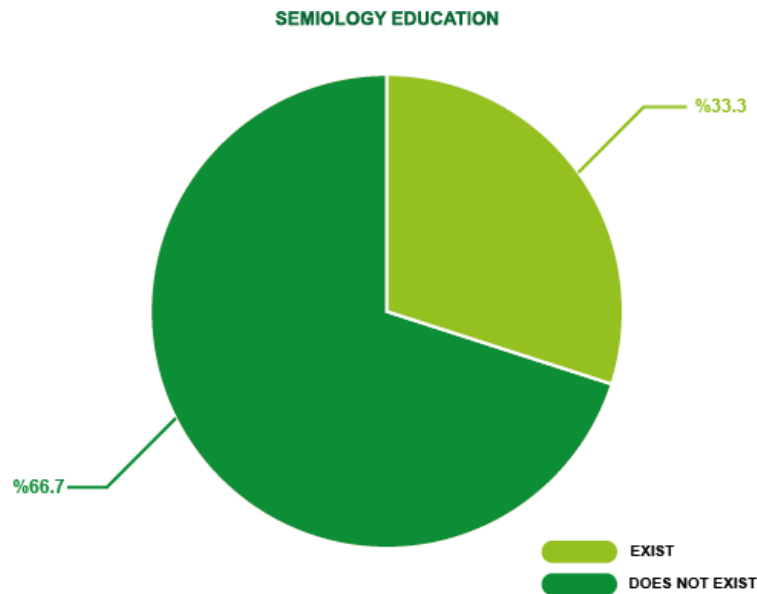

Table 3.1. Universities which have semiology education in industrial design department

List of Universities That Have Semiology Education in Industrial Design Department's Curriculum
İzmir University of Economics
Yaşar University
İstanbul Technical University
Atılım University
Medipol University
İstanbul Aydın University
Özyeğin University
Gazi University
Ondokuz Mayıs University
İzmir Institute of Technology

Table 3.2. Names of Universities which have semiology education in industrial design department
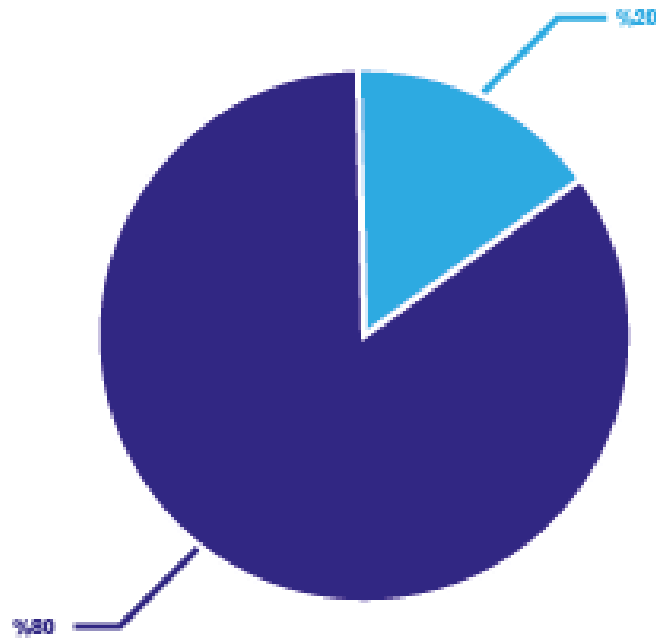
Table 3.3. Postgraduate programs which has semiotics/semiology

When the education programs of the universities that provide semiotics courses are compared under the Industrial Design Department, common information about semiology course are obtained. According to this common information, the aim of the course is to provide the student with the necessary tools for semiotic analysis of design products. These tools are intended to be used both in the analysis of existing designs and in the development of new design.

Students who successfully complete the course of semiotic are expected to perform design analysis with semiotics theories. They should be able to use basic semiotics theories and approaches in analyzing concrete examples. They should be able to classify existing products according to their meanings within a system of large objects and design products that can create meaning in a predetermined way.

3.3. Semiotic Approach in Product Design

Semiotics is a system consisting of all the various units of each meaningful meaning of communication which is used by people to communicate each other (Erkman, F 1987:12). Semiotics involves the expression intended for the object, its discourse and the consideration of the message transmitted by the material and production process. In summary, the indicator science is the object's shape and its relationship with its users. The symbolic burden of the object and its relation to materials and production processes can

41

be complemented to a systematic design methodology in order to inform the design process and contribute to the achievement of more successful results (Figueuiredo, J 2010:341-342).

Customer satisfaction is the most important thing for the product design. Designed product has to be flawless and complete for the customer. Customer satisfaction is the result of the collaboration of elements such as color, hardness, touch and effectiveness at the first look. Satisfying product designs are described generally as more confidential and convincing. The industrial designer stands in a unique place between customer, designer and user. Industrial designer as a mediator works for keep customers' and users' needs in balance, thus express this issue on product. The major methods which are used by industrial designer in order to understand users' needs by demographic researching and express these needs on product with the design methods (Ventura, J 2011:73-80). For this situation semiotics is an important factor that combining designer idea, user and customer demand. According to Krippendorff, semiotics is the main principle for guiding designers and industry (Krippendorff, K 2006). The manipulation of the features of works aiming at determining meanings has long been an alarming goal for designers. The first systematic approach has emerged when the product semiotics was proposed. With this situation, product semiotics term has drawn the attention of designers (Krippendorff, K; Butter, R 1984:4-9).

Although problem solving is a general design principle, some semiotic aspects should be specified to better understand such designs before attempting to propose. These semiotic properties include the type of representation, the consistency of representation, the tools used, the interpretation possible, and the relationship between the design and the final product. This makes it possible to understand the semiotic process in which designs are created.

The shape, material, color and texture of the product are specific to the product itself. The meaning of materials, forms, colors and textures is one of the characteristic concerns of product design, so it can be associated with product semiotics/semiology. This chapter will mentioned about semiotic elements such as form, material, color and texture for product design. A product will be examined by using semiotics/semiology elements.

3.3.1. Form

In product design giving a form is an important fundamental for industrial designers. When giving a form to design, designer tries to meet the demand of user or customer and creating a product with features as unique and valued in marketplace (Kuen and King 2016).

For dictionary meanings of "form", Cambridge dictionary explains it as "to begin to exist or to make something begin to exist"(Cambridge dictionary, n.d.).Also Oxford dictionary describes form as "The visible shape or configuration of something"(Oxford Dictionary, n.d.).

When the form is evolved in design process, every change is evaluated separately from every angle like front, back and sides. The given form can affect the semiotic elements such as how to hold the object and what it means to the user. According to *Understanding Industrial Design* book;

> While some physical objects are part of a branded family, many are standalone forms that free industrial designers to consider a much wider range of shapes. This allows shape to define the personality of an object, whether round, square, sharp, soft, or organic (Kuen and King 2016).

A product's shape is the first thing you see and first look is important subject for buyer, designer and product relationship. First look carrying much care in marketplace because buyer do not prefer only function of product, they also look at product's appearance. Therefore, products shape should give a true message to buyer.

3.3.2. Material

The things that are used for making usable objects by naturally or artificially ways are materials. Today, there are 200 thousand materials including metal, ceramic, plastic and composites (Fındık 2016). Choosing the most suitable material for this product from this variety is called material selection. Although form, color and shape are important, material selection for designed product is a distinctive factor.

Incorrectly selected material is caused to damage to parts and unnecessary cost, from a semiotic point of view to prevent the user from sending the correct signals. For example, if we take an iron; the plastic material to be used in the hand holding part of the

iron should be able to inform the user that the iron will not slip when handled and the hand will not burn.

3.3.3. Color

Until now, we have assumed that colors can serve as signs. Taking the notion of sign again, the question was: a color that could represent something that stood outside of itself?

In other words, does red mean only redness, or can it be associated with other concepts? We don't need to make a long argument to see colors work as signs, and we see that many things that are alien to them can be represented through colors. When we want to fit a particular garment, we often take color (from material to fabric, shape, or some characteristics of the texture) as the most obvious signs we can choose to identify it. In this way, for example, instead of the term "wool sweater" or "crochet" or "round collar" or "checkered pattern, we often prefer to say:" Green sweater. "Sometimes, even if various signs are used together, each of When referring, there are almost no chromatic signs. Color is often printed more vividly than other types of markers.

On the other hand, the relationships aroused with colors such as jealousy with green, passionately red, black with death, yellow with cowardice, loyalty and blue are well known. Of course, these associations are based entirely on social and cultural contexts, but they do not invalidate the fact that there are processes in which these colors function effectively as signs, where colors express different things. Magariños de Morentin reveals the semiotic function of colors:

> "The examination of color as the bearer of semiotic function differs from its psychophysical or neurophysiological study, because the latter is mechanically measurable and is characterized and analyzed by its characteristic properties depending on the physical conditions of the subject or environment, semiotic physical conditions. It accepts color as an object objectively suitable for substituting the beings of another universe and organizing in meaningful clusters."

As mentioned above, color is a worthy of notice tool for product design. Color can affect outlook of product in different ways like gender prefer, quality and elegant look, luxury or cheap look.

Color choice can make product recognizable such as Apple products. When we think about apple, first color that thought firstly is white. As another example, when we

thought about red car, we taught firstly as a Ferrari. In shortly, color is a remarkable tool when designing a product.

3.3.4. Texture

Texture plays an important role in product design. With the texture a product can give different messages to user or designer can unique textures to product in order to be attractive. Also texture can affect products ergonomy or user experience.

Texture can be examined as tactile and visual textures. Although tactile textures are individual to every material, they can be created new different techniques. For example, tectile textures can be created with the 3D technologies.

Visual textures can provide a rhytim or different look to products. If users do not feel the texture with touching, they can feel by seeing the texture. For example, even if the product is not wood, the texture can provide wood feeling.

According to Peirce, when an observer sees a texture, it produces equivalent signs of interpretation in his mind like tactile concepts as rough, smooth, etc. The texture stands for an object. It has such internal relations that we can recognize it as belonging to the same kind of tecture, even if it appears at different times or on different materials (Peirce 1966).

CHAPTER 4

USE OF SEMIOLOGY IN PRACTICE BY INDUSTRIAL DESIGNERS IN IZMIR

4.1. Introduction

This study is essentially about the importance of semiotic approach in industrial design education and to meet the requirements of this study, measurement of the semiotics/semiology knowledge and semiotics/semiology usage in professional work environments is researched.

The main propose of this study is to investigate whether the knowledge of semiotics/semiology has been used by industrial designers in their practice. In addition to this, the aim is analyze the necessity of semiotic/semiology as a course in university for all designers. Following questions can be considered as a guide for this research work; 1. Do all designers get semiotics/semiology course? 2. What is the difference about perspectives of designers who has semiotics/semiology knowledge or not? 3. Do industrial designers use their semiotics/semiology knowledge in their professional life?

Semiotics/semiology was exanimated many times in years, researches were done and pieces were written. At the same time, industrial design came forward as a multidisciplinary field. When people look semiotics/semiology principles and industrial design principles, they can see the similarities between them. There is no enough academic projects or works about importance of semiotics/semiology for industrial design. The scope of this study is to explore the answers to questions above and fill this gap in the literature by doing so.

Result of this study may prove the necessity of semiotics/semiology in industrial field and reveal to gain a different perspective for designers. Semiotics/semiology can be approved as a guide for designers and users. Also this scientific field can strike a balance between user and designer in order to understand design better.

Experiments of writer's on semiotics/semiology and design field, research questions and observations formed a basis for literature review. Sources which were

searched during literature review was helpful to understand semiology basis and find the candidates to do questionnaire and focus group work.

Three methods of research were used by the author for this study. These methods which had their specific scopes will be explained and discussed as chapters below. The scope for these methods included industrial designers who work as a professional in companies in Turkey. Considering their graduated universities, lessons content of industrial design departments were examined to see that they take semiotics/semiology course or not.

This study was conducted in two main parts; a questionnaire for industrial designers who were candidate to focus group and focus group study under the guidance of an instructor with 14 industrial designers who work as a professional in İzmir.

The aim of the questionnaire was choosing the candidates truly, preparing them for focus group study and measuring the effect of semiotics/semiology on industrial designers who joined the focus group study. The outcomes of the survey are showed in graphics, explained and discussed.

Results of focus group study have the characteristics of consideration for importance of semiotics/semiology for industrial designers who work as professional in companies and to utilize semiotics/semiology knowledge for their professional lives. The outcomes of focus group were discussed and analyzed in next chapters.

After getting these data and comparing it to the literature review and checking if it is addressing the research questions correctly, conclusion of this research was written on for all.

As a last, after getting information and comparing them with the findings of literature review and checking if it is addressing the research questions correctly, conclusion of this research was written.

4.2. Methodology

The optimal methodological approach for the purposes of this study by accordance with the study's nature is a qualitative study based on the feedback of multiple personas who are design practitioners. Personas include Turkish industrial designers who work in different firms in Izmir and generally graduated from industrial design departments of different universities.

Questionnaire and focus group study conducted as interviews were chosen as methods for this study. Researches are made as desk research and field research, and got both qualitative and quantitative answers. In this chapter will mention about why this methods are applied, method techniques and participants.

4.2.1. Questionnaire

As an alternative to other methods, the questionnaire is faster way to reach directly to your potential respondents in your chosen sampling frame. In this section, a questionnaire was conducted to select the appropriate potential persons for the focus group and to measure what was learned during the focus group.

In order to collect data, a questionnaire was conducted with 10 industrial designers to learn demographic information of them and semiotic knowledge before the focus group and the findings obtained after the survey were conducted to learn their opinions about semiotic science after the focus group.

Before starting the questionnaire, the features of the participants were determined and according to these features, the participants were chosen from university data bases, linkedn and the author's social network. Being alumni of related departments and currently working in a design field are the two main and only criteria to participate in the focus group. First step of questionnaire was sent by email to participants who were chose according to determined features.

First step of questionnaire was prepared for two categories as who has semiotics/semiology knowledge and who has no any knowledge about semiotics/semiology. In the initial questionnaire, six close-ended questions as in table below were asked.

What is your gender?
What is your age?
What is the highest degree or level of school you have completed?
Which university/universities did you graduate from?
Which company do you work?
What is your job title?

Table 4.1 Demographic Questions

Demographic questions were used to choose 14 industrial designers who work in different firms in Izmir and to understand their education levels.

Second part for first step of questionnaire was prepared to measure semiotics/semiology knowledge of participants and questions directed the participants according to their semiotics/semiology knowledge with the question 'Do you have any knowledge about semiotics/semiology?'. If the participants have semiotics/semiology knowledge, they were directed questions below;
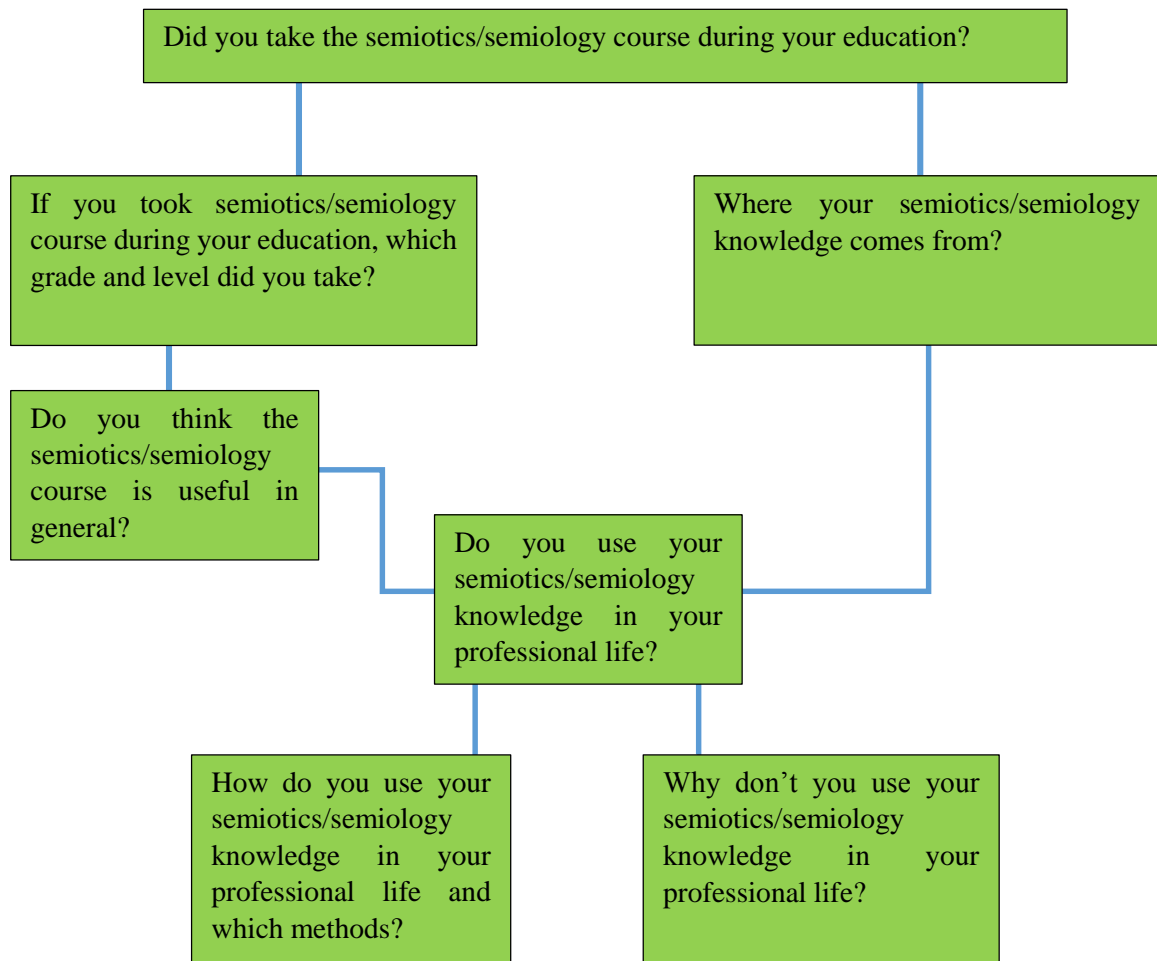

Table 4.2 Semiotics/semiology knowledge questions

If the participants do not have any knowledge about semiotics/semiology, they were directed final part of questionnaire. There was a picture of iron in final part of questionnaire and expected to analyze the picture.

Qualitative data were collected from the first step of questionnaire and used for creating focus group. Focus group details will be explained in next part. End of the questionnaire, there was an attachment as below. This attachment included information about focus group and participation conditions.

This focus group study is carried out in order to provide numerical and verbal information for the master thesis conducted at the Industrial Design Department of Izmir Institute of Technology. Industrial Design / Industrial Design Department working in Turkish firms is designed to measure the degree to which undergraduate or graduate graduates benefit from semiotics / semiology / indicator science in performing their jobs. The data obtained during the focus group observations, testing and discussion will be used only for scientific purposes, thesis work, scientific publications and presentations. The identity of the participants will be reserved.

Second step of questionnaire was applied after the focus group study in order to collect remarks of the study, semiotics and focus group. This step of questionnaire includes two questions to reach true comments from true personas;

1. Did this focus group study about semiotics/semiology benefit to you?
2. Should semiotics/semiology education be more common?

4.2.2. Focus Group Study

Concept of a focus group method alongside with the observation, conducting a survey and information testing techniques that were used to enhance the method, is to achieve desirable results from this study (Fern, E. 1962). Aim here is to utilize a conveniently sampled focus group that can contribute the research in terms of testing the skill, determining the needs of students. All things considered, it seems reasonable to gather a group of people from industrial design graduates who were working actively in their field as a focus group for this study.

A coffee shop in Alsancak, İzmir was the meeting point of the focus group. A circular seating arrangement was used and arranged before the participant's arrival. Printout copies of the pre-session test, a disclosure form and writing equipment were prepared and brought by the moderator/the author. A whiteboard for visual presentation were arranged by the coffee shop personnel. Saturday, 23 April at 10 am, the focus group met to discuss the topics.

Before the focus group study, the pre-discussion test was applied to participants in order to measure their semiotic knowledge in general. The test will be applied before the discussion so that the answers of the participants are not affected by the other participants and the subjective answers can be reached. Questions are the pre-discussion test questions which mentioned in previous part. Questions used in the evaluation form

and the discussion were prepared by the researcher and approved by an expert. All of the demographical data of the participants were obtained from the evaluation forms with closed-end questions.

A list of core questions and possible related probes to use during discussion prepared. The core questions included open-ended and suitable for probe generating during the application of this stage. The moderator should be aware of the answers given by participants to the previously applied test which has to examine the skillset the participants had about the semiology sciences. During the discussion new core questions and probes can be emerged from those interpretations of participants and the moderator should be ready to put those new core questions and probes to use. All things considered, five core questions will be used in the discussion not including the possible question that can be emerge during the discussion. The core questions stated below will be used.

CQ1-Can you talk about your education on semiology?

P1-Where did you first encounter the term?

P2-When and which project/work did you used it?

P3-What were your thoughts about the class?

CQ2-Do you please describe your current jobs?

P1-What kind of tasks are you responsible?

P2-Are any of these task is suitable for using semiology as a approach and what are the reasons behind?

CQ3-Do you find that semiology useful for you ?

CQ4-Did short descriptions about semiotics/semiology are useful?

CQ5-Would you like to add anything else?

The first step of focus group study is that evaluate the remarks of participants for iron picture which was given in questionnaire. This step provided to see which answers are correct or false. This was an important step to see the difference between participants who has semiotics/semiology knowledge and who has not any knowledge about semiotics/semiology.

The second step of focus group study was a small presentation and briefing about semiotics/semiology basis and terms. With the guidance of expert on semiotics/semiology, necessary information was given as short descriptions to participants. This step provides a small brainstorming between participants and help to understand relationship of semiotics/semiology and industrial design. In this step, a

picture of a product as tv remote controller was analyzed in semiotics/semiology frame to make the subject easier to understand.

The final step of focus group study was personal analyzes for a product. A iron picture was given again to participants to analyze as personal. Results of analyzes was kept as a final data of focus group study.

4.3. Findings and Analysis

In this chapter, analysis of the data obtained from focus group discussion that were held by the researcher, in purposes to completing this study, will be undertaken. Data will be analyzed in 3 steps. First, an analysis of the data obtained from the demographic survey that has been analyzed before to select of participants. After selection of the participants was made and the meeting was conducted with the focus group obtained data from pre-discussion test and discussion will be analyzed.

One focus group was held for the small research in February, 2019 to illustrate the concept that was discussed before in the text. The group was chosen by the two main criteria, one of the criteria was their undergraduate education and the other criteria was the current employment status of the participants. For the purposes of this research, participants of focus group were all have a degree in industrial design or in equivalent departments such as product design or industrial product design. All of the designers who have been participants, agreed to this research and aware of the fact that the shareability of the data obtained from this research. Data was obtained as a result of test that filled individually by the participants and discussion between group and the researcher.

Questions used in test and the discussion were prepared by the researcher and approved by an expert. All of the demographic data of the participants were obtained from a survey conducted by the author to select the participants of focus group with closed-end questions. All of the questions used in the survey is shown in the previous chapter.

4.3.1. Questionnaire Analysis

The data of 14 participants were analyzed with graphical analysis and the suggestions of the participants.

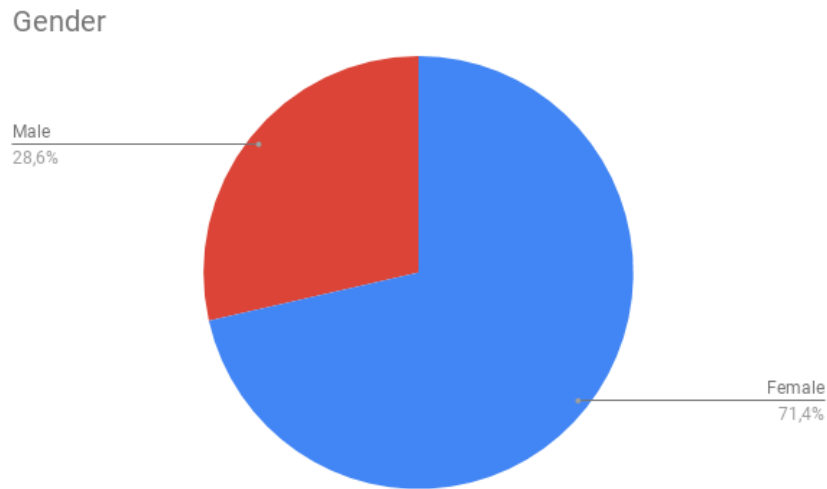## 4.3.1.1 Demographic Analysis

Figure 4.1. Gender

Firstly, gender question was asked in order to understand characteristics of participants because colors or shapes can affect participants in different ways according to gender. The 71.4 % of the participants were females and the 28.6 % of them were males.
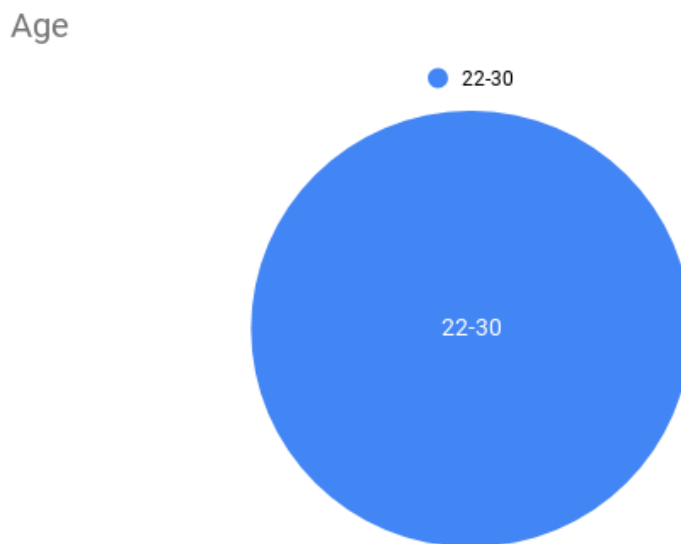

Figure 4.2. Age

According to spesific features that determined before the questionnaire to choose true participants, two different age range as 22-30 and 30-above. This age range were

preferred considering graduation age from university and chosen personas. Chart is showing that all participants are between 22-30 age range.
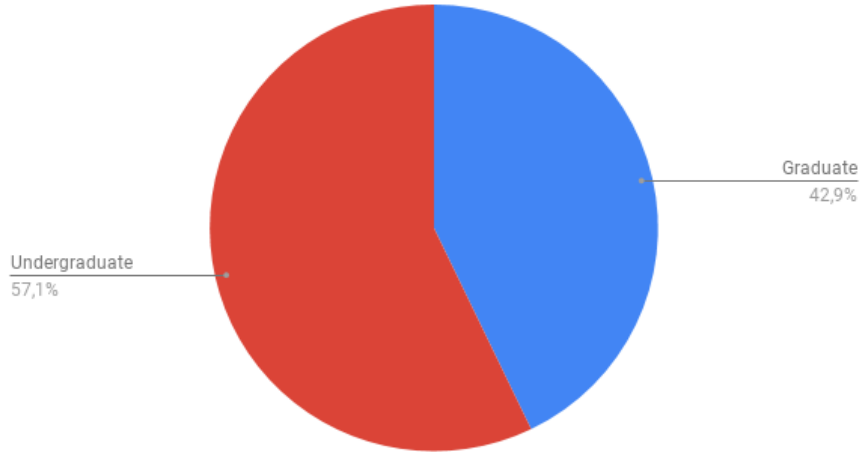

Figure 4.3. Education level

While the 57.1 % of participants have a master's degree, the 42.9 % of them have a bachelor's degree. This question is important to understand which level of their education they gain their semiology knowledge.
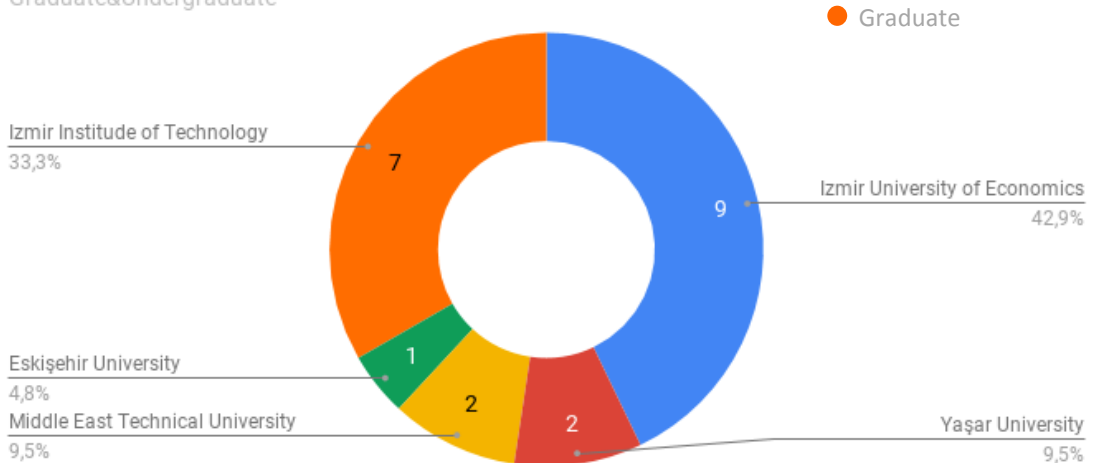

Figure 4.4. Universities

The 9.5 % of participants graduated from Yaşar University, 9.5 % of participants graduated from Middle East Technical University, 4.8 % of participants graduated from Eskişehir University and big part of participants as 42.9 % graduated from Izmir

University of Economics. At the same time, 33.3% of participants have master's degree from Izmir Institute of Technology.

The university names which participants graduated were important data collection in order to examine syllabus of semiotics/semiology course which is given in universities.
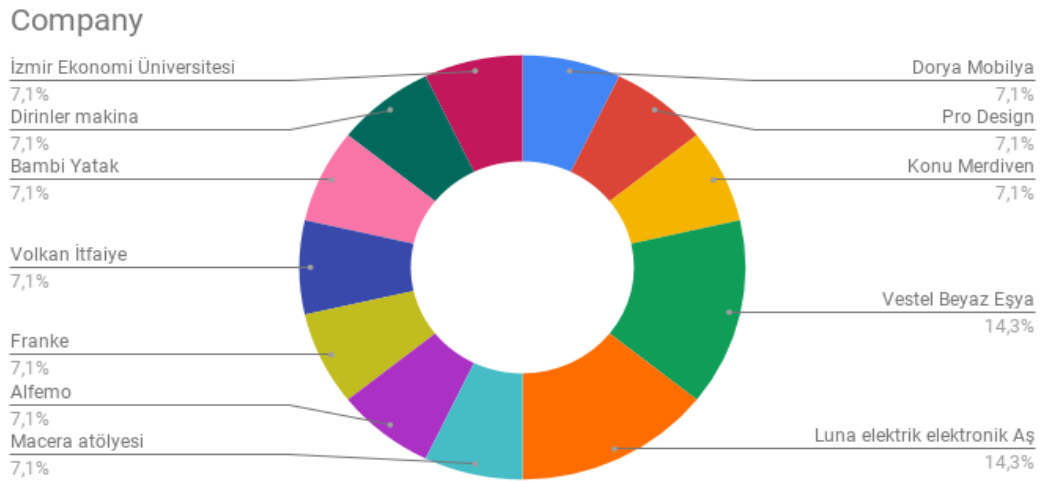

Figure 4.5. Companies

Considering the working status of the participants in different companies, the participants were preferred. This has helped to gather richer resources and also allowed the study of the use of semiotic science in different sectors.

Participants work as a designer and design responsible in different companies as Luna Elektrik Elektronik, Dorya Mobilya, Dirinler Makina, Bambi Yatak, Volkan İtfaiye, Alfemo, Macera Atölyesi, Franke, Pro Design, Konu Merdiven, Vestel and as a research assistant in Izmir University of economics.
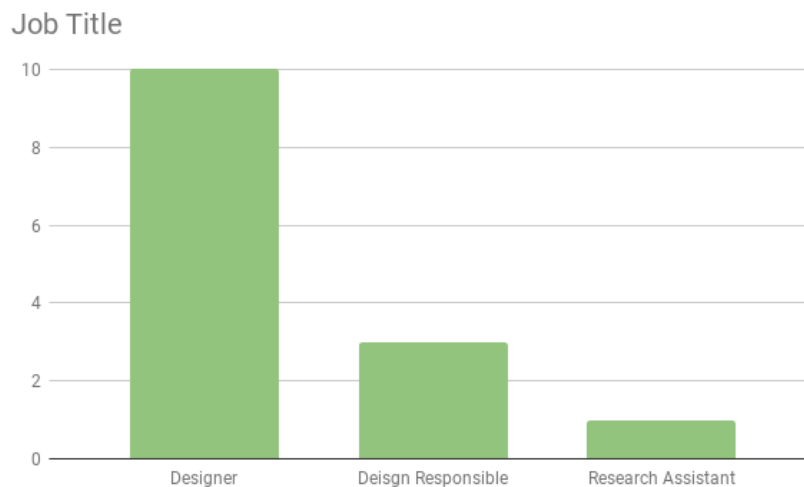

Figure 4.6. Job Title

4.3.1.2 General Data Analysis

As mentioned in related part above, second part for first step of questionnaire was prepared to measure semiotics/semiology knowledge of participants. All of the participants heard 'semiotics/semiology' term before so, they all answered as "yes." for the 'Do you have any knowledge about semiotics/semiology?' question.

Figure 4.6.1. Semiotic/semiology course

Although all of participants have knowledge about semiology, 57.1 % of participants took the course of semiotics/semiology during their education. 42.9 % of them have semiology knowledge from different sources.
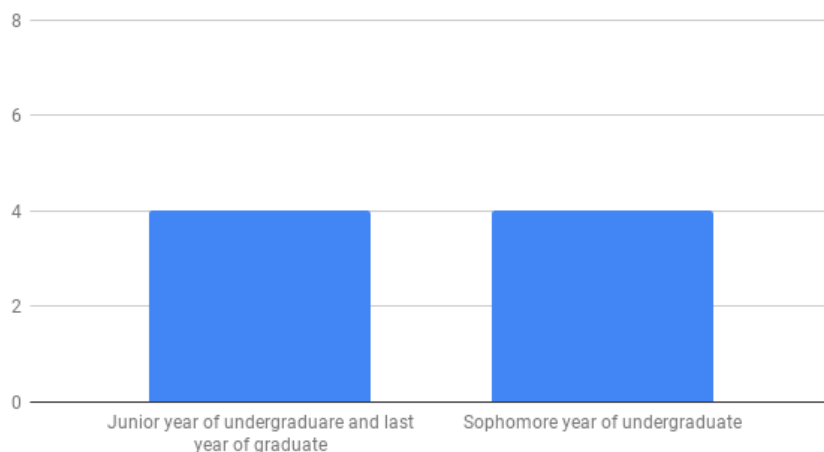

Figure 4.6.2. Year of semiotic/semiology course

4 of the participants take the course in their junior year of undergraduate and last year of graduate education. Also 4 of them take the course in their sophomore year of

undergraduate. All of the participants who took semiotics/semiology course think that semiotics/semiology is useful in general.
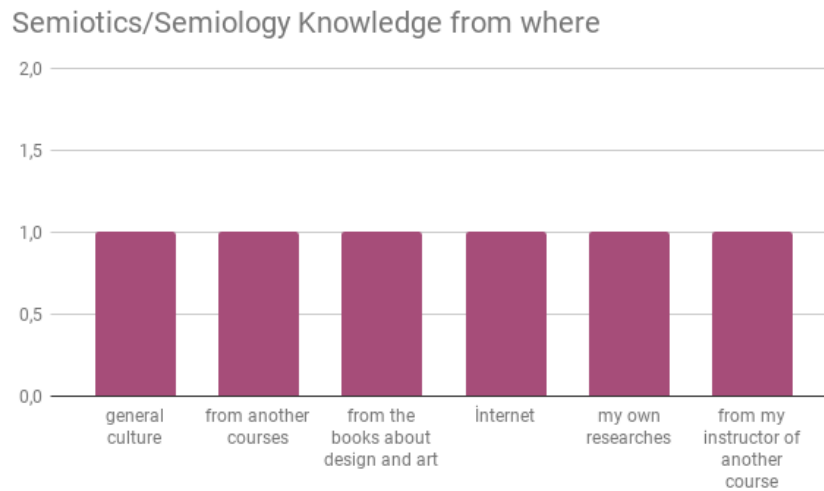
Figure 4.6.3. semiotic/semıology knowledge

Rest of participants has semiotic/semiology knowledge from different sources like their researches, general culture, other course topics, their instructors, internet and the books.

Figure 4.6.4. Semiotics/semiology knowledge in professional life

The 35.7 % of participants who has semiotics/semiology knowledge do not use their knowledge in their professional lives. Unlike to this, the 64.3 % of participants use their knowledge in their professional lives. Both participants, use and not use their knowledge, explained their reasons to use or not use the semiotics/semiology in their professional lives.

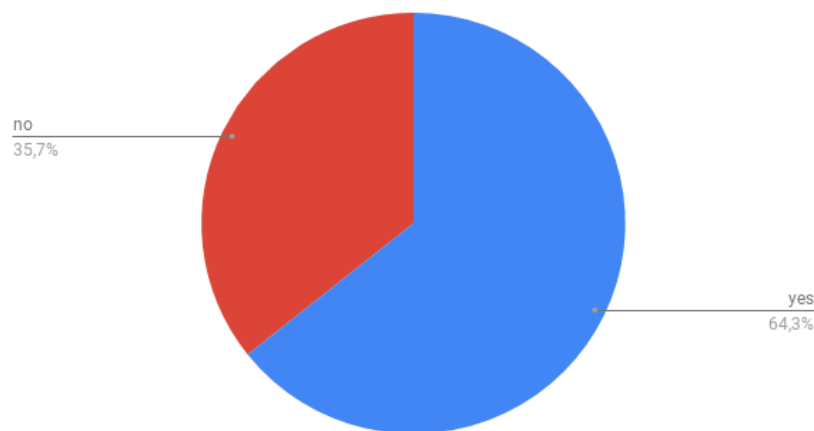The nine of participants use semiotics/semiology in their professional lives and the answers of participants were itemized in table below;

When creating a form, I think about message that will be given and I pay attention to design using semiotic codes.
I use semiotics in job interviews.
I use especially UI design in order to increase readability considering color and shape of keys. I'm also trying to implement (albeit limited) the form in the form through communication on the function of the product.
I'm using it as a design method. At the beginning of the design phase, semiology can sometimes be the starting point.
I use it to study things and approach them correctly.
With user feedback. During the design phase, I would like feedback from users.
I used semiotics in logo designs rather than product design.
I can exemplify the use of yellow belt on black in areas that may harm the person (machine walking platform) and to attract the person's attention.
I use it to comment on student projects. I state that students should consider semiotics in their design.

Table 4.3. Usage of semiotics/semiology in professional life

The five of participants do not use semiotics/semiology in their professional lives because of several reasons which listed below;

Can not use it for working my area.
I have not yet realized a necessary issue in my sector.
I want to use it for myself, but not everyone is knowledgeable about semiotics, and often they don't understand what I mean.
When designing the product in the company I work for, the form of the product is changed only with a focus on reducing costs.
Due to the lack of theoretical knowledge, the lack of practical practice in practice, the repetition of business processes, and the limitations of certain similar parameters, we bypass such sciences.

Table 4.4. Semiotics/semiology in professional life

4.3.1.3 First Product Analysis

Figure 4.6.5. Iron

Before the focus group study, analysis of a product considering semiotics/semiology aspects was wanted from the participants in questionnaire. An iron picture was added in the end of the questionnaire and expected remarks for the iron from both type of participants who have semiotics/semiology knowledge and has not.

The remarks of the participants were used for the comparison in the end of the study. Answers of participants were listed as a table below;

The slope in the holding part says hold me here, the flatness of the lower part gives a message to be placed on this part, the sharpness of the three parts is designed to enter the fine corners.
Purple color is a luxury and quality product.
Wrinkle removal tool
Product Form: An example of the common form of "Ironing"   Handle and spike: Describes how to hold and move the product   Purple-Black color: Exclusive product perception   Feature Details and Keys: Nozzle, water filler keys and rotary-adjustment are used in general ironing design and can now be defined as a feature in the form-structure   Brand logo and serial name: Describes the product brand and series. The word "Pro" refers to the advanced features of the product.

The color of the product and the form of the lines on it are more feminine. The product was associated with women to make ironing and tried to appeal to women. Putting the product on a white background also supported it. Since the sharpening tip of the product is not directed to the person looking at the photo, there is emphasis on the person without disturbing the person looking at it. It was tried to show that it is a very good iron that works well by emphasizing the pointed part of the product which is likened to a gun. With organic forms and colors, the product is softened even if it has sharp lines and it is tried to create a product that guarantees that there will be no harm.

The color of purple symbolizes purple and elegance. The flatness of the gold indicates that it will touch a surface. The cable is made of plastic and has a flexible structure made for convenient motion acquisition and safety. Pro stands for high quality.

The soleplate of the iron gives us information about its use. It refers to how to control the handle section and button positions.

The product is an iron with home electronics group. The product design has a holding handle in accordance with the ironing function of the product and has a narrow shape towards the tip to facilitate its use in various textile groups. It is understood that it has been developed for home use rather than for industrial ironing purposes, and it has the color and shape that is used in order to reach its target audience. And a small, easily accessible water tank, also suitable for domestic use, also has adjustment knobs for different modes. With the judgment that domestic works, which are common in our country and worldwide, belong to women, the target audience is women and colors with feminine tones are used.

Race car looks like this design. The color, the design, the angle of attraction of the visual, as if it would jump out and make the whole iron.

This product is mostly used in women purple color is preferred. The fact that there is an empty space in the middle indicates that the product was held there. The flat surface on the back of the product shows that the product can stand in a second position. The product is designed to taper forward, allowing easy access to corners and details. Its fluid and aerodynamic structure shows the product interaction to be mobile. Chrome strips give the impression of a higher segment and expensive

product. The product base is made of metal and the backing is plastic, which means that this surface is used for different purposes.
Smoke from the bottom of the product indicates that it is ready or ready for use.
At the top of the product, there is a piece that can be gripped by the human hand. Here it is visually stated where to keep the product. At the same time we see that a different material is used in the upper part. This material looks like a softer material than others. We can understand that this place is designed in this way to provide comfort and convenience to people about grip.

Table 4.5. First product comments

4.3.2. Focus Group Analysis and Comments

The analysis and interpretation of focus group data require a great deal of judgment and care, just as any other scientific approach, and regardless of whether the analysis relies on quantitative or qualitative procedures. However, the analysis and interpretation of focus group data can be as rigorous as that generated by any other method. Indeed, there is no one best or correct approach to the analysis of focus group data. As with other types of data, the nature of the analyses of focus group interview data should be determined by the research question and the purpose for which the data are collected.

The most common purpose of a focus group interview is to provide an in depth exploration of a topic about which little is known. For such exploratory research, a simple descriptive narrative is quite appropriate and often all that is necessary. In this part, the participants who joined focus group, their jobs, and their semiotics/semiology knowledge were analyzed in focus group, and also several products were exanimated with the help of semiotics/semiology fundamentals.

4.3.2.1 Introduction to Focus Group

As mentioned in previous chapter, the participants of focus group study were chosen with several ways. Questionnaire was applied in order to be sure about that the participants are suitable for focus group. There were 14 participants while questionnaire was applied. However, 4 of the participants notified that they were not available for the

focus group. Therefore, basic demographic data was analyzed again according to participants as you can see below;
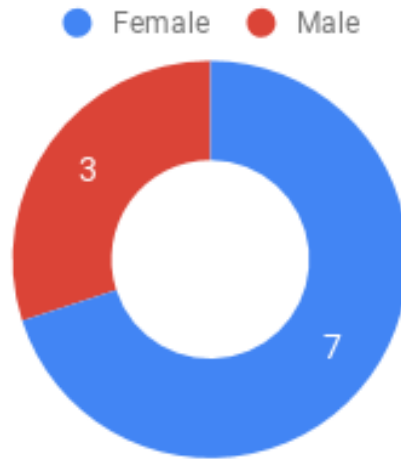

Figure 4.7.1. gender

10 participants conducted to focus group study. The seven of the participants were female and the three of them were male.
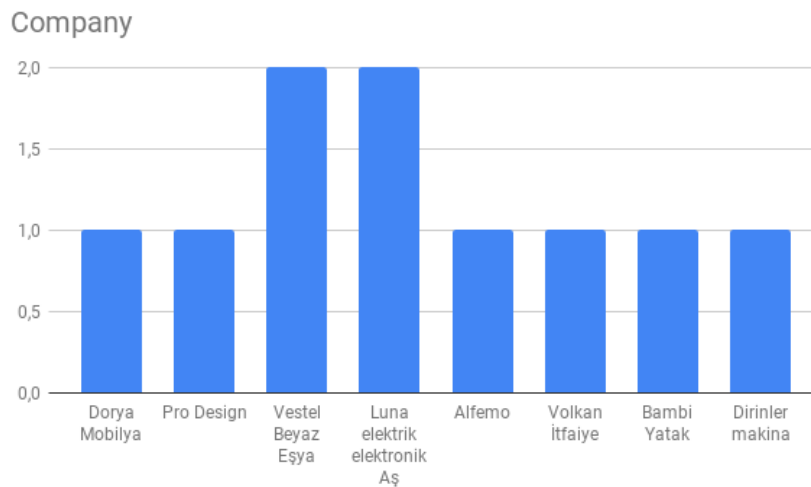

Figure 4.7.2. Companies

2 of the participants work for Vestel, 2 of the participants work for Luna Elektrik and the other participants work for Dorya Mobilya, Pro design, Alfemo, Volkan İtfaiye, Bambi Yatak and Dirinler Makina. This question was the important question for the eliminate candidates as different work standards and target work areas such as furniture design or product design.
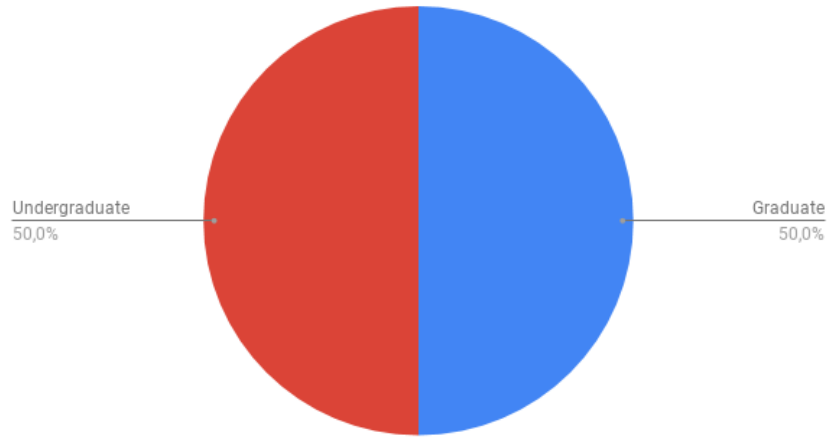
Figure 4.7.3. Level of Education

While half of the participants have bachelor's degree, other half of participants have master's degree.
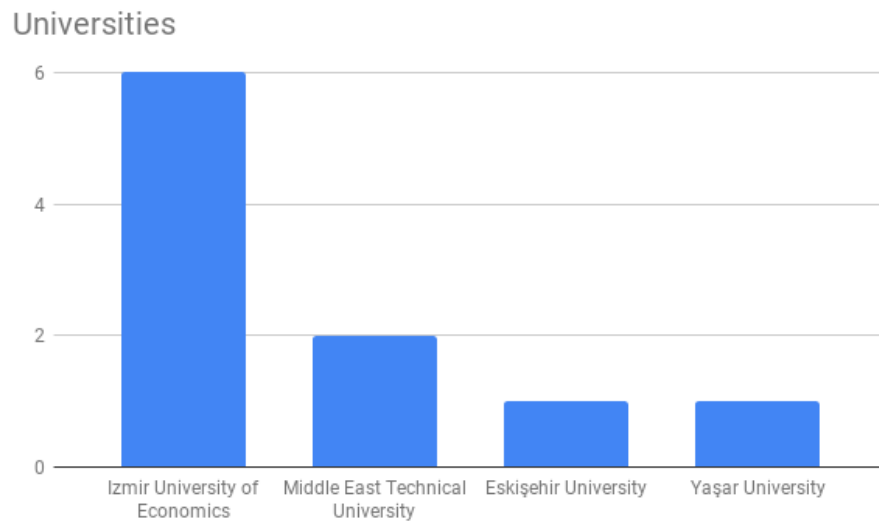
Figure 4.7.4. Level of Education

6 of the participants graduated from Izmir University of Economics, 2 of them graduated from Middle East Technical University, 1 of them graduated from Eskişehir University and one of them graduated from Yaşar University.

4.3.2.2 Interpretations of Focus Group Study

Reason for meet participants each other, basic meeting study was applied at the start of the focus group study. When the time reserved for conducting the focus group

started, participants wrote their five characteristics such as name, age, education level, university information, company name they work on papers. These papers passed from hand to hand and short meeting was completed.

The moderator did presentation about fundamentals of semiotics/semiology for the participants. After the presentation, participants did brainstorming about how they apply semiology fundamentals in their sectors and they discuss their sectors in semiotics/semiology basis. The participants, who have semiotics/semiology knowledge and use this knowledge in their professional lives, mentioned about how they use semiotics/semiology for their job.

For the better understanding a product as tv remote controller was interpreted considering semiotics/semiology basis.

Figure 4.7.5 Tv Controller

The remote controllers generally have suitable shape for hand ergonomics. The TV remote controllers usually consist of keys with numbers, letters, and setting icons. It also finds a specific key for closing the opening. We can examine the controller according to Saussure;

Signifier: Morphological Properties of Tv Remote Controller

Sign: Tv Remote Controller

Signified: Technical Fesibility
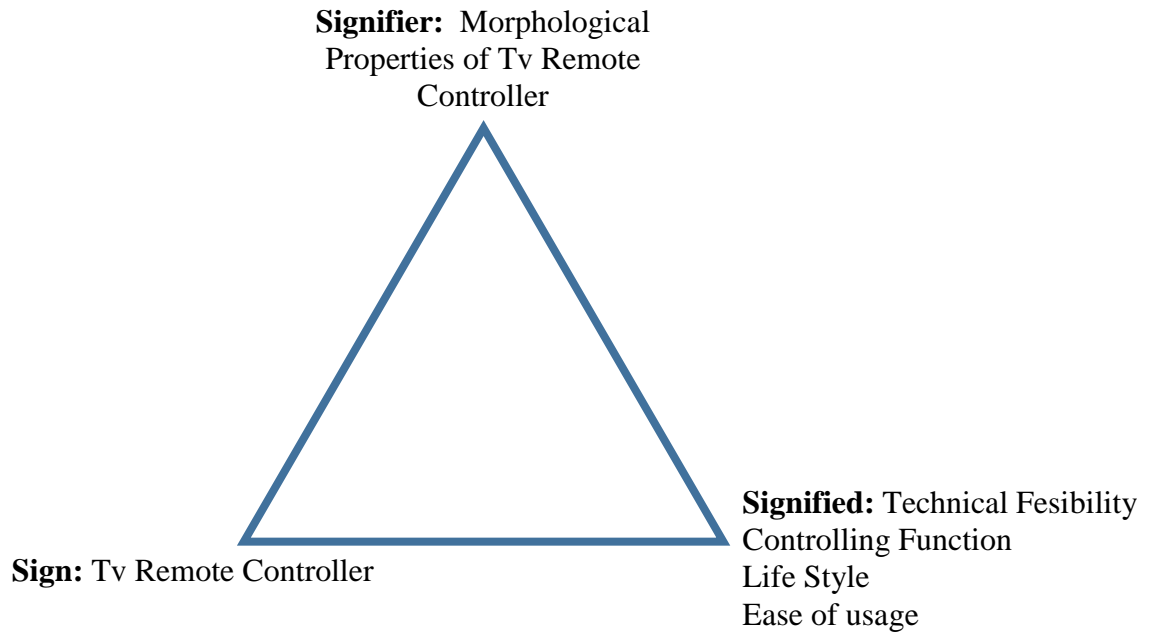Controlling Function
Life Style
Ease of usage

Figure 4.7.6. Tv Controller Elements

In general, buttons on the front surface of the controls to control the television operation is performed. When we see these general features, we recognize the tv remote controllers. If remote controller is a sign, morphological features of tv remote controller compose the signifier of sign. The process of controlling television can be called as signified.

As a final step for focus group, the product which was chosen in questionnaire was interpreted again according to information given. The main aim of this interpreting was that see difference between current perspectives of designers studied on semiotics/semiology and before the study.

In this step candidates interpreted the iron (figure 4.1) considering their semiotics/semiology knowledge. We can see the summarized answers were chosen considering big differences between first answers and last answers. The answers were chosen for show the big differences between get semiotics/semiology knowledge and without any semiotics/semiology knowledge.

In addition to answers, end of the focus group, designers said that focus group was beneficial and interesting. They want to use semiotics/semiology in their professional lives.

-Purple color is a luxury and quality product.	-Purple color is giving the product more feminen look. -This situation can show that women use the iron more than male. -Black colour on the purple is giving elite and quality look to iron. - At the attractive points of the iron more lightened color was used.
-Wrinkle removal tool	-Material which was used on bottom part of the iron looks like heavy and durable So, I can understand to this product can be used for flattening the something because of its features -Metarial and color are used on the bottom showed that this product is enduring to hotness.
-Race car looks like this design. The color, the design, the angle of attraction of the visual, as if it would jump out and make the whole iron.	- The iron has sharp edges. This situation provides moving the iron easily. - Bottom of the iron is slippery so it can move fast enough and I should use the iron on smooth and flat surface.
-Smoke from the bottom of the product indicates that it is ready or ready for use.	- The iron has holes on the bottom and the front sides. -I think something come out from these points. - On the top surface of product, there are buttons. These buttons are suitable to hand ergonomy. In addition, handle part is made by smooth and soft material, so I should hold the iron from there.

Table 4.6. Final Step of Focus Group

CHAPTER 5

CONCLUSION

This study has examined semiology/semiotics knowledge of professional industrial designers, semiotics/semiology and design education in Turkish Universities, effect of semiotics/semiology in professional life and relationship between product design and semiotics/semiology. The scope of this thesis was only limited to Izmir area. Reason for this limitation was reach the effective candidates and provide easiness for transportation to focus group.

This study started with definitions of industrial design and semiotics/semiology terms, and fundamental terms of industrial design and semiotics/semiology. Industrial design and semiotics/semiology education was examined considering the professional industrial designers knowledge and education levels.

To reach the correct results applied literature review, questionnaire and focus group methods. Interpretations were compared between professional industrial designer who has semiotics/semiology knowledge before the focus group and after the focus group. Observations and results were supportive to aim of the thesis.

In the end of this study, it is possible to summarize the findings of the datas which gathered during the study. This thesis appears to be the first study investigating the use of semiology knowledge in the Industrial Design practice by professional designers. My research has shown that industrial designers could not apply their skills sufficiently in their professional lives. They do not have much semiotics/semiology knowledge or they can not use effectively their semiology knowledge in their professional lives. This means my findings actually support my initial arguments. However, my work also has some limitations and shortcomings:

- As it stands, this research can be treated as a pilot study.
- This study could be applied to all industrial design professions working across Turkey. If this had been done, the results could be different and the results could be more generalized.
- The results of this study may still encourage or lead researchers to develop a new design curricula.

- Based on the findings, idea genarations cards/guide books could be created for industrial designers to use to appropriate semiology in their practice.

REFERENCES

"Ideate High Academy". *Design Thinking Process*.
https://ideatehighacademy.com/design-thinking/.

"Basic Information of Deutscher Werkbund".
http://www.deutscher-werkbund.de/wir-im-dwb/basic-information-in-english/.

"Cambridge dictionary". *Form Description.*
https://dictionary.cambridge.org/tr/sözlük/ingilizce/form.

"ENŞİCİ, Yrd. Doç. Dr. Ayhan". *Türkiye'de Endüstriyel Tasarım Eğitimi*.
http://panorama.khas.edu.tr/edergi-yazi-24#PDF/1.

"ETMK". 2006. *ETMK Kurum Kimliği Klavuzu*
http://etmk.org.tr/tr/kurumsal-kimlik/.

"ETMK". 2016. *Endüstriyel Tasarım Tanım*
http://etmk.org.tr/tr/endustriyel-tasarim/.

"Heskett, John". 2002. *Design - A Very Short Introduction*. Oxford University Press.
https://doi.org/10.1093/actrade/9780192854469.001.0001.

"Lindsay, Schultz". *History of Industrial Design.*
https://www.choidesign.com/blog/2017/5/3/history-of-industrial-design.

"Liu, Carl. 2011". *Ideata Sketching.*
https://designsojourn.com/good-books-on-design-sketching/.

"Oxford Dictionary". *Industrial Design Oxford.*
     https://en.oxforddictionaries.com/definition/industrial_design.

"Oxford Dictionary". *Definition of Form.*
     https://en.oxforddictionaries.com/definition/form.

"Zukowsky, John,". *Industrial Design Britannica.*
     https://www.britannica.com/topic/industrial-design.

"The Editors of Encyclopaedia Britannica". 2018. *Industrial Revolution Definition.*
     https://www.britannica.com/event/Industrial-Revolution

"The Paleolithic Period."
     https://www.blinklearning.com/coursePlayer/clases2.php?idclase=56018069&i
       curso=1013579.

"WDO". 2017. *Definition of Industrial Design.*
     https://wdo.org/about/definition/industrial-design-definition-history/

Akerson, Fatma. *Göstergebilime Giriş*. İstanbul: Multilingual, 2005. S:49-50

Aktulum, K. 2004. *Göstergebilim*. Süleyman Demirel Üniversitesi, Burdur Eğitim
     Fakültesi Dergisi, No: 7, s:5.

Aktulum, K. 2004. *Göstergebilim*. Süleyman Demirel Üniversitesi, Burdur Eğitim
     Fakültesi Dergisi, No: 7, s:9.

Ambrose, Harris. 2010. *Design Thinking*.

Asatekin, Mehmet, and Güner Mutaf. 1978. *Endüstri Tasarımı Bölümü Kuruluş Raporu*.

Barthes Roland. 1979. *Göstergebilim İlkeleri*, çev. Berke Vardar-Mehmet Rifat, Ankara:Kültür Bakanlığı,s:1

Berger, John. 1972. "John Berger." *Ways of Seeing*.

Broody, D, and H Clark. 2009. *Design Studies: A Reader.*

De Saussure, F. 1916. *Cours De Linguistique Generale*, Çeviren: Prof. Dr. Berke Vardar, İstanbul: Multilingual Yayınları, 1998.

Deely, J. 1990. *Basics of Semiotics. Bloomington: Indiana University* Pres.s:112

Er, Alpay. 1998. *1990'lı Yıllarda Endüstriyel Tasarım*.

ER et al. 2003. *Endüstriyel Tasarım Kılavuzu*. İstanbul: İstanbul Sanayi Odası.

Erkman, F. 1987. *Göstergebilime Giriş*. İstanbul: Alan yayıncılık. S: 13

Erkman, F. 1987. *Göstergebilime Giriş*. İstanbul: Alan Yayıncılık.s:28

Erkman-Akerson, F. 2005. *Göstergebilime Giriş*, İstanbul, Multilingual.s:49-51.

Fiske, John. 2014. *İletişim Çalışmalarına Giriş*. Çev. Süleyman İrvan. Ankara: Pharmakon Yayınevi, s:124

Gantz, Carroll. 2014. *Founders of American Industrial Design*. McFarland.

Greimas, A.J. 1966. *Sémantique Structurale*. Paris: Larousse s:21

Gottdıener, Mark. 2005. *Postmodern Göstergeler*. Çev. Erdal Cengiz, Hakan Gür, Arhan Nur. Ankara: İmge Kitapevi, s: 49-50

Guiraud, Pierre. 2016. *Göstergebilim*. Çev. Mehmet Yalçın. Ankara: İmge Kitabevi,s:17

Güneş, A.2012. *Çağdaş bir çözümleme yöntemi: Göstergebilim*. E-Journal of New World Sciences Academy, Volume:7, Number:2, Article Number:4C0132, s:33.

Güneş, Ahmet. 2013. *Age*, s:341

Güneş, Ahmet. 2013. *Göstergebilim Tarihi*, Sivas NWSA-Humanities s:335.

Güzel, Bekir. 2014. *Reflections Of Social Problems Based On Industrial Revolution In Literature: Germinal By Émile Zola.*

Heskett, John. 2005. *Better by Design Conference.* In New zeland.

İlkdoğan, Haldun. 2017. *Göstergenin Toplum Düzlemindeki Yeri: Toplumsal Göstergebilim*. İdil dergisi, Cilt 6, Sayı 39, Volume 6, Issue 39 (2017), s:3151.

J. Locke, *An Essay Concerning Human Understanding*, Oxford University Press, 1975, s. 720-721.

Kuen, Chang, and Simon King. 2016. *Understanding Industrial Design*. O'Reilly Media.

Öztokat, N. 2005. *Yazınsal Metin Çözümlemesinde Kuramsal Yaklaşımlar*. İstanbul: Multilingual, s:61

Payaslıoğlu, Arif T. 1996. *Türk Yükseköğretiminde Bir Yeniliğin Tarihi: Barakadan Kampusa* 1954-1964. Ankara.

Pierce, Charles S. 1933-1966. *Collected Papers of C. S. Peirce, p:288*

Plattner, Hasso. 2010. *An Introduction to Design Thinking: Process Guide*.

Restrepo et al. 2004. "*The Axiological And Epistemological Foundations Of A Pde Program.*"

Rifat, M. 2000. *XX. Yüzyılda Dilbilim Ve Göstergebilim Kuramları*. İstanbul: OM yayınevi, s:287.

Rifat, Mehmet. 1998. *XX. Yüzyılda Dilbilim ve Göstergebilim Kuramları* 1: Tarihçe ve Eleştirel Düşünceler.

Rifat, M. 1998. *XX. Yüzyılda Dilbilim ve Göstergebilim Kuramları 1. Tarihçe ve Eleştirel Düşünceler*, İstanbul, YKY.s:113.

Rifat; Mehmet. 2009. *Göstergebilimin ABC'si*, İstanbul: Say. S: 41-69

Rifat, Mehmet. 2009. *Göstergebilimin ABC'si*, Say Yayınları, ISBN 978-975-468-816-0 Sertifika No: 10962, İstanbul, s:13.

Saussure, F. 1985. *Genel Dilbilim Dersleri.* (Çev: Berke Vardar). Ankara: Birey ve Toplum Yayınları, s:46.

TPI. 1995. *The Protection Of Industrial Designs In Force*.

Vardar, B. 2001. *Dilbilimin Temel Kavram ve İlkeleri.* İstanbul: Multilingual Yayınları s:86

Vayvay, Özalp et al. 2016. "*Supplier Involvement In New Product Development: A Case Study From The Semiconductor Industry.*" Business Administration and Management, 123.

Von Stamm, B., 2003. The Innovation Wave: Meeting the Corporate Challenge, John Wiley & Sons, West Sussex, England.

APPENDIX A

QUESTIONNAIRE (TURKISH)

Endüstriyel tasarımda gösterge bilimsel yaklaşım

Bu anket İzmir Yüksek Teknoloji Enstitüsü Endüstriyel Tasarım Bölümün'de yürütülen yüksek lisans tezi için sayısal ve sözel bilgi sağlamak amacıyla yapılmaktadır. Türk firmalarında çalışan Endüstriyel Tasarım/Endüstri Ürünleri Tasarımı Bölümü lisans veya yüksek lisans mezunu bireylerin, mesleklerini icra ederken semiyotik/semiyoloji/gösterge bilim den ne ölçüde yararlandıklarını ölçmek için hazırlanmıştır. Anket sırasında elde edilen veriler yalnızca bilimsel amaçlarla, tez çalışmasında, bilimsel yayınlarda ve sunuşlarda kullanılacaktır. Katılımcıların kimlik bilgileri saklı tutulacaktır.

* Gerekli

1. **E-posta adresi** *

   _____

2. **Cinsiyetiniz?** *
   Yalnızca bir şıkkı işaretleyin.

   ◯ Kadın

   ◯ Erkek

3. **Yaşınız?** *
   Yalnızca bir şıkkı işaretleyin.

   ◯ 22-30

   ◯ 30 ve üstü

4. **Öğrenim durumunuz nedir?** *
   Yalnızca bir şıkkı işaretleyin.

   ◯ Lisans

   ◯ Yüksek Lisans

   ◯ Doktora ve üstü

5. **Eğitim aldığınız okul/okullar?** *
   Lütfen lisans ve lisansüstü eğitim aldığınız tüm okulları yazınız. Eğitiminiz devam ediyor ise belirtiniz.

   _____

6. **Çalıştığınız şirket** *

   _____

7. **Ünvanınız** *
   Yalnızca bir şıkkı işaretleyin.

   ◯ Tasarımcı

   ◯ Tasarım sorumlusu

   ◯ Diğer: _____

Figure A.1. Questionnaire Page 1

8. **Gösterge bilim kavramını duydunuz mu?** *

   Yalnızca bir şıkkı işaretleyin.

   ◯ Evet

   ◯ Hayır

Semiyotik/semiyoloji/gösterge bilim
Ders hakkındaki görüşler ve bilgiler

9. **Endüstriyel Tasarım eğitiminiz sırasında semiyotik/semiyoloji/gösterge bilim dersi aldınız mı?** *

   Yalnızca bir şıkkı işaretleyin.

   ◯ Evet

   ◯ Hayır

Semiyotik/semiyoloji/gösterge bilim bilgisi

10. **Semiyotik/semiyoloji/gösterge bilim hakkındaki bilginiz nereden geliyor?**

Semiyotik/semiyoloji/gösterge bilim dersi

11. **Endüstriyel Tasarım eğitiminiz kapsamında semiyotik/semiyoloji/göstergebi lim dersi aldıysanız kaçıncı sınıf ve hangi düzeyde aldınız?** *

12. **Semiyotik/semiyoloji/gösterge bilim dersinin genel anlamda faydalı olduğunu düşünüyor musunuz?** *

    Yalnızca bir şıkkı işaretleyin.

    ◯ Evet

    ◯ Hayır

Çalışma hayatında uygulama

13. **Edindiğiniz semiyotik/semiyoloji/gösterge bilim bilgileri çalışma hayatınızda etkin kullanabiliyor musunuz?** *

    Yalnızca bir şıkkı işaretleyin.

    ◯ evet

    ◯ Hayır

Çalışma hayatında uygulama

14. **Edinmiş olduğunuz semiyotik/semiyoloji/gösterge bilim bilgilerini çalışma hayatınızda hangi yöntemlerle ve nasıl kullanıyorsunuz? Örnek verebilir misiniz?** *

Figure A.2. Questionnaire Page 2

Çalışma hayatında uygulama

15. Edinmiş olduğunuz semiyotik/semiyoloji/gösterge bilim bilgilerini neden çalışma hayatınızda etkin kullanamıyorsunuz? *

_____

_____

_____

_____

_____

Ürün Yorumlaması

16. Lütfen sorudaki ürünü yorumlayabilir misiniz?Örneğin; "Tutamak kısmı bana şunu ifade ediyor, rengi bana bunu ifade ediyor gibi" *

_____

_____

_____

_____

_____

Figure A.3. Questionnaire Page 3

Semiyotik/semiyoloji/göstergebilim ve ürün tasarımı

17. Lütfen aşağıdaki resimdeki ürünü semiyotik bilginize göre yorumlayınız. *

17. soruya geçin.

Görüş bölümü

18. Endüstriyel Tasarım eğitimi kapsamında semiyotik/semiyoloji/gösterge bilim dersi daha çok yaygınlaşmalı mı? Neden? *

Figure A.4. Questionnaire Page 4

APPENDIX B

FOCUS GROUP PARTICIPATION FORM

Bu odak grup çalışması İzmir Yüksek Teknoloji Enstitüsü Endüstriyel Tasarım Bölümün'de yürütülen yüksek lisans tezi için sayısal ve sözel bilgi sağlamak amacıyla yapılmaktadır. Türk firmalarında çalışan Endüstriyel Tasarım/Endüstri Ürünleri Tasarımı Bölümü lisans veya yüksek lisans mezunu bireylerin, mesleklerini icra ederken semiyotik/semiyoloji/gösterge bilim den ne ölçüde yararlandıklarını ölçmek ve tartıışmak için yürütülecek olup, test ve görüşme sırasında elde edilen veriler yalnızca bilimsel amaçlarla, tez çalışmasında, bilimsel yayınlarda ve sunuşlarda kullanılacaktır. Katılımcıların kimlik bilgileri saklı tutulacaktır.

This focus group study is carried out in order to provide numerical and verbal information for the master thesis conducted at the Industrial Design Department of Izmir Institute of Technology. Industrial Design / Industrial Design Department working in Turkish firms is designed to measure the degree to which undergraduate or graduate graduates benefit from semiotics / semiology / indicator science in performing their jobs. The data obtained during the focus group observations, testing and discussion will be used only for scientific purposes, thesis work, scientific publications and presentations. The identity of the participants will be reserved.

Yukarıdaki bilgilendirme metnini okudum ve anladım.
I read and understand the information staded above.

İsim Soyisim
İmza

APPENDIX C

FOCUS GROUP ENDING FORM

İsim/Soyisim	Eğitim düzeyi	Firma	Ünvanı

Lütfen yukarıdaki resmi göstergebilim bilginize göre yorumlayınız.

Renk	Malzeme	Form	Texture