

ISTANBUL TECHNICAL UNIVERSITY ★ GRADUATE SCHOOL OF SCIENCE
ENGINEERING AND TECHNOLOGY

**AN EXPLORATION OF USER EXPERIENCE ON PRODUCTS:
MULTIPLE OUTLETS AS A CASE OF DESIGN**

M.Sc. THESIS

Fulya TRAŞ

**Department of Industrial Product Design
Industrial Product Design Programme**

JUNE 2015

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**Fulya TRAŞ
(502091920)**

Department of Industrial Product Design

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Thesis Advisor: Assoc. Prof. Dr. Hümanur BAĞLI

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**KULLANICI DENEYİMİNİN İNCELENMESİ:
BİR TASARIM KONUSU OLARAK KABLOLU ÇOKLU PRİZ**

YÜKSEK LİSANS TEZİ

**Fulya TRAŞ
(502091920)**

Endüstri Ürünleri Tasarımı Anabilim Dalı

Endüstri Ürünleri Tasarımı Programı

Tez Danışmanı: Doç. Dr. Hümanur BAĞLI

HAZİRAN 2015

Fulya Traş, a **M.Sc.** student of ITU **Institute of /Graduate School of Science Engineering and Technology** student ID 502091920, successfully defended the **thesis/dissertation** entitled “**AN EXPLORATION OF USER EXPERIENCE ON PRODUCTS: MULTIPLE OUTLETS AS A CASE OF DESIGN** ”, which she prepared after fulfilling the requirements specified in the associated legislations, before the jury whose signatures are below.

Thesis Advisor : **Assoc. Prof. Dr. Hümanur BAĞLI**
İstanbul Technical University

Jury Members : **Assoc. Prof. Dr. Şebnem TİMUR ÖĞÜT**
İstanbul Technical University

Assoc. Prof. Dr. Ali Emre BERKMAN
TOBB University of Economics & Technology

Date of Submission : 04 May 2015
Date of Defense : 02 June 2015

To my family,

FOREWORD

This thesis is a result of a long and hard process for me. I would like to thank my advisor Assoc. Prof Dr. Hümanur Bağlı for her guidance and support for ending this study.

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Fulya TRAŞ
(Industrial Designer)

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ABBREVIATIONS

UX	: User experience
SD	: Semantic differential
HCI	: Human Computer Interaction

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AN EXPLORATION OF USER EXPERIENCE ON PRODUCTS: MULTIPLE OUTLETS AS A CASE OF DESIGN

SUMMARY

In this study, a research has been conducted to explore user experience (UX) on multiple outlet designs as a case. Multiple outlets are thought to be products that are low on the priorities of daily life. Widespread use and observed problems while using multiple outlets identified the direction this thesis. Another motivation for the study is the researcher's full time job in a wiring production company, her personal knowledge, observations, and interest about the product.

The study begins with a literature review about UX. Different approaches to define UX and its elements are investigated. A variety of models is introduced to address the base of this research study. Moreover, a literature review for UX evaluation methods is also investigated to decide about which is relevant for the empirical study to apply.

This thesis has a three-staged empirical study, starting with a UX research via questionnaire. The preliminary questionnaire gives data about concerns, pleasant and bad experiences of users. The second stage is an idea generation process within a workshop conducted with industrial designers. Designer's contribution to UX is explored. Finally, semantic differential scale method is used to measure perception of users about new multiple outlet designs. Comparisons of new designs and a contemporary design are examined to understand how users perceive a particular design solution.

The essence of this thesis study is to combine different views and evaluations of users to define their experiences, to see designer's contribution to improve UX, and to propose and apply a method for a user-centered design process. Additionally, a methodology to apply for a user-centered design process with applications of different UX evaluations methods is offered to use in design practice. Therefore, this study created an arena for users to mention their experiences on a forgotten product and designers to enhance experiences via some valuable methodologies; and presented a practical example of a user-centered design process.

KULLANICI DENEYİMİNİN İNCELENMESİ: BİR TASARIM KONUSU OLARAK KABLOLU ÇOKLU PRİZ

ÖZET

Bu çalışmada, kablolu çoklu priz tasarımı örneği üzerinden kullanıcı deneyimini inceleyen bir çalışma sunulmuştur. Kablolu çoklu priz, gündelik yaşamın öncelikleri arasında son sıralarda yer alan bir ürün grubu olarak düşünülmüştür. Ev, ofis, okul, pazar yeri, inşaat alanı gibi geniş kullanım alanları, araştırmacının elektrik anahtar/prizi ve çoklu prizi üreten bir firmada tam zamanlı Endüstriyel Tasarımcı olarak çalışması sonucunda edindiği bilgi, sahip olduğu gözlemler ve konuya ilgisi bu tezin yönünü ve içeriğini belirlemiştir.

Çalışma, kullanıcı deneyimi hakkında bir literatür taraması ile başlar. Son 30 yıldır hem araştırmacılar hem de profesyoneller için ilgi çekici bir araştırma konusu olan kullanıcı deneyimi, içeriğinin birçok disiplini kapsamı ve çok disiplinli doğası gereği birçok alanı kapsayan bir şemsiye anlayış olarak karşımıza çıkar. İlk olarak “kullanılabilirlik” etrafında İnsan-Bilgisayar Etkileşimi ve Etkileşim Tasarımı araştırmacıları tarafından odak noktası olarak çalışılmaya başlanmıştır. Teknolojinin gelişmesi ile birlikte yaygınlaşan interaktif ürünler “kullanılabilirlik” perspektifini yetersiz bırakarak “deneyim” kavramının oluşmasına sebep olmuş, ve “kullanıcı deneyimi” altında yeni bir alan ortaya çıkmıştır. Böylelikle “kullanıcı deneyimi”, insanların bir sistemi kullanmaları ya da sistemle karşılaşmaları halindeki deneyimi araştırmayı, bu deneyime yönelik tasarım yapmayı ve deneyimi değerlendirmeyi konu alır.

Konunun ne olduğunun anlaşılması için, kullanıcı deneyiminin tanımına ve elemanlarına yönelik çeşitli yaklaşımlar araştırılmış, bu anlatımlara ait birçok model araştırmanın temelini oluşturmuştur. Kullanılabilirlik ve kullanıcı deneyimi arasındaki farklar ile ürün odaklı, kullanıcı odaklı ve etkileşim odaklı deneyim modellerine ve tanımlarına yer verilerek kullanıcı deneyimi ile ilgili bir literatür özeti çıkarılmıştır. Farklı kullanıcı deneyimi tanımları yaklaşımları ile konuya farklı bakış açılarından yaklaşarak çok boyutlu bir birikime ulaşılmıştır. Ürün odaklı kullanıcı deneyimi yaklaşımları tatmin edici bir kullanıcı deneyimine ulaşmak için ürün tasarımı sürecine yönelik kurallar belirleyerek tatmin edici bir ürüne ulaşmak için tanımlar belirlemiştir. Etkileşim odaklı kullanıcı deneyimi çalışmalarında ise kullanıcının ürün ve fiziksel çevresi ile ilişkisinin tanımlarının yapılması hedeflenmiştir. Bu tez için temel alınan kullanıcı odaklı kullanıcı deneyimi yaklaşımlarında ise amaç ürünleri kullanan insanlar, yani “kullanıcılar” üzerine yoğunlaşmaktır. Kullanıcıların ne yaptıkları ve deneyimlerini geliştirmek için neler yapılabileceğini araştırmak bu modellerin içeriğini belirtir.

Kullanıcı deneyimi ile ilgili çalışmaların bir kısmı, bu deneyimin nasıl ölçüleceğine ilişkin çalışmalardan oluşur. Bu tezde, kullanıcı deneyimini değerlendirme yöntemleri ile ilgili bir literatür taraması yapılmıştır. Çok sayıda profesyonel ve araştırmacı kendi alanlarında uyguladıkları kullanıcı deneyimi değerlendirme metodlarını listelemek için bir araya gelerek çeşitli atölye çalışmaları yapmışlardır.

Bu atölye çalışmalarının çıktıları farklı şekillerde gruplandırılmaya çalışılarak, değerlendirme yöntemlerinin uygulama alanı, süreci, içeriği ile ilgili sınıflandırılmalar yapılmıştır. Bu sınıflandırmalar çalışmanın çeşidine (alan çalışması, laboratuvar çalışması, anket çalışması, uzman değerlendirmesi gibi), araştırmanın çeşidine (nitel ve nicel araştırma), değerlendirilecek grubun çeşidine göre (kullanıcı odaklı ve uzman odaklı) yapıldığı gibi, değerlendirilme yapılacak geliştirme ve deneyim türüne göre deneyimin ölçüleceği geliştirme fazı (Kavramlaştırma, analiz, tasarım, prototip, ve uygulama), deneyimin süresi (anlık uygulama süresi, uygulama süresinin bir bölümü, ve tüm uygulama süresi), deneyimin zamanı (1 günlük değerlendirme, 1 haftalık değerlendirme, ve aylar süren değerlendirme) gibi profesyonellere yönelik tasarım sürecine uygulamaları baz alınarak yapılmış sınıflandırmalar literatürde bulunmaktadır. Çalışma içeriği, süresi ve kapsamı düşünüldüğünde hangisinin ya da hangilerinin bu tez için uygulanabilir olduğu tartışılmıştır.

Bu tez, üç aşamadan oluşan, kullanıcı odaklı yaklaşım izleyen deneysel bir çalışmayı içerir. İlk aşamada, kablolu çoklu priz ile ilgili kullanıcı deneyimlerini listelemeye yönelik hazırlayıcı bir ön anket çalışması yapılmıştır. Anket çalışmaları, birçok araştırma yöntemi arasından bir durumu özetleme, genel bir fikir oluşturma amacıyla kullanılan yaygın bir yöntemdir. Araştırılan konu hakkında önceki deneyimler, bilgi ve gözlemler sayesinde bilinen temellerle, katılımcılara anlamlı sorular sorma imkanı vardır. Nitel araştırma yöntemleri tarandığında bu tip bir araştırma için “yarı yapılandırılmış görüşme” uygun bulunmuştur. Kullanıcılara yöneltilecek sorular ulaşılmak istenen verilere göre şekillendirilirken, görüşmenin esnek yapısı sayesinde kullanıcının anlayışı, yaşadığı deneyimi anlatma şekli, vs. gibi etkenlere göre soru sıralamasında yeniden düzenlemeler yapılabilir. Ayrıca elde edilecek nitel verinin miktarı bu yöntemi bu tez çalışması için avantajlı kılan sebeplerden biridir. Ancak, tez çalışması için zaman kısıtı, kullanıcıların ulaşılabilirliği gibi etkenler düşünüldüğünde yarı yapılandırılmış görüşme yönteminin çevrimiçi araştırma siteleri aracılığıyla çevrimiçi bir ön anket çalışması olarak değiştirilmesine karar verilmiştir. Ön anket çalışmasında kullanıcılara çoklu kablolu prizi kullanırken yaşadıkları endişeler, kötü ve iyi deneyimleri sorulmuştur. Ayrıca kendi deneyimlerini geliştirmek için öneri sunmaları istenmiştir. Bu anket çalışmasına verilen cevaplar listelenerek, üç gruba ayrılmıştır. Gruplandırma yapılırken deneyimin özünde yatan sebepler dikkate alınmıştır.

İkinci aşamada, güvenlik, ürün ve kullanım ortamı olarak üç gruba ayrılmış olan nitel ön anket verileri bir grup endüstriyel tasarımcı ile yorumlanıp üzerinde tartışılarak, tasarım fikirleri oluşturma sürecine dahil edilmiştir. Çeşitli sosyal medya ortamlarında Endüstriyel Tasarımcılar için bir davet yazısı oluşturulmuş ve yapılacak atölye çalışması için katılmak isteyen gönüllü profillerine ulaşılmıştır. 4 kişiden oluşan atölye çalışması ile ön anket çalışması sonucunda elde edilen nitel verilerden yola çıkarak çeşitli ürün fikri eskizleri oluşturulmuştur. 2 ve üzeri fikir üreten tasarımcılar fikir seçeneklerini atölye ortamında sunarak tartışmaya açmıştır. Bu fikirlerden dördü, tasarım sürecinin kavram geliştirme aşamasının çıktıları olarak, tasarımcılar tarafından ürünleştirilip bilgisayar destekli tasarım programları ile 3-boyutlu hale getirilip gerçekçi görselleri hazırlanmıştır.

Son aşamada ise, gerçekçi görselleri oluşturulmuş tasarım fikirlerinin kullanıcılar tarafından nasıl algılandığını ölçmek için semantik diferansiyel ölçeği yöntemi uygulanmıştır. Semantik Analiz Yöntemi, tasarım süreçlerinin özellikle senaryo oluşturma ve eskizleme gibi kavram geliştirme süreçlerinde kullanılan birçok yöntemden biridir. Bu tez çalışmasında, tasarım süreci eskiz yapma, rafine etme ve

eskizleri 3-boyutlu modelleme programlarıyla görselleştirme olarak kavram oluşturma süreciyle tamamlanmaktadır. Literatürde bu tasarım aşaması değerlendirilmesi üzerine yapılmış örnek çalışmaların da incelenmesiyle semantik diferansiyel ölçeği yöntemiyle kullanıcıların deneyiminin ölçülmesine karar verilmiştir. Ürün semantiği, insan eliyle yapılmış biçimlerin sembolik özelliklerinin kullanımlarının incelenmesi ve bu incelemenin endüstriyel tasarıma uygulanması ile ilgilenir. Tasarım; kullanıcı ve tasarımcı arasındaki bir iletişim yöntemidir. Bu tez çalışmasındaki tasarım atölyesi çalışması bu iletişimin tasarımcı bakış açısıyla inşa edildiği zemindir. İletişim araçları da ürün semantik analizi ile değerlendirilecek olan 2-boyutlu ürün fikirleri görselleridir.

Semantik diferansiyel ölçeğinde birbirine zıt ikili sıfat grupları ile değerlendirme yapılmıştır. Sıfat grupları çeşitli literatür araştırmaları, ön anket çalışması ile elde edilen deneyim listesi ve kullanıcı deneyimi modellerinden yola çıkılarak belirlenmiştir. Ölçekten çıkan sonuçlara göre yeni tasarımların ve günümüze ait kabul görmüş bir tasarımın kullanıcıda oluşturduğu algıların karşılaştırılması, aynı yeni tasarım için kullanıcı algısı ve tasarımcı değerlendirmesi karşılaştırılması analiz edilmiştir.

Bu çalışmanın özü, kullanıcının deneyimlerini belirlemek için farklı görüş açılarını ve değerlendirmelerini harmanlamak, ve tasarımcının kullanıcı deneyimini geliştirmeye yönelik katkısını görebilmektir. Bu sebeple; bu çalışma, kullanıcılara günlük hayatın içinde kaybolmuş bir ürünle ilgili deneyimlerini anlatmalarına ve tasarımcılara bu deneyimleri geliştirmelerine yönelik bir zemin yaratmıştır. Ayrıca, kullanıcı deneyimi değerlendirme yöntemleri araştırılarak seçilen ürün grubuna hangi yöntemin daha uygun olduğu ile ilgili bir değerlendirme yapılmış, ve aynı tip ürünler için kullanıcı odaklı bir tasarım süreci önerilmiş, uygulanmış ve sonuçları belirli limitler dahilinde değerlendirilmiştir.

1. INTRODUCTION

1.1 Scope and Purpose of Thesis

From the moment a person wakes up in the morning to the last moment before falling asleep, he encounters dozens of products. Some of those products make life “easy” and please him, on the other hand some attempt to make life “easier” and get him nervous. All those products have a common point, as Krippendorf (1989) says, “making sense.”

Design activity is a process of "solving problems, creating something new, or transforming less desirable situations to preferred situations" (Friedman, 2003). In this process, the design goals and constraints are set like performance, ergonomics, production and cost, regulatory and legal's, marketing program, and designer constraints (Bloch, 1995). These are some inputs for product design. The output of the process is a product. Customers, who use the product, in other words “users”, evaluate the product. This evaluation emerged an interest called user-centered design in a variety of disciplines, such as marketing, consumer research, ergonomics, economics, and engineering (Desmet and Hekkert, 2007). Due to design's characteristics of being an integrated discipline that requires aesthetic, marketing, ergonomic, and engineering skills, design researchers also got some action about user-centered design and defined their own approaches (Desmet and Hekkert, 2007).

The term “user experience” (UX) is firstly adopted by Human-Computer Interaction community researchers and practitioners (Hassenzahl and Tractinsky, 2006; Law, Roto and Hassenzahl, 2009). They broke through the limits of usability and recognized UX “having non-utilitarian aspects of such interactions, shifting the focus to user affect, sensation, and the meaning as well as value of such interactions in everyday life” (Law, Roto and Hassenzahl, 2009).

The aim of this study is to investigate the users' experiences and perceptions about products by analyzing their usage scenarios of the products, to enhance the experiences with a user-centered approach, and to evaluate the enhanced products

with users. The studied product group was chosen from everyday life, “multiple outlet”, in other words “extension cords”, “power strips”. There are two motivations behind determining the UX concept with multiple outlet in this study. One of the motivations is that, multiple outlet is observed to be existed at least one unit almost in every home, office, classroom, etc. However, it is thought to be only an instrument product that connects our valuable electrical devices to electricity and they are abandoned to stay in invaluable places like under or behind some large furniture. Therefore, it is a remarkable study area to explore. Another motivation is the researcher working as a full time industrial designer at a wiring devices manufacturer; hence, personal knowledge, observations and interest in the product directed this thesis study.

The research questions of the study are:

- How is UX evaluated in a design process?
- What kind of experiences do users have while using a multiple outlet?
- How do users perceive a new design compared to an existing one?
- How do designers interpret UXs and provide solutions?
- How do users perceive a particular design solution from their perspective?

1.2 Structure of the Thesis

The general structure of this thesis is:

1. Introduction explains the scope and the aim of the study. The summary of the chapters are also given to frame the research.
2. Understanding The User Experience looks at the approaches of definitions of UX. Different models of UX models are introduced and the key elements of UX are addressed to be the base of the research study. Moreover, UX evaluation methods are also reviewed to understand how UX is measured qualitatively and quantitatively.
3. Empirical Study expresses the study about the multiple outlets in 3 parts. The first part is the preliminary research, the second part is the practical interpretation of the preliminary research by the designers and the third part is the evaluation of designers’ solution ideas by users.

4. Conclusions and Recommendations part includes the summary and evaluations of the findings of the empirical study and the methodology of the thesis. Further research suggestions are also conveyed in this chapter.

2. UNDERSTANDING USER EXPERIENCE

2.1 Introduction to User Experience

The term “user experience” has been a striking concept for researchers and practitioners of multiple disciplines during the last three decades. Due to its content related with a range of disciplines and its multidisciplinary nature, UX becomes an umbrella incorporating many concepts (Roto et al., 2011; Rajeshkumar et al., 2013).

As Hassenzahl and Tractinsky (2006) pointed out, UX was adopted by the human-computer interaction (HCI) and interaction design. It was firstly introduced by Donald Norman (1995) to criticize the aspects of human interface research and application at Apple Computer Inc (Rajeshkumar et al., 2013). As the technology developed, users encountered more interactive products that needed to be useful and usable. This evolution of technology has convinced UX designers and HCI researchers to design user interfaces that make it easier for users to accomplish their goals, and they have agreed on the importance of UX in interface design. However, HCI approach was criticized of being “vague, elusive and ephemeral”. Hence, design researchers tried to explain UX by defining its dimensions, elements, frameworks and evaluations (Hassenzahl and Tractinsky, 2006; Rajeshkumar et al., 2013).

UX field studies, designs for and evaluates the experiences that people have while using or confronting a system. Roto et al. (2011) categorize different perspectives of UX as; *a phenomenon*, *a field of study*, and *a practice*; such as the analogy, health as a phenomenon, medicine as a field of study and a doctor’s work as a practice. Views approaching UX as a phenomenon describe what UX is, identify its types and explain the circumstances and consequences of it. Perspectives of UX as a field of study works on how experiences are formed or what people expect or have experiences, look for means to design systems enabling particular UXs, and investigate and develop UX design and assessment methods. Researches about UX considering as a practice envision UX as part of a design process, represent UX

building a prototype to demonstrate the desired UX, evaluate UX, and bring designs aimed at enabling a certain UX. This various perspectives related with different disciplines make UX a large research area in any field. Figure 2.1 shows the collection of areas covered within UX (Rajeshkumar et al., 2013).

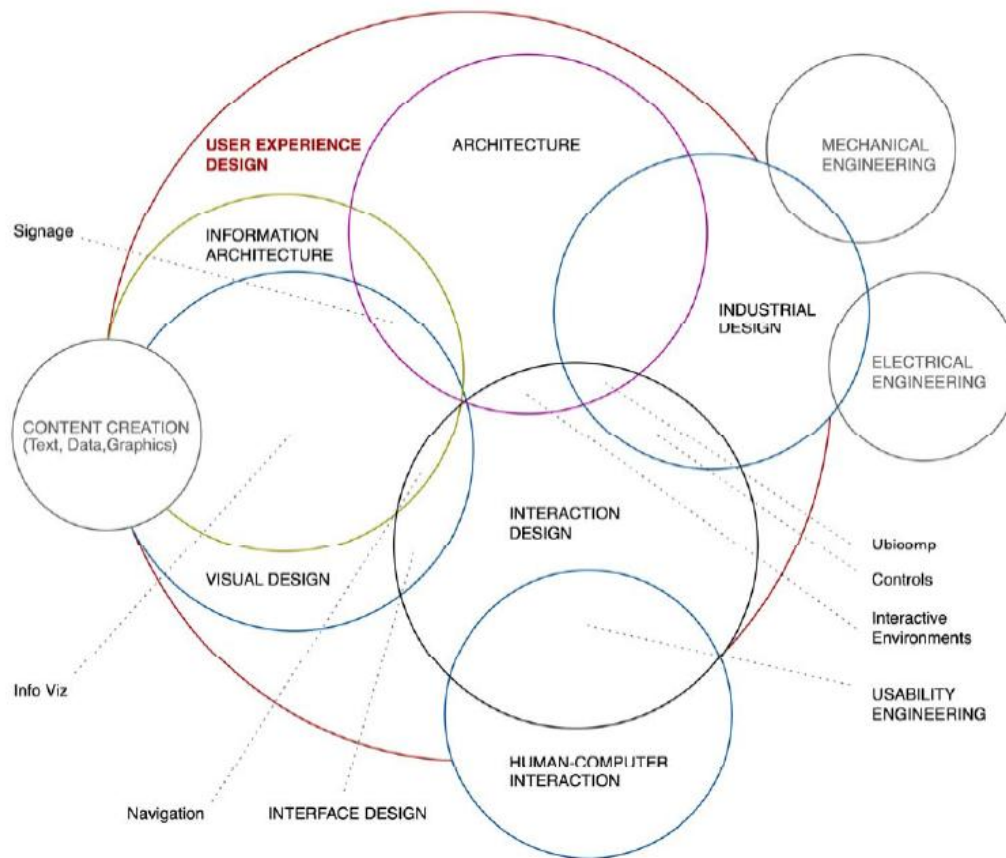


Figure 2.1 : Various disciplines of UX.

As shown in figure, Interaction Design, Human-Computer Interaction, Industrial Design, Architecture, Information Architecture, Content Design and Visual Design is the main areas where UX Design is covered. It can be said that UX is a focus point of study for designing a good experience (Rajeshkumar et al., 2013).

All these disciplines intersecting in the same circle of UX design have led to several definitions and different perspectives of certain different viewpoints on UX. The definitions range from a psychological to a business perspective and from quality to value centric (Roto et al., 2011).

One of the earliest and influential studies about human experience was Dewey's views (1934, in Mutlu, 2004). According to Dewey, the experience is constituted

between the experienter and the experienced object. The contribution of both makes up the intellectual, emotional and practical forms of experience.

Forlizzi, Mutlu & DiSalvo (2004) adopted Dewey's three material qualities of human experience and have built a framework by adding different views on the emotional experience part. Dewey's intellectual experience is "the intellectual conclusions from signs and symbols that are inherent to a distinct experience", emotional experience is "subjective and an internally driven evaluation of the objective situation" and practical experience is "activity consistently completed within the confines of an objective situation". The amount of these three forms of experience can vary combining to form "an overall experience that may or may not be emotionally satisfying".

Forlizzi, Mutlu & DiSalvo (2004) points out that the person's intended experience (goal) and the actual experience have a relationship to form the overall experience. Another factor that influences the experience is the environment that the user and the object exist. Figure 2.2 illustrates the framework of Forlizzi, Mutlu & DiSalvo (2004) that renders the dimensions of the experience and represents the difference of the person's intended goal and actual experience.

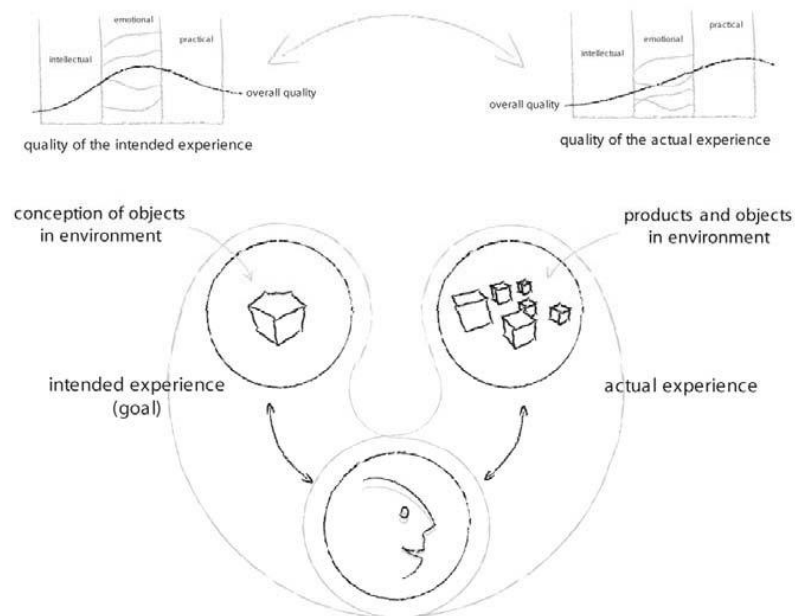


Figure 2.2 : A framework of UX.

In parallel with the framework, it can be declared that user having some goals, a product having some qualities, and an environment where the goal is intended to take place are the three elements of a UX.

In the following part, different models of UX, proposing the definitions and components is introduced.

2.2 User Experience Models

There are many approaches to understand the nature of UX in the literature. Forlizzi and Battarbee (2004) have an attempt to categorize UX approaches of researchers and practitioners. Each categorization has a different focus for UX; product-centered models emphasize the product qualities that lead to a rich UX, user-centered models try to understand the person who will use the product, and the interaction-centered models emphasize the relationship between the subject and the object.

Product-centered models define the guidelines for designing desirable products to achieve a satisfying experience (Forlizzi and Battarbee, 2004). An example for this category is Alben's (1996) criteria for effective interaction design (Figure 2.3). The criteria are categorized into two groups. First group is, “manageable, aesthetic experience, appropriate, mutable, needed, learnable/usable”, directly related to UX and the second group is, “understanding of users, effective design process”, about the design process of the designer.



Figure 2.3 : The criteria for products to get satisfying UXs.

The second categorization of Forlizzi and Battarbee (2004), user-centered models, focuses on the people, in other words the users, who use the products. The aim is to understand users' actions and the aspects appropriate for users that will enhance their experience. Hassenzahl's (2003) model is an example for user-centered models. In this example, key elements of UX and the relations between these elements are defined. Explicitly, the model of Hassenzahl addresses the aspects such as "subjective nature of experience, perception of a product, emotional responses to a product and the varying situations". Figure 2.4 illustrates the Hassenzahl's model.

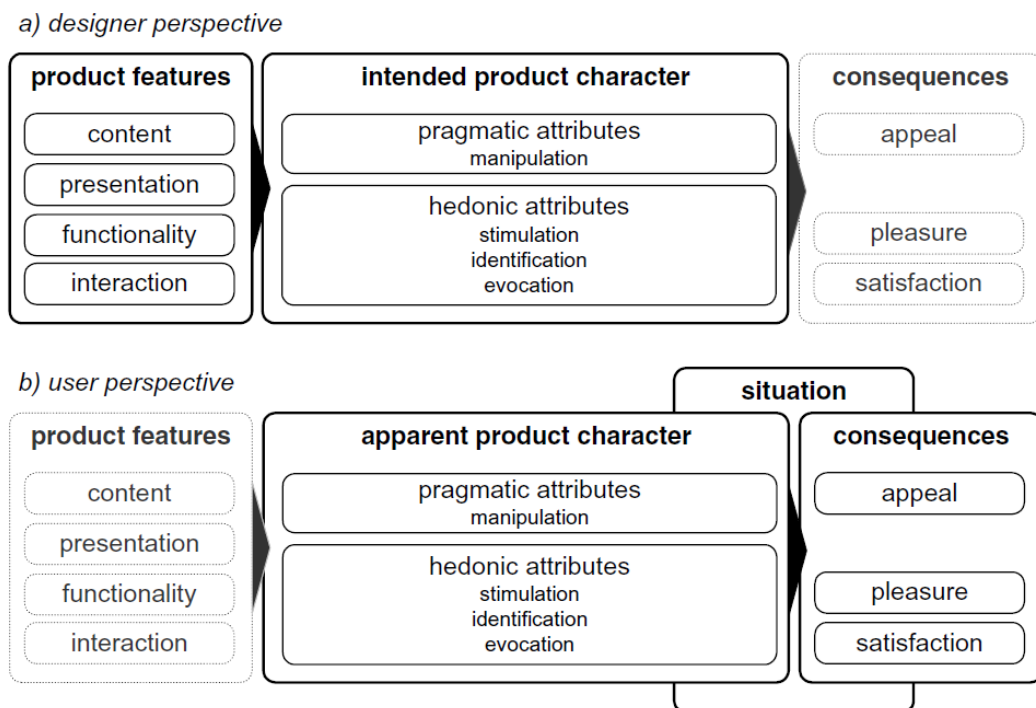


Figure 2.4 : Key elements of the model of UX.

In Hassenzahl's model, two perspectives for UX are defined, "designer perspective" and "user perspective". From the designer perspective, the product's features, such as content, presentation style, functionality, interaction style are chosen to make up an "intended product character" during the design process. The character outlines the product's qualities like novel, interesting, useful, and predictable. When the user meets a product, the flowing process changes its perspective into "user perspective". The user firstly recognizes product features. Based on these features, every user constructs own product character, which is "apparent product character". Subsequently, the evaluation of the apparent product character leads to some conclusions about the product's appeal, such as "it is good/bad", emotional

consequences, such as pleasure, satisfaction, and behavioral consequences, such as increased time spent with the product. Apparently, these evaluations all take place in a specific usage “situation”, such as a particular environment.

As aforementioned, user-centered models focus on the users to define UX. Hassenzahl’s basic contribution is an approach to understand the perception of the user when confronted with a product and how apparent product character is constructed.

Apparent product character is built based on two groups of product attributes, called “pragmatic and hedonic attributes”. Pragmatic attributes are the product’s character derived from product qualities, which fulfill the functional goals and “manipulate” the environment, like being supportive, useful, and controllable. On the other side, hedonic attributes emphasize the user’s psychological well-being. Hassenzahl (2003) categorizes hedonic attributes as “stimulation, identification and evocation”. The product has to be “stimulating” to develop one’s personally, i.e., proliferation of knowledge and development of skills. Novel, interesting and exciting products having new impressions, opportunities and insights “stimulate” the users. A product’s “communication identity”, which is “identification attributes”, defines the social status and the need for expressing the user. Lastly, “evocation” refers to the attributes of products that “provoke memories” of the past events important for the user. In brief, Hassenzahl (2003) approaches to define a user-centered model by defining user’s evaluation process of the product features.

Interaction-centered models define the ways that the user engages with products and their environment. By defining, they attempt to explain the bridge between the designers and users, not the user or the product itself. Wright, McCarthy and Meekison (2003) create a model having four threads that define an experience. Threads are called compositional, sensual, emotional and spatio-temporal threads. They think that experience cannot be divided into parts or elements; hence, the four threads of their model are intertwined making a braid. Figure 2.5 shows the experience model of Wright, McCarthy and Meekison.



Figure 2.5 : Interaction-centered UX model.

Compositional thread is concerned with the part-whole structure of an experience. The structure could be thought as “a narrative structure, action possibility, plausibility, consequences and explanations of actions”, answering the questions like; “what is this about?”, “what has happened?”, “what will happen next?”. Sensual thread deals with the sensory engagement of a situation and the “look and feel” of a product. The emotional thread refers to the emotional reactions to a situation of the user him self’s or making empathy to somebody’s situation. Lastly, spatio-temporal thread defines the experience happening in a particular time and place.

To sum up, there are different approaches of UX models offering frameworks for the definition of UX and its elements. In the following part, different methodologies for evaluation of UX are discussed.

2.3 Evaluation of User Experience

As several studies were completed to understand UX from different viewpoints, the medium was coming closer to a ground where UX is needed to be evaluated by some metrics and methods to be applied in practice (Obrist et al., 2009). Several workshops and studies were conducted with participation of practitioners and researchers to collect UX evaluation methods (Väänänen-Vainio-Mattila, K., Roto and V., Hassenzahl, 2008; Law et al., 2008; Sas and Dix, 2009; Zimmerman, Forlizzi and Koskinen, 2009).

Before the attempts to evaluate UX, there have been many traditional methods to evaluate usability. Some researchers suggest that both evaluations of UX and usability could be interpreted similarly (Bevan, 2009); on the other hand, some researchers oppose this similarity by spotting the differences (Roto et al., 2009; Rajeshkumar et al., 2013). Usability is used for testing effectiveness, satisfaction and efficiency, making the product easy to use and improving learnability; however, UX

is used to understand subjective user recognition, suggestion and related emotional responses with their pragmatic and hedonic characteristics (Hassenzahl, 2004; Rajeshkumar et al., 2013). These differences made researchers to identify methods for evaluation of UX.

Several discussion topics were raised in the workshops conducted with practitioners and researchers to explore evaluation methods of UX. Used and known methods, tools and techniques in the early, and later design and development phase were listed. Additionally, advantages and limitations of these methods used in different platforms and devices were discussed; and experiences of different participants while applying UX evaluation methods and their suggestions for improvement were highlighted. As a result, an overall picture of what is recently used and known about UX evaluation in industry and academics was visualized during these workshops (Obrist et al., 2009).

There are some papers approaching to categorize UX evaluations in literature (Bevan, 2009; Vermeeren et al., 2010; Roto et al., 2011; Rajeshkumar et al., 2013). One of the most summarizing and latest categorizations of UX experience is study of Rajeshkumar et al. (2013). In their analysis, UX evaluation methods are categorized to make the process of identification and validation of evaluation methods easier; simplify the process of selecting an appropriate evaluation process; identify advantages or detect any “deficiencies” of current evaluation methods; and help UX researchers and practitioners in formulating their evaluation method to meet the requirements of their project.

89 UX evaluation methods in total are identified from literature and a categorization is developed according to:

- Research/study type
- Development phase
- Type of research conducted
- Type of users/evaluators
- Time restriction factor
- The period of experience

Research/study type evaluation methods are the category based on the parameters like how the research is conducted, where and in what situation the research takes place. The methods are laboratory studies, field study, survey, and expert evaluation.

Classification of UX evaluation methods based on development phase is divided into 5, defining different stages of a design process; *concept/requirement/what is wanted*, *analysis*, *design/development*, *prototype*, and *implementation and deployment*. Figure 2.6 shows an example of a model of software development process from Rajeshkumar et al. (2013).

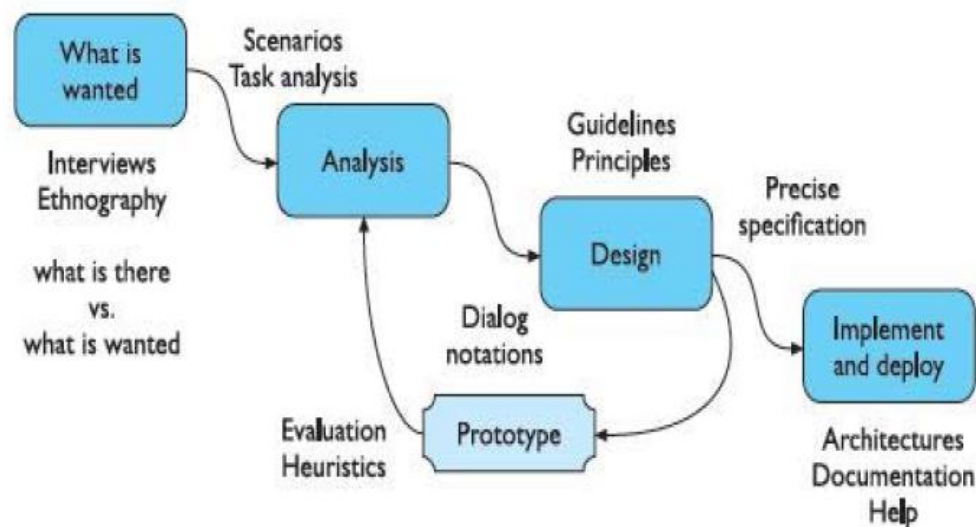


Figure 2.6 : An example of a model of software development process.

Classification based on the type of research conducted is divided into 2 according to the type of data gathered; *quantitative* and *qualitative* research. Quantitative research looks for explanatory laws and involves objective, quantitative and statistically valid measurements; however, qualitative aims more in-depth descriptions and involves collecting, analyzing, and interpreting data by observations.

Another classification is made based on the type of user/evaluators. Rajeshkumar et al. (2013) define two types of users as “*normal*” users and *subject-matter experts*. The perceptions of an ordinary user and an expert may differ because of the perspectives and knowledge about product.

Time restriction factor classifies UX evaluation methods according to the duration needed to conduct the evaluation process. It can be *a single day* for some products while *several months* for some others.

Categorization based on “period” of experiences is a classification according to *momentary*, *episodic*, or *overall* UX, which can also defined as before using the system, snapshots during interaction, based on an experience of a task or an activity, and based on long-term UX.

89 UX evaluation methods are categorized under these six classifications, Table 2.1 and Table 2.2 illustrate the classifications based on type, and development and experience factors.

Table 2.1 : Classification of UX evaluation methods (type).

Type	Taxonomy
Study Type	Field Study
	Lab Study
	Survey
	Expert Evaluation
Type of research	Qualitative Research
	Quantitative Research
Type of user/evaluator	User-oriented
	Expert-oriented

Table 2.2 : Classification of UX evaluation methods (development & experience).

Development and Experience	Taxonomy
Development Phase	Concept
	Analysis
	Design
	Prototype
	Implement & Deploy
Time Restriction	1 day of evaluation
	1 week of evaluation
	Months of evaluation
Period of Experience	Moment of whole application
	Episode of whole application
	Overall of whole application

Similarly, Roto and her friends have another study on UX evaluation methods and their classification with information collected from UX community. They also share their studies voluntarily via web site <http://www.allaboutux.org/> with their categorization of UX evaluation methods according to *method type*, *development*

phase, studied period of experience, and evaluator/information provider. Table 2.3 shows the categorization of methods.

Table 2.3 : Classification of UX evaluation methods.

Method Type	Development Phase	Studied Period of Experience	Evaluator/Information Provider
Field studies	Scenarios, Sketches	Before usage	UX experts
Lab studies	Early Prototypes	Snapshots during interaction	One user at a time
Online Studies	Functional Prototypes	An experience (of a task or activity)	Groups of users
Questionnaires/Scales	Products on Market	Long-term UX	Pairs of users

In brief, there are many UX evaluation methods in literature for any type of study, experience, and phase. Researchers continue to investigate about methods deeply to make these methods more clear, relevant, and applicable for practitioners.

3. EMPIRICAL STUDY

3.1 Methodology

In order to explore UX on multiple outlet, a user-centered approach is applied in this study to help designers to understand users. The study begins with a data collecting process to have an idea, to get qualitative data about experiences, and to frame kinds of multiple outlet experiences of users. As a second phase of the study, results and primitive data collected used as input in a workshop conducted with a group of industrial designers. Finally, workshop results are comprehended with a group of users to get a final understanding about product ideations.

Hennink, Hutter, and Bailey (2010) define a qualitative research cycle with four interlinked tasks; the formulation of a research question, reviewing literature, developing a conceptual framework for the study, and selecting an appropriate fieldwork approach. In a general definition, qualitative research is an approach allowing the researcher to examine people's experiences in detail by using some research methods. Among several research methods, surveys and questionnaires are the most common, when research is concentrated on profiling a situation and developing an overall pattern. They are also applicable when sufficient is already known through some previous experiences, knowledge and observations about the situation; so that it is possible to design meaningful questions to include and willing respondents that are in a position to provide meaningful data about the topic can participate (Rowley, 2014).

When UX evaluation methods are examined, there are many methods suitable for collecting qualitative data about a particular experience. *Semi-structured experience interview* is one of those methods (Url-4). Semi-structured interview is a conversation with people going through a list of questions to reach the wanted data. Although interview questions are prepared beforehand, they may not follow the exact order. Since the emphasis is the frame and understanding of the interviewee,

interviewer can act flexible about the sequence of questions (Bryman, 2012). In a semi-structured interview, interviewer asks the participant about what he thinks, feels, and experiences. The advantage of this method is to reach a wide range of qualitative data with small samplings (Url-4). It can also be used in many phases of any product design process and any type of experiences that Roto et al. defined.

Based on these overviews, it is decided to make semi-structured interviews for gathering data about UX of a multiple outlet in this study. However, when time limitation and availability of users that will contribute to the study is considered, some changes are made in the methodology for collecting preliminary data. A preliminary questionnaire is conducted via online survey websites.

As a second phase of this study, a workshop with industrial designers is arranged to perform the creative stage of a design process. Data gathered from the preliminary questionnaire is input for this workshop to be analyzed, evaluated and create solution ideas.

The last stage of the study is evaluation of UX about product ideas of design workshop. When UX evaluation methods categorized under development phase are overviewed, 22 UX evaluation methods are listed under “concept ideas” category (Url-5). This list is offered to be used at the early stages of product development process like scenario building and sketching. In this thesis study, design process of designers ends with sketching, refining, and visualizing those sketches with 3D computer modeling with some realistic renderings. These concept creation stages can be evaluated by using an evaluation method applied with some visuals of concepts. Some studies like Hsu et al. (2000), Mondragon et al. (2005), and Korber et al. (2013) also evaluate UX with some visuals presented to participants. All have a common point in their methodology, which is using semantic differential or a Likert-type questionnaire format. Korber et al. (2013) present subjects 2D storyboards to evaluate on a Likert-scale; Hsu et al. (2000) employ semantic differential scale to analyze the differences in product form perception of designers and user via product visuals; and Mondragon et al. (2005) reveal different sensitivities of different groups in the same test about commercial product images by applying semantic differential method.

Product semantics was firstly introduced by Krippendorff and Butter (1984) as “*the study of the symbolic qualities of man-made forms in the context of their use and the application of this knowledge to industrial design*”. The form created by designer reports about the product itself including its use, cultural heritage, and designer’s own experience and style. Monö (in Demirbilek & Şener, 2003) defines four semantic functions of products as; *to describe* the facts, way of use, handling; *to express* the product’s values and qualities; *to signal* about user’s reaction like to be precise in his work; and *to identify* origin, nature and product area. Therefore, design is a way of communication between designer and user (Krippendorff and Butter, 1984).

Design workshop, as the second stage of this study, is an area where the communication between designer and user is built from designer’s view. Communication materials are 3D computer modeling and rendered visuals of some product ideas, which will be evaluated by users with a product semantic analysis, as the last stage of this thesis. Following Figure 3.1 illustrates three-staged process of this empirical study.



Figure 3.1 : Process of empirical study.

3.2 Preliminary Questionnaire

To have an overall understanding about the experiences of multiple outlets and to get information for preparing the input of the workshop, an online questionnaire, via the website www.esurveycrator.com, in Turkish language is devised with a group of 30 people (Appendix A). The questionnaire is shared via social media with a selective and restrictive manner. For instance, attention paid to have participants from different ages, jobs and social groups.

Participants are informed about aim of questionnaire and the product named as "multiple outlet" since there are several different naming; like “çoklu kablolu priz”,

“uzatma kablosu”, “uzatmalı priz”, for the same product in Turkey. After this brief introduction, they are asked to fill a simple table about their demographic data.

In the first part of the questionnaire, they are asked about the frequency of use of their multiple outlets, to highlight the widespread usage of product. In the second part, the concerns of the participants are asked while using a multiple outlet, with a multiple selection question with an optional answer field. The options were the outlook of the product (form, texture, color etc), problems with the usage environment (how to reach etc), safety (electricity etc), technical problems (hard to take the plug off etc), and others field as an added option.

The classification of main concerns of the participants was decided from a literature review and the observations about the product. Outlook of a product could give information about a variety of components. Product form is an outcome of a process framed with particular design goals and constraints (Bloch, 1995) and it has a power of attraction or repulsion of user. As a second classification of concerns, usage environment is offered to participants. Almost in each UX definition, environment is one of the elements of experience; therefore, the users' environmental concerns about multiple outlets are a remarkable data for this study. The safety concerns are the third option asked to participants. According to Maslow's hierarchy of needs theory (1943), "safety" is on the second layer of the pyramid. "Power strip" is defined as "an electrical device that has a series of outlets attached to a cord with a plug on one end" in Merriam-Webster online dictionary (2015). While using a product having electric power (220 V in Turkey) nearly in each plug hole, a person tends to think about safety as a second need for Maslow. Hence, the concerns of users for safety are an interesting point to investigate. Another classification of concern worth considering is technical or engineering problems and the effects of these to the users' interactions with the product. Technical problems are embodied with an example "hard to plug in/off" to make users clear. Lastly, an others field was added to encourage users to give as much data as possible in case of feeling not close or clear about the options given.

In the next part of the questionnaire, the participants are asked to think about their bad and pleasant experiences with a multiple outlet. The aim of these sections is to collect as many qualitative data as possible about UX. To obtain a vast of data, the participants are directed to think through a wide range of their experiences, from

negative to positive. Moreover, parallel with Wright, McCarthy and Meekison (2003), the experiences are not divided into parts or elements, they were thought as intertwined braids. According to this model, the questions of these parts are prepared as:

- Tell about the specifications of the multiple outlet you used. (number of outlets, length of the cable, color of the product, on/off button etc.)
- What happened in this experience?
- How was the environment you used? (Behind/beside the TV in the living room, under/on the table in the office etc)
- What were your main concerns/considerations?
- How did you feel?

Some examples are used to make questions more concrete and make the user to remember the moment of usage with some details like place, time, case, etc.

A mood chart developed by Vastenburger et al. (2011) is also presented for the participants to define their feelings. This question and the mood chart was asked to get a better understanding of experience and make a better classification of bad and pleasant (Figure 3.2). For instance, a person can hit his head under the table while plugging, which seems to be a bad experience. On the other side, this can make the user laugh with his friends thinking that it is a funny situation.

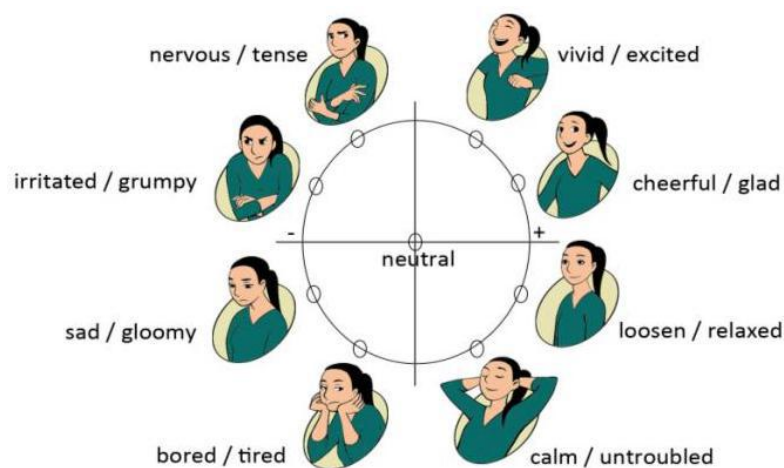


Figure 3.2 : Mood chart.

In the final part of the questionnaire, the participants are asked about their suggestions to improve the experiences while using the multiple outlet. This part is

motivational for users to think about their experiences again to make suggestion to the researcher. Several recommendations are listed as a result.

3.2.1 Sampling of questionnaire

The preliminary questionnaire is conducted with 30 people. Male to female ratio is kept equal in the study. 17 of 30 participants are females and 13 are males. Ages are changing between 21 and 65 years old. The wide range of age is an advantage to have a broad range of idea about experiences. 16 of 30 participants are holding a bachelor's degree, 9 of 30 participants are holding a graduate degree and 5 are graduates of high school. Participants' jobs are very diverse like; 7 mechanical engineers, 4 supplier managers, 3 technicians, 2 industrial designers, 2 dentists, 2 housewives, 1 student, 1 officer, 1 statistician, 1 industrial engineer, 1 psychologist, 1 biologist, 1 sports teacher, 1 city planner, 1 independent auditor and 1 mould maker.

3.2.2 Results of questionnaire

The questionnaire is completed with a wide range of qualitative and quantitative data to be used in the design workshop.

First, the frequency of use of multiple outlets is shown in Figure 3.3. None of the participants was using multiple outlet less than 4-6 times per month. 2 participants (6.7%) replied as often, 4-6 times per month. 6 of the participants (20%) use multiple outlet 7-10 times per month. Most of the participants, 22 of 30, 73.3% of all, use their multiple outlet every day. These frequencies show that multiple outlet is one of the products that are widely used daily life.

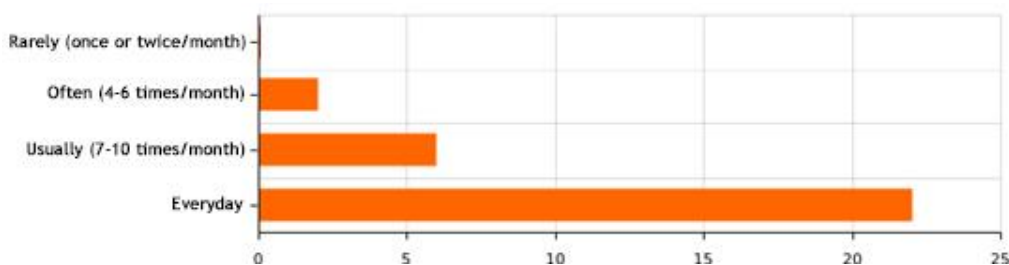


Figure 3.3 : Frequency of use of multiple outlet.

Second, the concerns of the participants are investigated. 8 participants (27.6%) declare that they concern about "the outlook of the product"; 16 participants' (55.2%)

concern is "problems with physical environment"; 21 participants (72.4%) mention that safety is the main concern while using multiple outlet; 8 participants (27.6%) declare their concern is technical problems. 2 people defined 2 concerns which could be identified as safety. Figure 3.4 shows the distribution of the answers.

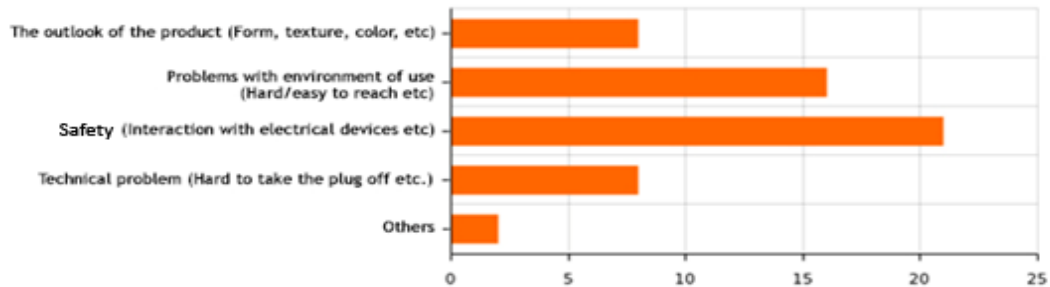


Figure 3.4 : Concerns of participants while using multiple outlet.

The distribution of concerns brings an overall look to the experiences. "Safety" has the most share with 72.4%. In Maslow's hierarchy of needs pyramid, safety has its placement on the second layer. Because electricity may harm people like fire hazards, electric shock etc., and it is directly used to connect the electrical devices to electricity, safety is depicted to be the first concern for users, as being the second need in the hierarchy.

Finally, 76 remarks listed from 30 participants of the questionnaire. 41 of them were about bad experiences and 35 of them were about the pleasant experiences. The remarks listed in Appendix B in Turkish and English with their categorization. For both of the bad and pleasant experiences, the answers are grouped into three categories according to the experience's basic reason. The categories were safety, product feature, and physical environment. This categorization is made with parallel to the concerns of the users. Differently, "the outlook of the product form" and "technical problems" are merged under the heading of "product feature". Because the number of mentions for both category is not a majority and both of the concerns can be defined with one or more features of a multiple outlet. For instance, "cable mass" and "hard to plug in" experiences are tagged under "product feature", which can change with design decisions.

"Safety" category includes the remarks of participants about their fears for getting some injuries and their annoyances for having their belongings damaged; like being

scared of sparks from the inlet of the multiple outlet and burned carpet and fear of fire because of sparks. "Product feature" category is composed of experiences due to one of the product's specification or features; like not being able to plug the socket because of placement of the on/off button. "Physical environment" category includes the experiences occurred due to environment of the multiple outlet; like falling down because of disorganized long cable of multiple outlet on the floor. Figure 3.5 illustrates the categorization of the questionnaire results for usage of designers in the workshop.

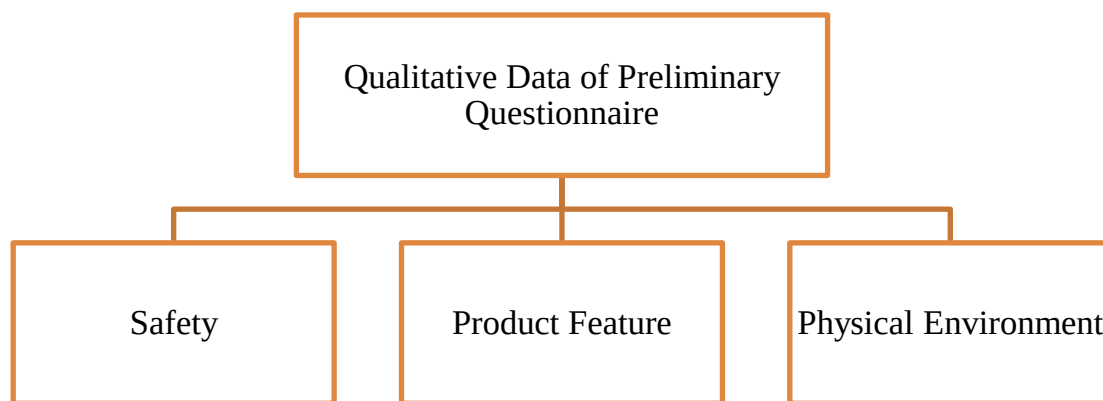


Figure 3.5 : Categorization of preliminary questionnaire to present designers.

After having an insight about their bad and pleasant experiences, participants are asked about their recommendations about developing the experience with multiple outlet in the last section of the questionnaire. These proposals are also divided in the same groups as experiences to map the use of users' power to change their multiple outlet.

To sum up, preliminary questionnaire is used as a method to collect qualitative data about UX. The raw data is categorized into three groups, "safety", "product feature" and "physical environment" to prepare a medium for design workshop that will be conducted with industrial designers to map the problems to solve and to develop ideas to enhance experiences.

3.3 Designing The Workshop

As an output of the preliminary questionnaire, the groups of the users' remarks as "safety", "product feature", and "physical environment" was the essence of the design workshop.

3.3.1 Workshop environment

The workshop invitation with place, date and hours was announced via social network within a group of Industrial Designers, Industrial Design students and Lecturers. The participants sent their communication information to join the workshop. 4 participants of the workshop are composed of 2 Industrial Design students and 1 Professional Industrial Designer and 1 Academic Design Lecturer. Figure 3.6 shows participant profiles of the workshop. Workshop was in native language of the participants, Turkish.

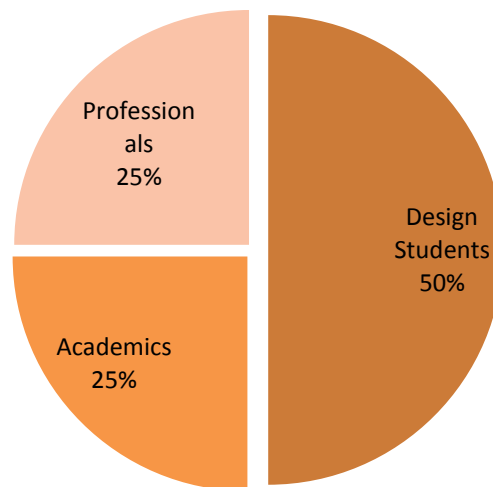


Figure 3.6 : Participant profiles of the workshop.

The workshop conducted between 10:00 to 17:00 in one of the largest manufacturing facilities of an electrical switch and socket manufacturer in Istanbul, Turkey. In the morning section, a warm up tour for the participants is organized. The participants participated in a facility tour to see the manufacturing, a group of products as a history of wiring devices from 1980s to 2010s, and a showroom displaying the product ranges and uses of the manufacturer. After the facility tour, the researcher gave information about herself, aim of the study and the process of the workshop.

The mentions of the participants, as a result of the preliminary study, were all written on different colored sticky notes and placed under the headings "safety" (güvenlik), "product feature" (ürün) and "physical environment" (kullanım ortamı). Since the participants stated their bad and pleasure experiences, two classified experiences were also positioned in different parts of the same headings. The poster of each group was divided into two sections. On the left section of the poster, bad experiences of the users were placed written one by one on yellow sticky notes. On the right side, pleasant experiences were written on blue sticky notes. The good and bad experiences were coded with different colors, so that designers could visually draw a line between experiences. Figure 3.7 shows the sticky notes presented to designers. Half bottom of the posters of both bad and pleasant experiences were kept blank to invite designers contribute with their own ideas, experiences, etc.



Figure 3.7 : Sticky note posters presented to the participants.

The recommendations of the users were also presented within the same format under the heading of "Dreams" (Hayaller) due to the direction of the ideas of the participants. The sticky notes were chosen because of their replaceable property; therefore, the participants could easily replace and organize the notes to make up an idea for their design solution.

In the afternoon section, designers and researcher discussed the raw data on sticky notes, shared their comments, defined some concrete problems about usage, and proposed some arrangements for sticky notes. Designers decided to replace the ideas

under "dreams" and put under the "safety", "product feature" and "physical environment" headings to get a plain look and more organized data. They also told about their own experiences and added some notes to the board. By this way, they created their new organized and reinterpreted data as a part of a design process. Figure 3.8 is the updated version of the posters by designers. Some of the green "dreams" notes, which are thought relevant, were distributed to the other sections of the posters. For instance, the mention "It makes a visual pollution. I recommend a cover." was repositioned under the heading "product feature-bad experiences" side.

One of the most remarkable results of preliminary questionnaire is that no participants' mention in safety-pleasant experience category. This can be interpreted as multiple outlet is perceived to be unsecure because of electricity effects and users do not recognize any experiences about feeling safe with it. Designers also discussed this subject and concluded to increase safety perception of product. Designers' view "Perceived more secure" was added as an additional design input and positioned under "safety-pleasant experience" side. The list of user experiences retrieved from preliminary questionnaire is figured in Appendix C with their categorization under three headings.



Figure 3.8 : Sticky note posters updated by the participants.

Organization of outlets was another most mentioned experience discussed by designers. Not being able to use all the outlets is not acceptable for users because it means not being able to use full capacity of multiple outlet.

Long cable and its messy environment, leading to accident such as falling is another problem area that designers get notice. Having long cable is one of the basic features of a multiple outlet making it portable and adjustable to reach anywhere. However, this basic function seems to be unsolved, so that designers concentrated on this subject.

Additional function is also in demand for users. Especially USB charging is a requested feature because of widespread use of electronics devices charged with via USB, such as smart phones, tablet computers etc. Designers drew attention to this important need and discussed the subject with each other.

Aesthetic problems are additional solution area with its disorganized cables, unaesthetic form and troubles in cleaning. Designers also discussed and concentrated these areas while making up their design ideas.

After presentation and discussions on preliminary questionnaire results, four designers started their idea creation process. In the next 1.5 hours, designers searched ideas and concepts by sketching. In the following section, the results of the idea creation stage is presented.

3.3.2 Workshop results

Designers presented their sketch studies within the group and gave a brief description about the scenario of their proposals. Every designer presented 2-4 initial ideas to solve the problems of the users. They told usage scenario of their ideas, problems they solved and improvements for experience. Figure 3.9 shows the sketch studies of designers.



Figure 3.9 : Sketch studies of designers.

To have an effective result and analysis for the evaluations of designs, one of the design concepts of each designer's sketch study was selected to be refined. The selection criteria were the problems they solved. The problem areas were selected to be various for each design alternative. Therefore, 4 sketch ideas in total were chosen to be refined. The refinements would be in 3D models thinking about usage scenarios, production methods and available technologies. After the designers' refinement process, 3D models are shared with the researcher. The researcher prepared the regular renderings of the products to be considered for the semantic differential questionnaire.

Designer 1 described her refined design as; "A solution for the aesthetic concerns of the multiple outlet. The users mentioned about their problems with the harmony between their physical environment and the multiple outlet. They try to hide their multiple outlets behind something, so the solution for this behavior is to show the product as a visual object having desktop functions like holding your favorite photos, shopping list, notes and so on. The form of the product was decided to be bulky and stationary on a flat surface." Figure 3.10 shows the refined concept of Designer 1.



Figure 3.10 : The refined multiple outlet design of Designer 1.

Designer 2 described his selected design as; "One of the most common problems of users was the cables of the multiple outlet mixed up while using. The design is a solution for this problem with its cable wind-up mechanism. The circular form and the positioning of the outlets also solve the problem for not being able to use all the outlets because of the linear arrangement of the outlets. The on/off button was serving a safety button for most of the users, so the feature was kept originally. Additional functions as USB plugs are placed near the on/off button, to be considered as a need because the use of portable products is widened." Figure 3.11 illustrates the refined product of Designer 2.

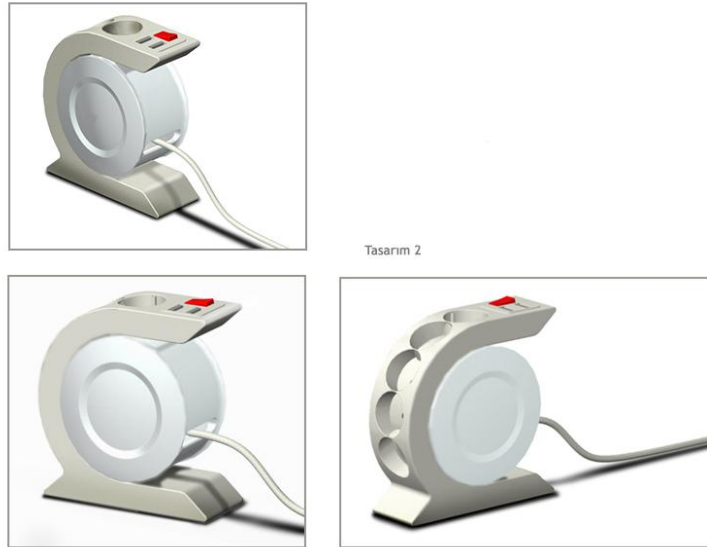


Figure 3.11 : The refined multiple outlet design of Designer 2.

Designer 3 described her selected design as; "Most users use their multiple outlet on the floor. Especially for the uses in a dusty environment, people do not want to touch it while plugging in and out. The solution offers a surface to put user's foot on to make a force to keep the multiple outlet on the floor. This makes an ease of use while putting the plug in and off." Figure 3.12 represents the refined product of Designer 3. Due to its special usage and to make it more understandable, a blurred human figure stepping on the special surface of the multiple outlet was also represented.

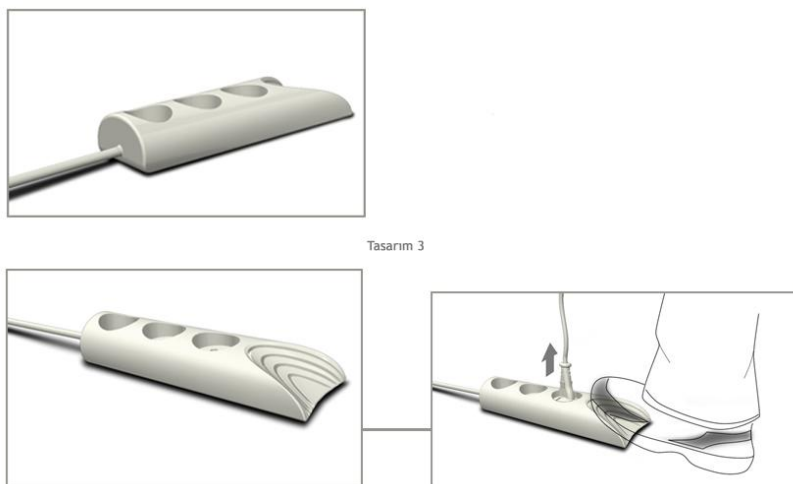


Figure 3.12 : The refined multiple outlet design of Designer 3.

Designer 4 described his selected design as; "This is a solution for the mixed cables. The cable can easily compile itself and makes a neat environment. Dividing the whole body into two offers a modularity as an advantage for its mobility and the

arrangement of the plugs because the space between the outlets can be increased when needed. Thanks to its expanding cable." Figure 3.13 illustrates the refined product of Designer 4.

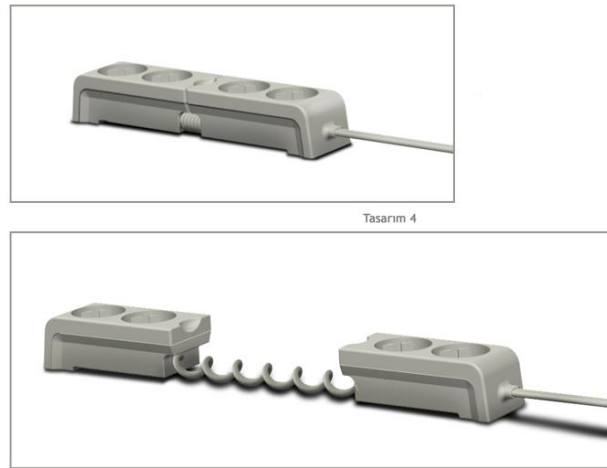


Figure 3.13 : The refined multiple outlet design of Designer 4.

In brief, in the workshop study each designer contributed to a different problem area from the preliminary user research. They presented solutions at least for two problems that are mentioned in the preliminary questionnaire with each design idea. Designers prepared the 3D CAD models of the ideas and researcher rendered the designs to be perceived equally by users. Light colors are selected to make users understand the forms of products clearly. The excessive highlights were avoided to make the visual more realistic. The usage scenario and the solution area was the focus to be underlined. Figure 3.14 shows the final design ideas and their concentrated solution areas.



Figure 3.14 : Design ideas and the solution areas.

3.4 Product Semantic Analysis

The research about user experiences and workshop study conducted with designers was an attempt to develop design ideas to contribute the experiences of users and enhance their bad experiences. Designers studied the preliminary questionnaire results as brief defining design problems. They define a product character with some product features that will lead to some conclusions at users' side. Hassenzahl (2003) defines this designer perspective, however reminds us the user, who will actually have the evaluation of the product and reveal the real experience. From the designer perspective, the product's features, such as content, presentation style, functionality, interaction style, are chosen to make up an "intended product character" during the design process. The character outlines the product's qualities like novel, interesting, useful, and predictable. When user meets a product, the flowing process changes its perspective into "user perspective".

Hassenzahl's basic contribution is an approach to understand the perception of the user when confronted with a product and how apparent product character is constructed. This study will continue to investigate how the user will evaluate the new multiple outlet designs from "user perspective". In literature, Hassenzahl investigated this perspective in several studies (Hassenzahl 2001&2004,) with semantic differential scale.

Semantic differential is a method to measure what connotative meaning of concepts might have for people in terms of some dimensions (Osgood et al., 1957). Semantic differential is "one of the most appropriate techniques to assess the intensity and direction of the meaning of concepts, especially complex and multidimensional concepts" (Mindak, 1961 in Verhagen et al., 2015). Users are asked to rate concepts with a set of opposite adjective pairs, such as cold-hot, hard-soft. The opposite pairs are put on each side of a linear line that is divided into equal pieces (generally 5, 7 or 9 pieces). The mid-point of the scale means "neutral". The participant marks his/her position according to which pole word and how much that pole reflects his/her idea.

An example for this scale is shown on Figure 3.15 (Url-1).

Using the website is a...

bad idea	☐	☐	☐	☐	☐	☐	☐	good idea
foolish idea	☐	☐	☐	☐	☐	☐	☐	wise idea
unpleasant idea	☐	☐	☐	☐	☐	☐	☐	pleasant idea
negative idea	☐	☐	☐	☐	☐	☐	☐	positive idea

Figure 3.15 : 7-point semantic differential scale example.

3.4.1 Sampling of semantic differential questionnaire

The questionnaire is completed with 62 participants. 3 of them were excluded because of missing demographic information. In total, 59 participants, 27 females and 32 males, contributed with their evaluations of multiple outlets. The samples' median age was 30, ranging from 21 to 62 years old. The 36 of participants have their bachelor's degrees, 19 had their graduate degree 3 had their doctorate and 1 was a graduate of high school. There was a diversity about jobs of the participants like; 15 engineers, 6 academicians, 5 industrial designers, 5 teachers, 5 statisticians, 5 social scientist students, 4 city planners, 3 officers, 3 managers, 2 dentists, 1 architect, 1 psychologist, 1 advertising consultant, 1 human resources specialist, 1 housewife and 1 artisan.

3.4.2 Identifying bipolar anchors

The most significant part of semantic differential method is the choice of opposite anchors that will define the arguments of the participants (Osgood et al., 1957). In this study, the opposite anchors are decided by several explorations made from the beginning of the study. Firstly, most common mentions of the preliminary questionnaire participants are examined to have a list of opposite anchors. The experiences of users are summarized into single words. 9 couple of opposite anchors are listed as shown in Table 3.1 in Turkish and English.

Table 3.1 : The anchors from the results of preliminary questionnaire.

Participant's Mention		Anchors			
Turkish	English	Turkish		English	
Çarpar mı diye korktum.	I got afraid because of electric shock.	güvenli	tehlikeli	safe	dangerous
Güç tüketimine dayanabilecek mi?	Can it carry the power of products?	sağlam/dayanıklı	dayanıksız	durable	non-durable
Kullanılan fişlerin rahat takılamaması.	Not being able to plug in different plugs	kullanışlı	kullanışsız	useful	useless
Fişten çıkarmak için bayağı zorlanıyorum.	It is hard to take the plugs out.	kolay	zor	simple	hard
Açma/kapama düğmesiyle tüm elektrikli aletleri kapatma avantajı	Advantage of turning off all the electrical equipments with the on/off button	pratik	zor/yavaş	practical	hard
Aynı anda pek çok şey az kabloyla kullanıma hazır durumda	Lots of equipments are ready with minimum cable	hızlı	yavaş	quick	slow
Cep telefonu gibi USB'den şarj edilebilen ürünler prize bağlanabilmeli.	USB chargable products like cell phones, could be plugged in the socket.	teknolojik	eski	technological	old
Evi süpürürken her odada priz aramam gerekmiyor.	I do not need to look for socket in each room while cleaning.	taşınabilir	sabit	portable	stationary
Uzun kabloların birikmesi ortamda toz topluyor.	Cable mass makes a dusty environment.	hijyenik	kirli	hygienic	dirty

The user model experience of Hassenzahl (2003) assumes users constructing product character combining the product's features with personal expectations or standards. The character consists of pragmatic and hedonic attributes of the product. The pragmatic attributes are classified as "manipulation" and the hedonic attributes are classified as "stimulation", "identification" and "evocation". Manipulation is the functionality attributes of the product, whereas stimulation is the novelty attributes and identification is the need to express somebody self through objects. Evocation refers to the symbolic meaning of a product for the user. The groups of 9 opposite anchors that are relieved from the preliminary questionnaire are categorized according to the pragmatic and hedonic attributes in Figure 3.16.

Manipulation	Stimulation	Identification
• safe-dangerous • durable-nondurable • useful-useless • simple-hard • practical-hard • quick-slow • portable-stationary	• technological-old	• hygienic-dirty

Figure 3.16 : Categorization of the anchors of preliminary questionnaire.

In the figure, 6 of the anchors are in the manipulation, 1 in stimulation and 1 in identification. It can be said that multiple outlet is a product that are mostly thought with is functional properties. Hassenzahl (2003) defines "pragmatic object" and "hedonic object" according to the strength of its attributes. He calls primarily pragmatic objects as ACT products and primarily hedonic objects as SELF products. Due to its functional properties and its direct link to the user's goal, which is to have needed electricity to run the electrical device, the multiple outlet is an ACT object. Parallel with this view, the mentions of users about the manipulation attributes of multiple outlet is more than the stimulation and identification attribute.

One of the hedonic attributes of Hassenzahl was the product's ability to evoke memories and act as a symbol of the past, evocation. Hassenzahl (2004) accepts that some kind of products, such as souvenir magnets bought from a vacation and placed on the refrigerator, have evocation attributes. In this study, it is out of evaluation

because the multiple outlet and the preliminary studies do not address that kind of attributes. In addition, since the evaluations are made based on 2D visuals of product ideas, no adjectives are defined for sensory thread such as soft-hard, smooth-textured.

When the semantic differential studies of product attributes (Hassenzahl, 2004; Bradley and Lang, 1994; Osgood et al., 1957), the preliminary questionnaire, the definitions of the designers' workshop products are all considered to make the final anchor list of the semantic differential questionnaire. To make a balanced evaluation, 3 bipolar adjectives are decided to be used for each classification of product attributes. Figure 3.17 shows the latest group of 9 adjectives in English and Turkish.

Manipulation	Stimulation	Identification
•safe-dangerous •simple-hard •portable-stationary	•standard-creative •typical-original •cautious-caurageous	•amateurish-professional •gaudy-classy •masculine-feminine
•güvenli-tehlikeli •kolay-zor •taşınabilir-sabit	•alışılmış-yaratıcı •tipik-orijinal •temkinli-cesur	•amatör-profesyonel •şatafatlı-zarif •erkeksi-kadınısı

Figure 3.17 : Categorization of the anchors of SD scale in English & Turkish.

3.4.3 Conducting semantic differential scale

In the semantic differential questionnaire, 4 multiple outlet designs of workshop result and a default multiple outlet are evaluated by 59 participants with a 5-point semantic scale. The questionnaire was shared via social media with a selective and restrictive manner. For instance, attention was paid to have participants from different ages, jobs and social groups. 5-point semantic scale is used to make the participants more clear and not lost about the questionnaire. The questionnaire was prepared in the participant's native language Turkish (Appendix D).

Participants were informed about the aim of the questionnaire and the product named as "multiple outlet" since there are several different naming for the same product in Turkey. The demographic information of participants was collected to see the profiles of the users. In the following stage, an example was given about how the questionnaire will be replied to make the participants clear before they begin evaluating the designs. 4 multiple outlet designs were presented as in the Figure 3.18.



Standart Grup Priz

Tasarım 1



Yukarıda gördüğünüz tasarımın ikili kelime grubundan hangisine ne kadar yakın olduğunu düşünerek ilgili yuvarlağı işaretleyiniz.

güvenli	☐	☐	☐	☐	☐	tehlikeli
sıradan	☐	☐	☐	☐	☐	orijinal
amatör	☐	☐	☐	☐	☐	profesyonel
taşınabilir	☐	☐	☐	☐	☐	sabit
alışılmış	☐	☐	☐	☐	☐	yaratıcı
şatafatlı	☐	☐	☐	☐	☐	zarif
kolay	☐	☐	☐	☐	☐	zor
temkinli	☐	☐	☐	☐	☐	cesur
erkeksi	☐	☐	☐	☐	☐	kadınsı

Figure 3.18 : The layout of the questionnaire.

The order and priority of 9 bipolar adjectives were randomized to make the participant more aware and prevent the feeling of replying the same questions. At least two perspective views of the designs were presented with a realistic rendering to sense a real multiple outlet. The participants were asked to mark the closest round according to their evaluation of the design and the adjective pair. One of the most common standard multiple outlet designs with an explanation under is positioned on the top right side to make a comparison when needed.

The same semantic differential evaluation is completed with 4 multiple outlet designs of the workshop. A scale for an ordinary multiple outlet was also added to compare the design solutions with contemporary multiple out design. Figure 3.19 shows the evaluated contemporary multiple outlet for SD scale.



Figure 3.19 : Contemporary multiple outlet design in the SD scale.

The contemporary design is selected from a variety of multiple outlets from different manufacturers. Because of its widespread use, the outlet was a 3-gang, white, earthed and with on/off switch.

According to the Hassenzahl's UX definition, two perspectives were introduced as user perspective and designer perspective. This study also investigates about the differences and similarities between those perspectives and considers about the perceived product characters.

9 bipolar adjectives randomized in the scale can be grouped as A1, A4 and A7 for manipulation; A2, A5 and A8 for stimulation; and A3, A6 and A9 for identification. The randomized adjective list is implemented to make users not to think repeatedly about the same attributes.

Basically, SD scales are analyzed to compare design ideas and contemporary multiple outlet design. Additionally, the scales are used to measure product character attributes from designer and user perspectives in this study. The following section will summarize analysis and results of SD scales.

3.4.4 Results of semantic differential scale

SD scales are analyzed on graphical representations comparing design ideas and contemporary multiple outlet design. Correlation coefficient is calculated for each design as an indicator for comparison.

Images of Design 1 and contemporary design, and the evaluation lines are shown in Figure 3.20. The lines for two designs come closer to some extend in anchors A3,

A6, and A7 near the neutral point for two adjectives. For the rest of anchors, they are evaluated differently, especially positioning of stimulation anchors A2, A5, and A8 are dramatically away from each other. For manipulation adjectives A1, A4, and A7, design 1 is considered more near to the neutral values than contemporary design. Except adjectives masculine-feminine, identification bipolar' positioning are similar to each other from users' perspective. Correlation coefficient for two designs is -0.43, which is an indicator of a weak association between the evaluations of design 1 and contemporary design.

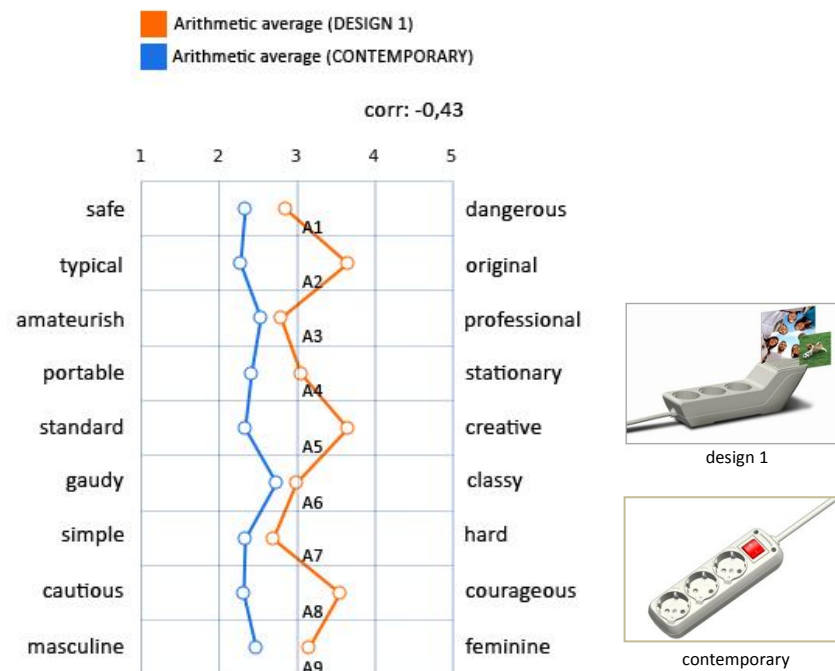


Figure 3.20 : Evaluation of design 1 and contemporary design with SD scale.

Evaluation of Design 2 and contemporary multiple outlet is illustrated in Figure 3.21. In some of bipolar adjectives, evaluation values are almost the same, like A1 and A4 manipulation adjectives. Third manipulation couple “simple-hard” shows a slight inclination to “simple”; however, design 2 is considered as more neutral about this adjective couple. Correlation coefficient for two designs is -0.23, which is a weaker association. This weakness is a result of the specific difference between couples A2, A3, A5 and A8. Design 2 is regarded more novel with its stimulation attributes, and more professional as an identification attribute.

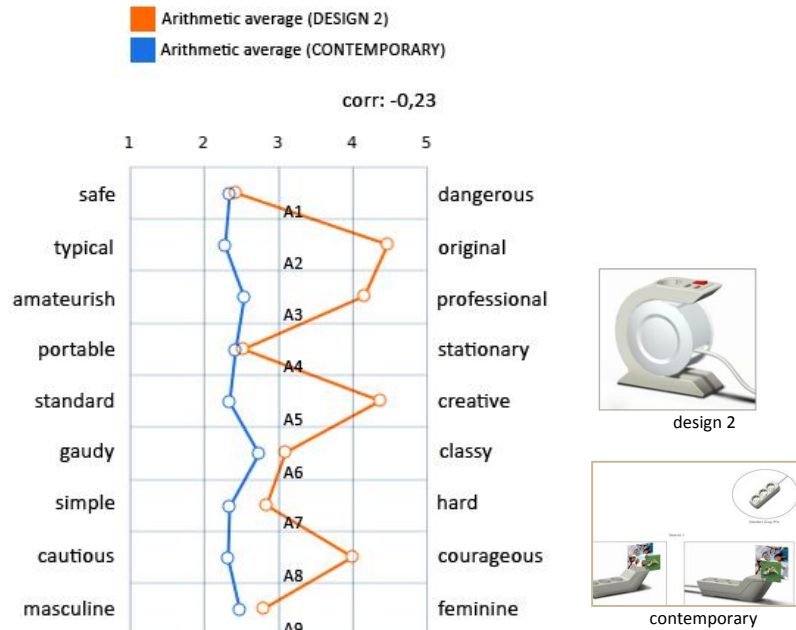


Figure 3.21 : Evaluation of design 2 and contemporary design with SD scale.

Results of Design 3 and contemporary design are illustrated in Figure 3.22. Correlation coefficient for two designs is 0.21, which is not a strong association. Especially stimulation adjectives A2, A5, and A8 are close to opposite sides for two designs. However, manipulation anchors A1, A4, and A7 are evaluated very close to each other, near safe, portable, and simple. Like stimulation, identification adjectives are also considered in reversed directions. Design 3 is professional, classy, and feminine; whereas, contemporary design is amateur, gaudy, and masculine.

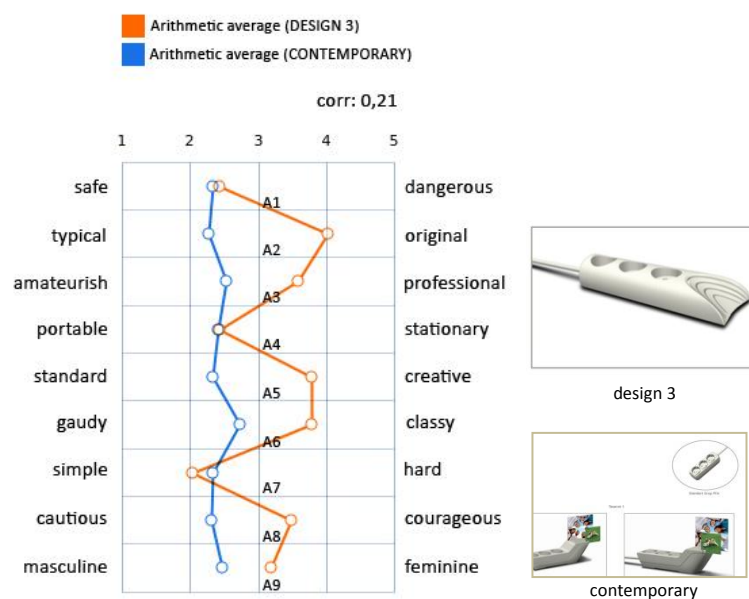


Figure 3.22 : Evaluation of design 3 and contemporary design with SD scale.

Figure 3.23 shows the evaluation of Design 4 and contemporary design. The positioning of adjectives A4 and A9 are close to each other. Both have a tendency to be defined as portable and masculine. When manipulation attributes are examined; apart from A4 and A7, A1 is considered to be in the opposite polar. Design 4 is thought to be dangerous, whereas contemporary design is closer to be safe. Values of stimulation adjectives are remarkable for two designs. Users perceive Design 4 more original, creative and courageous. For identification attributes, new design looks more professional, neutral about gaudy-classy. Being masculine is determined in both designs, which is a bit stronger about contemporary design.

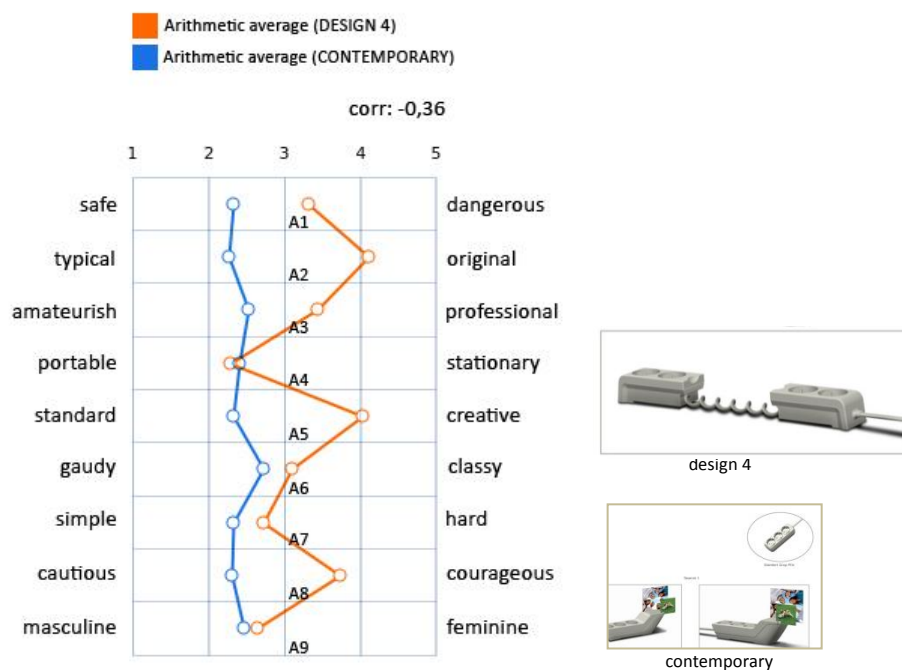


Figure 3.23 : Evaluation of design 4 and contemporary design with SD scale.

As an additional analysis, the results of SD scale are analyzed based on the user experience model of Hassenzahl (2003). The model suggests that intended product character is designed according to designer's perspective; however, the apparent product character is constructed from user perspective. In this study, the same multiple outlet design is evaluated both by its own designer and participant user group. The aim of this two-way evaluation is to analyze the correlations between two perspectives.

Result of the SD scale of users and designer of multiple outlet design 1 is shown on Figure 3.24. The lines for users and designer are inclined to overlap to a significant extend in adjective pairs "typical-original" (A2), "amateurish-professional" (A3),

"portable-stationary" (A4), "gaudy-classy" (A6) and "simple-hard" (A7). However, "safe-dangerous" (A1), "standard-creative" (A5), "cautious-courageous" (A8), "masculine-feminine" (A9) pairs shows a weak association between the designers and users. Correlation coefficient for design 1's variables is calculated to be 0.85, which is a significant value meaning perceptions of consumers and designers are positively and highly associated.

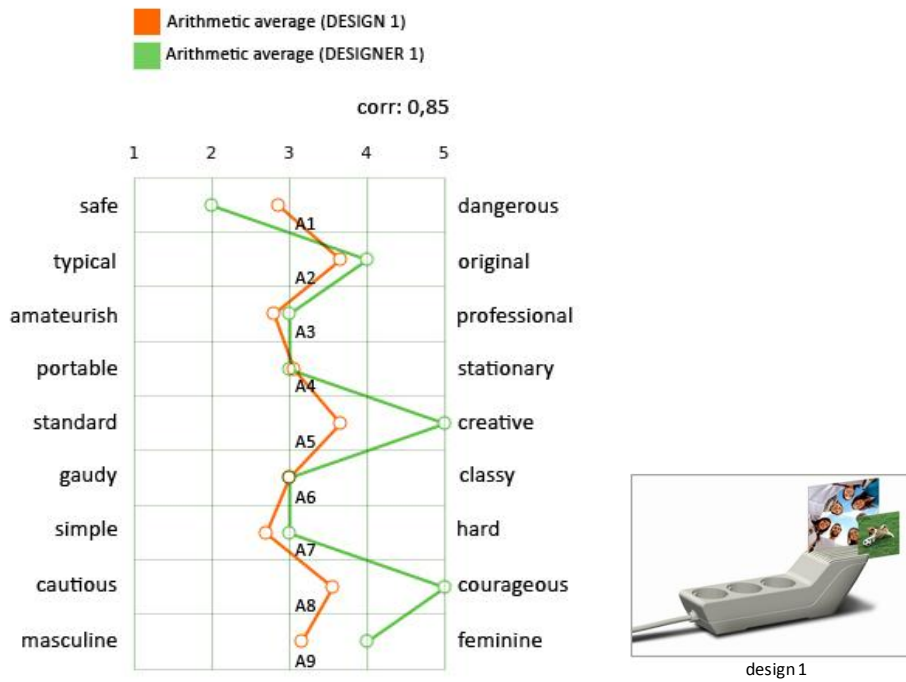


Figure 3.24 : Evaluation of design 1 with SD scale.

Figure 3.25 demonstrates evaluation of design 2. For design 2, correlation coefficient of data is 0,23. This value indicates a weaker association between users and designer 2's perception. This can easily be observed from figure that; although "safe-dangerous" (A1), "typical-original" (A2), "standard-creative" (A5), "cautious-courageous" (A8), "masculine-feminine" (A9) show closer inclinations, "amateurish-professional"(A3), "portable-stationary" (A4), "gaudy-classy" (A6) and "simple-hard" (A7) couples are split up to opposite poles. Among all, "portable-stationary" couple indicates opposite directions strictly. Stimulation anchors, (A2, A5, and A8) have a similar tendency for both evaluations; on the other hand, manipulation and identifications considerations are not defined consistently with adjectives used.

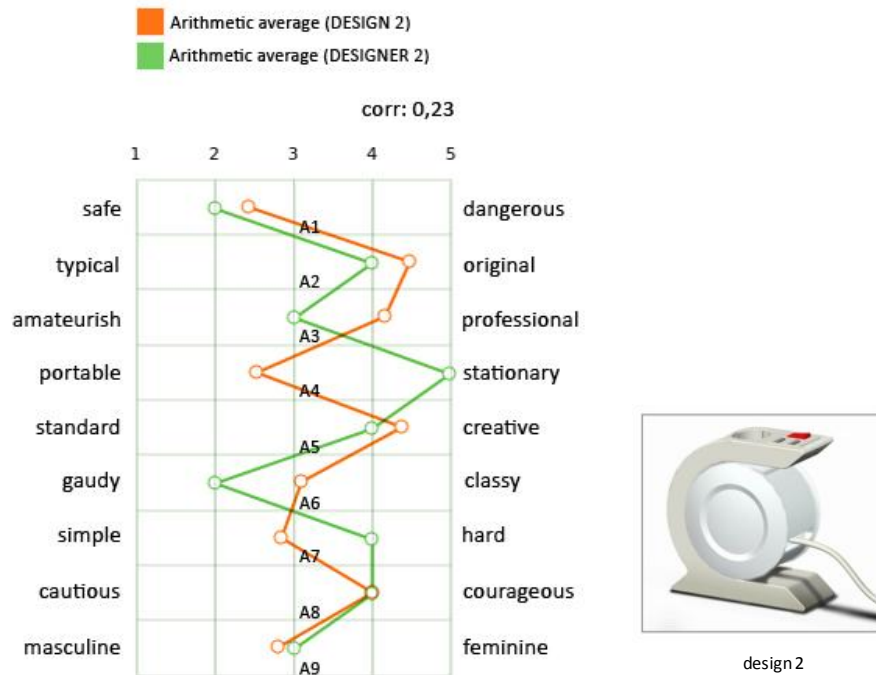


Figure 3.25 : Evaluation of design 2 with SD scale.

Figure 3.26 represents evaluation of design 3. Correlation coefficient of the evaluation data is 0,93. It can also be recognized that designer and user perspectives are highly associated with parallel evaluations. Except from the couples A2 and A6, perception ratings of couples are nearly same.

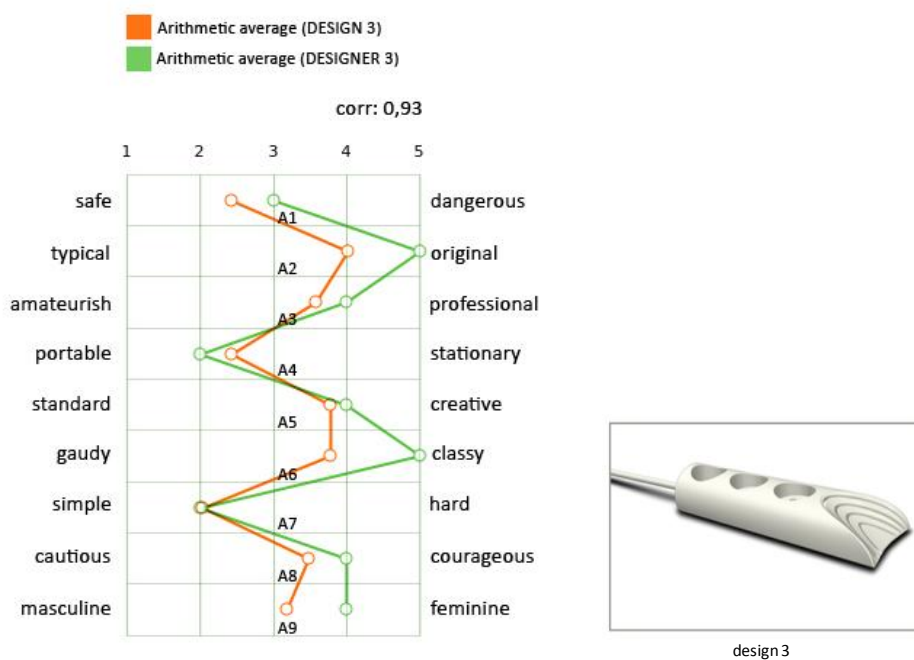


Figure 3.26 : Evaluation of design 3 with SD scale.

Figure 3.27 displays the evaluation of design 4. Design 4 is one of the most associated designs when evaluation of users and designer of the multiple outlet is considered. Correlation coefficient of evaluation is calculated as 0,89; showing a positive and highly correlation between users' and designer's perception. Manipulation, stimulation, and identification attributes of product is considered consistent between users and designer.

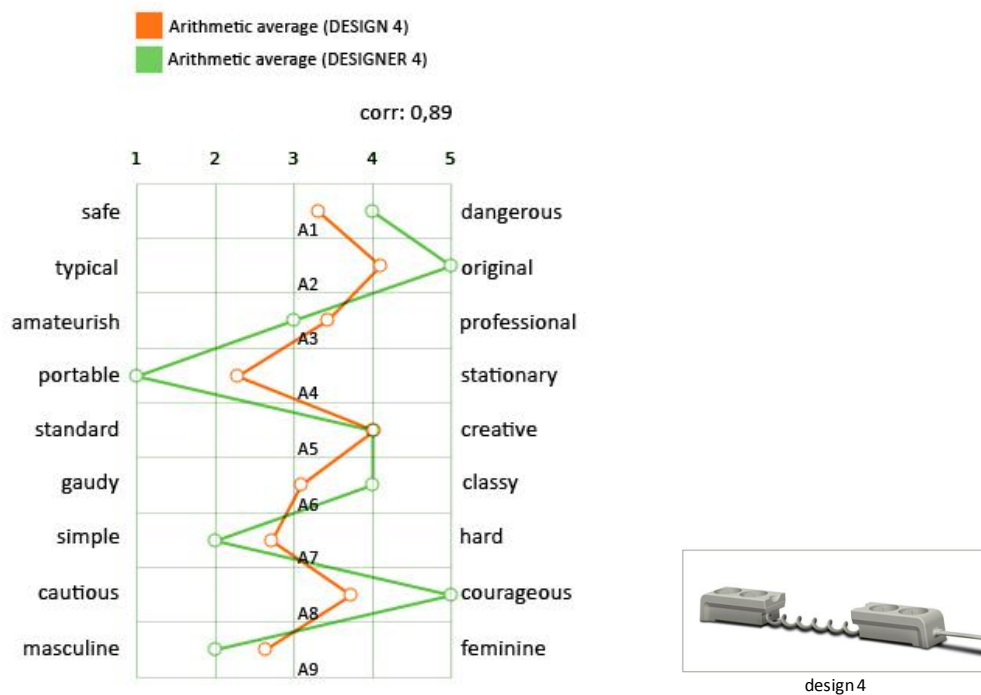


Figure 3.27 : Evaluation of design 4 with SD scale.

4. CONCLUSIONS AND RECOMMENDATIONS

This chapter is a review of the answers to research questions of study from three empirical studies and makes a conclusion with the analysis of three. A brief discussion about further research is also included.

4.1 Concluding Remarks

UX is correlated with a broad range of different concepts like emotional, affective, experiential, hedonic, and aesthetic variables (Law, Roto and Hassenzahl, 2009). This variety leads various approaches to define the UX and its elements.

Multiple outlets were observed as a product group that people use in almost every place every day; on kitchen counter, under office desk, on nightstands next to bed, etc. Nonetheless, users tend to forget if they are using a multiple outlet or not until it is broken and not working, or until the furniture is replaced and it is revealed behind that drawer. These observations made a UX research unavoidable.

Throughout the whole process, user was in the middle of the study. Raw UX data is collected from users, processed by designers as a basis and solutions were shared by users again to evaluate the results in the form of products.

First phase of empirical study was held in a questionnaire format to get information about UX. Time limitation and availability of users that will participate were the main constraints behind this study. An online questionnaire was conducted instead of face to face interviews with users to get a great amount of qualitative data in a short time. Users are asked to think about their bad and pleasant experiences about the multiple outlet they use. This two opposed experiences made users to think in a broad perspective. The experiences were explored by what and how questions, and qualitative information are gathered. The experiences were grouped as “safety”, “product feature” and “physical environment”. This categorization is based on a conclusion of a literature review and personal observations. The researcher’s

assumptions were presented to the participants by asking about types of concerns while using a multiple outlet. The most important concerns of users were safety, product feature, and physical environment, as being identical to the assumptions.

As Hassenzahl contributed to literature, designer defines some features for a product to constitute a product character. In the second phase of this study, designers are given a set of data from preliminary questionnaire in a workshop setting and scenarios are designed with the help of given data, whose source is user. By this method, a variety of intended product characters having pragmatic and hedonic attributes are constructed by designers considering UXs and users' mentions. Contributions of designers' own experiences and discussion about raw questionnaire data is the most productive and creative part of this study. Designers developed ideas by quick sketching and 4 of them were selected out of many alternatives. The selection is made considering their solution areas responding the most experienced concerns; safety, product feature, and physical environment. 3D CAD models are prepared thinking about usage scenarios, production methods and available technologies. Realistic renderings are presented to users to evaluate them by SD scale.

In the third phase, evaluation of products is completed by SD scale. The method of SD scale was an appropriate technique for evaluations, since design process were at its concept development stage with some product ideas represented in rendered visuals in a 3D CAD tool. The users are prompted to think between two opposite concepts, by visuals, such as safe-dangerous, typical-original and amateurish-professional, which are derived from literature review and experiences of users from preliminary questionnaire. Each experience of users translated into adjectives corresponding Hassenzahl's (2003) product attribute definitions to frame UX in multiple outlet.

The SD scale results were interpreted in two ways. First, users' perceptions about new 4 designs and a contemporary multiple outlet design from daily life. Second, evaluations of users and designers on the same new product were compared to see designer and user perspective. Two of these analyses on 4 new designs and contemporary design brought a medium to compare from different angles. When results of SD scale are reviewed, some remarkable conclusions are noteworthy.

Firstly, perception of manipulation attributes of new designs and contemporary design are mostly parallel. Bipolar adjectives defining functionality, supportiveness, usability was evaluated almost equally. Because multiple outlet is thought to be an ACT object with its functionality and directly related with user's goals, any multiple outlet design is thought to fulfil same objectives in any case. This can also be exemplified with a "hammer"; its function is to apply force to a nail no matter how its design is.

Secondly, stimulation attributes of each design were considered as more original, more creative and more courageous. Participants of workshop were all industrial designers; they were practically part of a creative process, so that solutions of design problems were novel. Users were not told what and how new multiple outlets work or function. The most important contribution of designers in this study is to reflect innovative points to users in an understandable concept without any direction.

Lastly, identification attributes of new designs were also trended to be different than contemporary design. There was a consensus that new designs were more professional, classy, and feminine. It can be said that novel products are recognized as professional and classy because of their noble images. Therefore, novelty is perceived as an attribution that uplifts identification.

The analysis of users' and designers' evaluation was also completed to understand the product characters build from both perspectives. Users and designers mostly followed a parallel pattern in almost all designs, apart from Design 2. Designer made out a scenario about a multiple outlet with some winding mechanism that coils cable on. The product was specialised for a stable home usage. However, users' scenario was built with a professional multiple outlet which is portable. This made a remarkable conflict between designer and user.

Empirical study is constructed to represent a product design process; although it is a long and detailed way to achieve a successful product. The biggest constraints behind this study were time limitation and availability of participants. Hence, the empirical construction was restricted to concept ideation phase, not the whole product design process. If UX of multiple outlets were explored with a final product as a result of a whole design process, the conclusion would be more detailed, concrete, and rich.

Briefly, this study's basic contribution is combining different views and evaluations of users to define their experiences; and application of a multiple outlet design process with a user-centred approach. Designers are added to the study to contribute for improvement of UX. Therefore, this study created a medium to allow users mention about their experiences and designers to advance the experiences.

4.2 Further Research

Throughout the three phases of the thesis, several research areas and questions were aroused. These should be considered for the future studies.

Firstly, the users' evaluation about their experiences with a newly developed multiple outlet would be more concrete if they had an opportunity to evaluate design ideas through some 3D mock-up models or prototypes. In this thesis, design ideas were restricted to concept development phase with 2D rendered visuals.

Secondly, the age and social status of users could be a distinctive factor while constructing experiences. This information of users would be more deeply investigated for further research studies.

Lastly, this study is completed on multiple outlets, as a forgotten product. The study could be an example for any kind of product from our daily life that is neglected in somewhere.

REFERENCES

- Alben, L.** (1996). Quality of Experience. *Interactions* (3 (3), 12-15).
- Bevan, N.** (2009). What is the difference between the purpose of usability and user experience evaluation methods. In *Proceedings of the Workshop UXEM* (Vol. 9).
- Bloch, B., H.** (1995). Seeking the Ideal Form: Product Design and Consumer Response. *Journal of Marketing* (Vol. 59, July 1995).
- Bradley, M. M. & Lang, P. J.** (1994). Measuring Emotion: The Self-Assessment Manikin and The Semantic Differential. *Journal of Behaviour Therapy & Experimental Psychiatry*. (Vol.25, No.1, 49-59, 1994)
- Bryman, A.** (2012). *Social research methods*. Oxford university press.
- Demirbilek, O., & Sener, B.** (2003). Product design, semantics and emotional response. *Ergonomics*, 46(13-14), 1346-1360.
- Desmet, P. M. A., & Hekkert, P.** (2007) Framework of Product Experience. *International Journal of Design* (1(1), 57-66).
- Forlizzi, J., & Battarbee, K.** (2004). Understanding Experience in Interactive Systems, In *Proceedings of the 2004 conference on Designing Interactive Systems*.
- Forlizzi, J., Mutlu, B., & DiSalvo, C.** (2004). A Study of How Products Contribute to the Emotional Aspects of Human Experience.
- Maslow, A. H.** (1943). A Theory of Human Motivation. *Psychological Review* (Vol 50(4), Jul 1943, 370-396).
- Mutlu, B., & Forlizzi, J.** (2004). The Chaotic Nature of Human Experience: Insights on the Subject Matter of Design towards Establishing a Science of Design. *A Thesis Essay Submitted in Candidacy for the Degree of Master of Design in Interaction Design, School of Design, Carnegie Mellon University*.
- Friedman, K.** (2003). Theory Construction in Design Research: criteria: approaches, and methods. *Design Studies* (Vol.24, No. 6, November 2003).
- Hassenzahl, M.** (2001). The Effect of Perceived Hedonic Quality on Product Appealingness. *International Journal of Human-Computer Interaction* (13(4), 481-499).
- Hassenzahl, M.** (2003). The Thing And I: Understanding the Relationship Between User and Product. *Funology: from usability to enjoyment* (pp. 31-42), M. A. Blythe, A. F. Monk, K. Overbeeke, & P. C. Wright (Eds.)

- Hassenzahl, M.** (2004). The Interplay of Beauty, Goodness, and Usability in Interactive Products. *Human-Computer Interaction* (Vol.19, 319-349).
- Hassenzahl, M., & Tractinsky, N.** (2006). User experience – a research agenda. *Behaviour & Information Technology* (Vol.25, No.2, p91-97).
- Hennink, M., Hutter, I., & Bailey, A.** (2010). *Qualitative research methods*. Sage.
- Hsu, S. H., Chuang, M. C., & Chang, C. C.** (2000). A semantic differential study of designers' and users' product form perception. *International Journal of Industrial Ergonomics*, 25(4), 375-391.
- Korber, M., Eichinger, A., Bengler, K., & Olaverri-Monreal, C.** (2013). User experience evaluation in an automotive context. In *Intelligent Vehicles Symposium (IV), 2013 IEEE* (pp. 13-18). IEEE.
- Krippendorff, K.** (1989). On the Essential Context of Artifacts or On the Proposition that "Design is Making Sense (of Things)". *Design Issues* (Vol.5, No. 2, Spring 1989).
- Krippendorff, K., & Butter, R.** (1984). Product semantics: Exploring the symbolic qualities of form. *Innovation*, 3(2), 4.
- Law, E. L.C & the VUUM Program Committee** (2008). Preface, in *VUUM 2008 Proceedings of the International Workshop on Meaningful Measures: Valid Useful User Experience Measurement (VUUM)*, (3-7).
- Law, E. L.C., Roto, V., Hassenzahl, M., Vermeeren, A., & Kort, J.** (2009). Understanding, Scoping and Defining User Experience: A Survey Approach, in *CHI'09 Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (719-728).
- Mondragón, S., Company, P., & Vergara, M.** (2005). Semantic differential applied to the evaluation of machine tool design. *International Journal of Industrial Ergonomics*, 35(11), 1021-1029.
- Obrist, M., Roto, V., & Väänänen-Vainio-Mattila, K.** (2009). User experience evaluation: do you know which method to use?. In *CHI'09 Extended Abstracts on Human Factors in Computing Systems* (pp. 2763-2766). ACM.
- Osgood, C. E., Suci, G. J., & Tannenbaum, P. H.** (1957). The Measurement of Meaning. *University of Illinois Press*.
- Rajeshkumar, S., Omar, R., & Mahmud, M.** (2013). Taxonomies of User Experience (UX) evaluation methods. In *Research and Innovation in Information Systems (ICRIIS), 2013 International Conference on* (pp. 533-538). IEEE.
- Roto, V., Law, E., Vermeeren, A. P. O. S., & Hoonhout, J.** (2011). User experience white paper. *Bringing clarity to the concept of user experience*.
- Rowley, J.** (2014). Designing and using research questionnaires. *Management Research Review*, 37(3), 308-330.
- Sas, C., & Dix, A.** (2009). Designing for reflection on experience. In *CHI'09 Extended Abstracts on Human Factors in Computing Systems* (pp. 4741-4744). ACM.

- Wright, P., McCarthy, J., & Meekison, L.** (2003). Making Sense of Experience. *Funology: from usability to enjoyment* (pp. 43-54), M. A. Blythe, A. F. Monk, K. Overbeeke, & P. C. Wright (Eds.)
- Vastenburg, M. H., Romero Herrera, N., Van Bel, D., & Desmet, P. M. A.** (2011). PMRI: Development of a Pictorial Mood Reporting Instrument, in *Proceedings of the 2011 Annual Conference Extended Abstracts on Human Factors in Computing Systems*.
- Väänänen-Vainio-Mattila, K., Roto, V., & Hassenzahl, M.** (2008). Now let's do it in practice: user experience evaluation methods in product development. In *CHI'08 extended abstracts on Human factors in computing systems* (pp. 3961-3964). ACM.
- Verhagen, t., Van den Hoof, B., & Meents, S.** (2015). Toward a Better Use of the Semantic Differential in IS Research: An Integrated Framework of Suggested Action. *Journal of the Association for Information Systems* (Vol.16: Iss.2, Article 1)
- Vermeeren, A. P., Law, E. L. C., Roto, V., Obrist, M., Hoonhout, J., & Väänänen-Vainio-Mattila, K.** (2010). User experience evaluation methods: current state and development needs. In *Proceedings of the 6th Nordic Conference on Human-Computer Interaction: Extending Boundaries* (pp. 521-530). ACM.
- Zimmerman, J., Forlizzi, J., & Koskinen, I.** (2009). Building a unified framework for the practice of experience design. In *CHI'09 Extended Abstracts on Human Factors in Computing Systems* (pp. 4803-4806). ACM.
- Url-1** < <http://www.semanticdifferential.com/index.html>>, date retrieved 25.04.2015.
- Url-2** < <http://www.merriam-webster.com/>>, date retrieved 20.04.2015.
- Url-3** < <http://www.allaboutux.org/>>, date retrieved 04.06.2015.
- Url-4** < <http://www.allaboutux.org/semi-structured-experience-interview>>, date retrieved 04.06.2015
- Url-5** < <http://www.allaboutux.org/concept-methods>>, date retrieved 04.06.2015

APPENDICES

APPENDIX A: Preliminary Questionnaire

APPENDIX B: Records of Preliminary Questionnaire

APPENDIX C: Workshop Posters

APPENDIX D: Semantic Differential Scale Questionnaire

APPENDIX A: Preliminary Questionnaire

Page 1 of Online Questionnaire

Resume participation »

Çoklu Kablolu Priz Kullanıcı Anketi 0 %

Merhaba,

Bu anket çalışması İstanbul Teknik Üniversitesi Endüstri Ürünleri Tasarımı Bölümünde devam etmekte olan bir Yüksek Lisans Tezi araştırması için veri oluşturmak amacıyla hazırlanmıştır.

Ankette "çoklu kablolu priz", "uzatma kablosu", "uzatmalı priz" isimleriyle anılan grup priz deneyimleriniz ile ilgili sorular bulunmaktadır. Sorular için doğru ya da yanlış cevap yoktur, sadece sizin çoklu kablolu grup priz ile ilgili deneyimlerinizi gözlemleyebilmek için cevaplarınıza ihtiyaç vardır. Verdiğiniz cevaplar gizli tutularak sadece araştırma verisi olarak kullanılacaktır. Dilerseniz e-posta adresinizi bırakarak araştırma sonucu ile ilgili bilgi alabilirsiniz.

Şimdiden teşekkürler..



Page 2 of Online Questionnaire

Resume participation »

Çoklu Kablolu Priz Kullanıcı Anketi 13 %

Sizinle ilgili.. *

Yaşınız..

Cinsiyetiniz..

Eğitiminiz..

Mesleğiniz..



Page 3 of Online Questionnaire

Resume participation »

Çoklu Kablolu Priz Kullanıcı Anketi 25 %

Çoklu kablolu prize ne sıklıkla kullanıyorsunuz?

☐ Nadiren (Ayda 1-2 kez)

☐ Sık sık (Ayda 4-6 kez)

☐ Çoğunlukla (Ayda 7-10 kez)

☐ Hergün



Page 4 of Online Questionnaire

Resume participation -

Çoklu Kablolu Priz Kullanıcı Anketi38 %

Çoklu kablolu priz kullanırken genel endişeleriniz neler?

☐ Ürünün görünüşü (Biçim, doku, renk vs)

☐ Kullanım ortamı problemleri (Erişim kolaylığı/zorluğu vs)

☐ Güvenlik (Elektrikli aletlerle etkileşim vs)

☐ Teknik problemler (Fişin çıkarılamaması vs)

☐ Diğer

Page 5 of Online Questionnaire

Resume participation -

Çoklu Kablolu Priz Kullanıcı Anketi50 %

Çoklu kablolu priz ile ilgili KÖTÜ bir deneyiminizi anımsayarak...

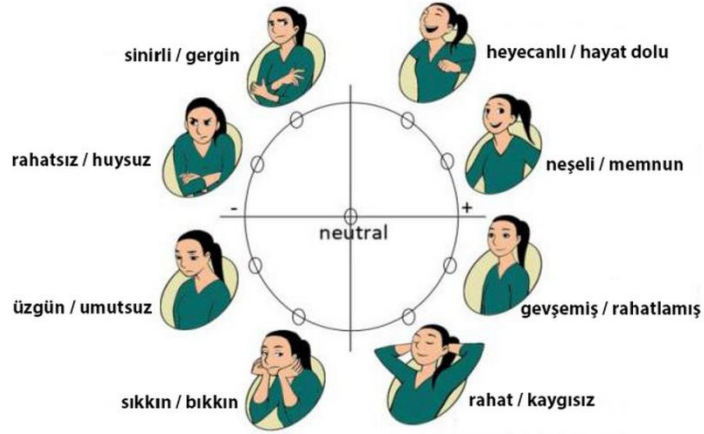
Kullandığınız çoklu kablolu prizın özelliklerini anlatınız.
(3'lü, 4'lü, 5'li, 3 metre/5 metre kablolu, on/off düğmeli, siyah/beyaz vs)

Bu KÖTÜ deneyimde ne yaşadınız, ne oldu?

Kullanım ortamı nasıldı? (Evde televizyon yanı/arkası, ofiste masa altı/yanı/üstü vs)

Bu KÖTÜ deneyimdeki genel endişeleriniz/düşünceleriniz nelerdi?

Nasıl hissettiniz?



Nasıl hissettiniz?

Yukarıdaki şekilde gösterilen duygulardan faydalanabilir, yenilerini ekleyebilirsiniz.



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Resume participation »

Çoklu Kablolü Priz Kullanıcı Anketi

63 %

Çoklu kablolu priz ile ilgili OLUMLU bir deneyiminizi anımsayarak...

Kullandığınız çoklu kablolu prize özelliklerini anlatınız.
(3'lü, 4'lü, 5'li, 3 metre/5 metre kablolu, on/off düğmeli, siyah/beyaz vs)

Bu OLUMLU deneyimde ne yaşadınız, ne oldu?

Kullanım ortamı nasıldı? (Evde televizyon yanı/arkası, ofiste masa altı/yanı/üstü vs)

Bu OLURLU deneyimdeki genel endişeleriniz/düşünceleriniz nelerdi?

Nasıl hissettiniz?



Nasıl hissettiniz?

Yukarıdaki şekilde gösterilen duygulardan faydalanabilir, yenilerini ekleyebilirsiniz.



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Resume participation -

Çoklu Kablolu Priz Kullanıcı Anketi

75 %

Çoklu kablolu prizi kullanırken deneyimi geliştirmek için önerileriniz neler?



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Resume participation -

Çoklu Kablolı Priz Kullanıcı Anketi

88 %

Anket burada tamamlandı.
İlginiz ve hassasiyetiniz için teşekkürler..

İletişim bilgileriniz.. (isteğe bağlı)

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Thank you very much for your participation!

APPENDIX B: Records of Preliminary Questionnaire

Table B.1 : List of bad experiences.

KÖTÜ DENEYİM/BAD EXPERIENCES		
GÜVENLİK/SAFETY	ÜRÜN/PRODUCT FEATURE	KULLANIM ALANI/ PHYSICAL ENVIRONMENT
Çamaşır makinesi ve kurutma makinesini aynı anda çalıştırdığımda gücü yetmedi, ısındı, kıvılcım çıktı, sigorta attı ve makineler kapandı.	Tv, telefon ve modemin bağlı olduğu kablolu prize, bilgisayarı bağlamak istedim. Youtube üzerinden açacağım bir filmi televizyonda kalabalık bir grup izlemek istiyorduk. Topraklı prizler yüzünden yeterli slot olmasına rağmen, bilgisayara ait enerji kaynağını prize takamıyordum. Bütün prizleri çıkarıp yer değiştirmelerle yapabiliyordum sandığımda da, son taktığım priz on/off düğmesine basar şekilde yerleşiyordu. (sıklıkla karşılaştığım bir sorun)	Ara sıra takılıp düşme tehlikesi geçirmem veya ortalığı dağıtmam dışında kötü bir deneyimim yok.
When i used the washing and drying machine at the same moment, it didn't last, got heated, spark came, fuse gone off and the machines were shut down.	I wanted to plug in the computer to a multiple outlet with tv, phone and modem connected. We wanted to watch a movie from youtube. There were available slots to plug in, but i couldn't plug in the computer adapter. I thought that i could manage it by changing the plugs, but at the end the last adapter was pressing the on/off button. (I live it so often)	I sometimes hook up and fall down. No more bad experiences.
Ona bağlı tüm elektrikli estalar yandı	Prize takılı olan ürünlerin zor çıkması sonucu fişin yüzüme çarpması	Kullanım esnasında kablounun çok dolaşp karışması
All the electrical equipments plugged in was broken.	the plug smashed on my face because it was hard to take off	The cable gots really messed up while using.
Kısa devre	Uzatma fişini duvara monteli prizden çıkarmak isterken komple duvara monteli prizi duvardan çıkarmama rağmen uzatmanın fişinin prizden çıkmaması.	Kablo karmaşası
short circuit	The socket mounted on the wall disassembled while I was trying to take the plug of multiple off.	Cable mass
Elektrik çarptı	Adaptörü çok zor çıkarıyorum	Tv, uydu, vs lerin kabloları kablolu prizinkiyle karışınca iyice kalabalık oluyor.
electric shock	I can hardly take the adapter off	When tv, satellite etc cables comes together, it makes a great mass.
Koku oldu kablo yandı		Elektrikli süpürgeyi taktığımda her yere ulaşabilmem güzel, ama sağa sola takılıyor, rahatsız ediyor.
A bad smell came, cables got burned.		It is nice to reach anywhere when I plug in the vacuum cleaner, but it tackles to somewhere, irritating.
Çoklu prizden çıkan kıvılcım halıyı yaktı, yangın tehlikesi oluştu		Sürekli kablolar toplanıp sarıldığı için kablolarda kırılma oluyor.; kablolar burkuluyor ve açılmaz hale geliyor.
the spark came out of the multiple outlet, danger off fire		Cables are always tide up and released so that come cracks are made in the cables, and they got tangled
Fişi çıkarırken bazen kıvılcım çakması		
Sparks come out when plugging off.		
Arc yaptığı için çoklu priz yandı.		
Multiple outlet is burned because of the spark.		
Bağlı olan elektrikli aletlerin hepsi bozuldu		
All the electrical equipments plugged in was broken.		

Table B.2 : List of concerns for bad experiences.

ENDİŞELER-DÜŞÜNCELER (KÖTÜ DENEYİM)/CONCERNS-THOUGHTS (BAD EXPERIENCE)		
GÜVENLİK/SAFETY	ÜRÜN/PRODUCT FEATURE	KULLANIM ALANI/ PHYSICAL ENVIRONMENT
Yangın çıkacak mı?	Prizler birbirine çok yakın. 3 lü priz kullanıyorum ancak hiçbir zaman 3 ünü birden kullanmıyorum. Kullanımı zor. Çıkarırken zorluk çekiyorum.	Görüntü kirliliği de oluyor. Tavsiyem kapaklı vs. Olabilir.
Fire hazards?	The outlets are so close to each other. I use a triple outlet but I cannot use all of them at a time. Hard to use. Plugging off is hard.	Visual pollution. I advice a cover etc.
Carpami diye korktum	Kullanılan ürünlerin rahat takılamaması	Görüntü kirliliği
I got fear of shock.	products cannot be plugged in easily	Visual pollution
Kabloya bağlı elektrikli aletlere zarar verip vermediği, panik ışığın alev döndüğü yangına sebebiyet vermesi	Fişten çıkarmak için bayağı zorlanıyorum	Tv izlerken gözüme takılıyor sinir oluyorum
If it is harmful for the electrical devices plugged in or not, if the spark makes a fire or not.	It is hard to plug off.	It draws my eye while watching TV, got irritated.
Güvenli olamaması		Mobilyaları, parkeyi çiziyor mu diye düşündüm. I thought what if it scratches the floorings and furniture.
Not secure		
Arc oluşma sonucu elektrik çarpması ve kullanılan ürünlerin rahat takılamaması		
electric shock because of the sparks and plugging in the devices hard.		
Çarpılmak		
electric shock		
Evde bulunulmadığı zamanlarda böyle bir sorun (Kıvılcım çıkması) çok büyük hasarlar verebilir		
(Sparks) can be harmful when nobody is at home.		
Ev yanar diye korktum.		
I was afraid of a possible fire at home .		
Elektrikten çok anlamayan biri olarak bana elektrik çarpması olabilir yada elektrik tesisatına sorun yaratır endişesi var bende.		
I don't understand electricity, so I have concerns about electric shock and to make some problems with the wiring		
Elektrik çarpmasından ve sestən korktum.		
I got afraid of the electric shock and the sparking sound		
Cihazların bozulması rahatsız etti		
I was irritated because of the broken devices.		
İnsana, elektrikli aletlere veya eve zarar vermesi, yangın tehlikesi		
Harm to human, electrical devices or home, fire hazard.		
Kısa devre olması yangın tutuş ma ihtimali		
short circuit, fire possibility		
Yangın çıkabilirdi		
a fire could happen		

Table B.3 : List of pleasant experiences.

OLUMLU DENEYİM/PLEASANT EXPERIENCES		
GÜVENLİK/SAFETY	ÜRÜN/PRODUCT FEATURE	KULLANIM ALANI/ PHYSICAL ENVIRONMENT
	Sadece çoklu priz olduğu için olumlu etkisi var, ekstra bir olumluluk yaşamadım	Bilgisayar ve tarayıcının bağlı olduğu bu prize, sonrada aldığım speaker fişini takmak istedim, masanın arkasından sarkıttığım fişi, yerden ayağımın hizasından kolaylıkla prize takabildim.. Anahtara yakın olan, ince slota takmam (evdeki kötü deneyimlerden sonra) çok kolay oldu.
	<i>pleasant because it is multiple, no more.</i>	<i>let the cable behind the table and plugged in near my foot on the floor easily. I used the slimmer slot near the switch, it was easy (after the bad experience at home)</i>
	Evimde odamda 3'ü prizini var ve gece lambası bilgisayar sürekli bunlara takılı; dolayısıyla hayat kurtarıyor	Evi süpürürken her odada priz aramam gerekmiyor.
	<i>and night lamp and the computer are always</i>	<i>I don't need to look for a socket in every room while cleaning.</i>
	hazır durumda	İhtiyaç duyduğum materyalleri rahatlıkla kullanabildim.
	<i>Many are ready with minimum cable</i>	<i>I could use the materials needed easily.</i>
	Uzunluğu işime yaradı	ERİŞİM RAHATLIĞI
	<i>The length was working</i>	<i>Ease of access</i>
	sağladı	Ortadan kaldırıp duvarı deldirerek 6 lı priz yaptırdım.
	<i>long cable was advantageous while cleaning</i>	<i>I put a 6 gang outlet on the wall and get rid of multiple outlet.</i>
	Olumlu deneyim olarak kullanım kolaylığı ve prize ulaşım kolaylığı olarak uygundu.	Bir çok kişinin aynı anda kullanımdan istifade edebildi.
	<i>Ease of use and ease of reaching the outlet.</i>	<i>Many people used at the same time.</i>
	Bütün pc fişlerini kullanıyor olmak diyebilirim	
	<i>To use all the pc plugs</i>	
	Açma-kapama düğmesiyle tüm elektrikli aletleri kapatabilme avantajı	
	<i>Turn on/off all the electrical devices with the switch</i>	
	Farklı fişlerin girebileceği farklı boyutlarda prizler vardı. Bir kısmı ince dar olanlardan bir kısmı adaptör olanlardan. Fişleri rahat	
	<i>There were outlets for different kind of plugs, some were thinner and some were adapter type. It was</i>	
	Olumsuz deneyimimden sonra takılı olan cihazları koruyacak tipte kablolu prizler olduğunu öğrendim. Onlardan kullanmaya	
	<i>I learned that there are kinds of multiple outlets that protects the devices. I started to use one, I am</i>	
	BİRDEN FAZLA ALET KULLANABİLMEK İYİ	
	<i>Good to use more than one device</i>	
	Bir kaç elektrikli alete güç veriyor olması	
	<i>gives power to some electrical device</i>	
	kesabiliyorum	
	<i>I can easily turn the energy off not plugging off.</i>	
	Birçok elektrikli aleti prize taktığımda prizin çektiği akımı kaldırabilmesi beni memnun etti	
	<i>It made me pleased when I plugged in many electrical devices and it worked with that currents.</i>	
	Yeni bir ofise taşınmistik , ve masayı yerleştirdiğimiz yerde priz yoktu, ama bizim bir dolu çoklu kablolu prizimiz vardı. Hepsini	
	<i>we moved to a new office and there was no outlet near the table, but we had lots of multiple outlets, we joined them all togethr. It was practical :)</i>	

Table B.4 : List of concerns for pleasant experiences.

ENDİŞELER-DÜŞÜNCELER (İYİ DENEYİM)/CONCERNS-THOUGHTS (PLESANT EXPERIENCES)		
GÜVENLİK/SAFETY	ÜRÜN/PRODUCT FEATURE	KULLANIM ALANI/ PHYSICAL ENVIRONMENT
Cihazların bozulmayacak olması <i>Devices won't be broken.</i>	Gereksiz tak çıkar, dene yanıl sürecini yaşamaktan endişe ediyordum. <i>I concern about the unnecessary plug in/out, test/error process.</i>	belirli noktalardan sabitlenecek bir kablo sistemi iyi olurdu.(raptiye yapışkan ve benzeri) <i>It would be good to have cable system with some fixing points (clips or stickers)</i>
Güç tüketimine dayanabilecek mi <i>will it stand to the power consumption</i>	Odadaki cihazların kullanımını çok kollaştırıyor <i>ease of use of devices in the room</i>	Görüntü kirliliğini önlemek için kablolu prize ortadan kaldırıp duvarı deldirerek 6 lı priz yaptırıldım. <i>I put a 6 gang outlet on the wall and get rid of visual pollution.</i>
	Grup prizde bulunan ışık olumlu, kablosuz olması daha uygun olur <i>light is a positive feature, wireless should be useful.</i>	
	Kablo avantajdır <i>cable is advantage.</i>	
	Çoklu olmasının avantajını kullanmak, genel hayatı kolaylaştırıyor. <i>The advantage of multiple, it eases life.</i>	
	Kullanışlı olması <i>useful</i>	
	İş gördüğü için sevindirici tabi <i>pleasing because it works</i>	
	Elektrik sarfiyatını azaltmak için tek tuşla stand-by ları da kapatabilmek çevreci ve faturalara da yansıyor <i>Turning off even the stand-bys with a single button to decrease the use of electricity and it is also seen on the bills.</i>	
	Her fişi birbirini rahatsız etmeden kullanabilmek <i>To use all the plugs not interrupting each other.</i>	
	Birden fazla alet kullanabilmek iyi <i>It is good to use more than one device.</i>	

Table B.5 : List of recommendations to improve experience.

DENEYİMİ GELİŞTİRMELİK İÇİN ÖNERİLER/RECOMMENDATIONS TO IMPROVE EXPERIENCE		
GÜVENLİK/SAFETY	ÜRÜN/PRODUCT FEATURE	KULLANIM ALANI/ PHYSICAL ENVIRONMENT
Yangın çıkarma ihtimali beni hep korkutur, bu yüzden doğal yanmaz malzemeden ürün istiyorum.	On/off düğmesinin yeri üzerine yeniden yorumlamalar yapılabilir, erişimin yine kolay olacağı ve priz boyutunu da büyütmeyle ilgili bir yüzeyle çözülebilir bu sorun.; Uzun kabloların aşın birikmesi ortamda hem hijyen (toz toplama) hem takılma/düşme sorunu yaratıyor. Bu sorunu çözmek için kullanılan zembereklili sistemler var, ancak orda da kablo genelde sıkışıp, sorunu daha da büyütüyor. Plastik parçaları çıkarıp açıp, yeniden sarmanız vs.. Kabloyu toplamak kablo üzerine takılan klipsler vs yardımıyla çözülebilir belki; ; Masa altında kalan uzatma kablolu prizleri için, onu masaya, ayağına ya da yerden yukarıda bir yüzeye takabilmek için basitçe ekstra klipsler eklenebilir. Özellikle ofislerde, ayakta kablolu bastığımız zemine prize koymaktan rahatsız olan kullanıcılar olabiliyor.	On/off button could be interpreted, with an inclined surface that will be easy to reach could be solved. Long cables makes hygiene and falling problems. A spring can be a solution but the cable sticks generally in that way. To open the plastic parts and fix the problem etc. Organizing the cables could be solved with clips on. For the multiple outlets that lie under the table, there may be clips to fix it on the table. Especially in offices, people may get annoyed because of the multiple outlet on the dirty ground.
Fire hazard frightens me, so I want a fireproof material.		
Arc yapmasını engellemek olası patlamalardan uzak tutabilmek. Kısaca güvenliği arttırmak.	kablosuz olursa kullanım kolaylığı olabilir	kullanılan kabloların malzemesi değiştirilerek kırılması, potluk yapması, dönmesi önlenmelidir. böylece takılmalar azaltılabilir
To protect sparking and booms.. Shortly, to increase safety.	It will be easy if it becomes wireless	Material of the cable could be changed to prevent cracks, turns. Then hookings and fallings can be decreased.
Güvenlik sebebiyle neleri taktığınız önemli sanırım, bununla ilgili daha çok bilgi vermeli.	taahhüt vb uzun gidilecek açma kapama tuşlu uzatma kablosunu tercih etmek.; halı altı vb yerlerde kabloların aşınmamasına dikkat etmek.; gergin vaziyette tutarak kullanmamak	
It is important what you plug in because of safety, I think. More information should be given.	If out of home for a while, like holidays, multiple outlets with switch button could be used. take care of the cable staying in places like under the carpet. not to use the cable tight.	
Uzun ömürlü ve dayanıklı olması, çarpmalarda hemen kırılma veya çizilme yaşanmaması; güvenli olması (yangın çıkarmaması ve akım koruma gibi özelliklerinin olması); kabloların otomatik sarılması (Süpürge makinelerinin kablolarını topladığı gibi); Cep Telefonu gibi USB ile şarj edilebilen ürünler gibi her türlü ürün prize bağlanabilir; Dış görünümdeki malzemenin insan eline alındığında yumuşaklık hissi vermesi; tehlike sınırında güç çekmeye başladığında uyarı vermeli.		
Long-lived and durable, not cracked or scratched when crashed, be secure (not to start a fire, extra protection etc), auto coiling up the cable (like the vacuum cleaner), cell phones can be charged via USB, the soft touch feeling of the product, warning when it started to take power near limits.		
	kapak takılabilir	belirli noktalardan sabitlenecek bir kablo sistemi iyi olurdu.(raptiye yapıpkan ve benzeri)
	a cover	It would be good to have cable system with some fixing points (clips or stickers)
	uzun kablo ve kullanılmayan zamanlar için kapak, böylece ortada kötü görüntü oluşturmaz.	Kablo kargasasının çözülmesi şart
	Long cable and cover while not using, no bad scenes then.	Cable mass has to be solved.
	mesela uzatma priz bölümü üzerinde 3 lü yada diğerlerinde şöyle biçe olması iyi olurdu bir düğme yardımıyla hiç fişlere dokunmadan priz fişi kendisi çıkarsa güzel olurdu.	Ev, TV sehpa vs ile görsel uyumunun iyileştirilmesi gerekir.
	A button could take the plug off easily by itself.	It should be more harmonious with home, TV unit etc
	PRİZ ARALARINDA DAHA ÇOK MESAFE OLMASI GEREKİR. GÖRÜNTÜ KİRLİĞİNİ ENGELLEMKE İÇİN KAPAKLI VE DESENİLİ OLABİLİR.	Kullanım yerlerine bağlı olarak mutfak, masa altı vs. herhangi bir sıvı dökülmesine karşı kapaklı bir koruma. Genelde hep endişelendimdir bu konu. Banyolarda kullanılan prizlerin kapakları gibi, kapaklı bir sistem oluşturulabilir.
	There need to more place between the outlets. It could be with a cover or patterned to prevent visual pollution.	For the usage areas like kitchen, underneath the table a cover to prevent liquids. This is a concern for me. The bathroom sockets have covers, some solution alike.
	Daha ergonomik, erişimi kolay, modüler prizler geliştirilebilir.	
	More ergonomic, easy to access, modular sockets.	

APPENDIX C: Workshop Posters

Table C.1 : Safety poster.

GÜVENLİK / SAFETY	
KÖTÜ / BAD	İYİ / PLEASANT
Çıkan kıvılcım halıyı yaktı. Yangın tehlikesi oldu. <i>the spark came out of the multiple outlet, danger of fire</i> Elektrikli eşyalarım yandı, hepsi bozuldu. <i>All the electrical equipments plugged in was broken.</i> Elektrik çarptı. <i>electric shock</i> Koku oldu, kablo yandı. <i>A bad smell came, cables got burned.</i> Çamaşır ve kurutma makinasını aynı anda çalıştırdım. Gücü yetmedi, ısındı, kıvılcım çıktı, sigorta attı, makinalar kapandı. <i>When I used the washing and drying machine at the same moment, it didn't last, got heated, spark came, fuse gone off and the machines were shut down.</i> Fiş çıkarırken bazen kıvılcım çıkıyor. <i>Sparks come out when plugging off.</i> Arc yaptığı için çoklu priz yandı. <i>Multiple outlet is burned because of the spark.</i>	

Table C.2 : Product feature poster.

ÜRÜN / PRODUCT FEATURE	
KÖTÜ / BAD	İYİ / PLEASANT
Tv, telefon ve modemin bağlı olduğu prize bilgisayarı bağlamak istedim. Televizyona bağlayıp Youtube'dan topluca film izleyecektik. Yeterli slot olmasına rağmen, bilgisayar adaptörünü bir türlü prize takamıyordum. Bütün prizleri çıkarıp yer değiştirmelerle yapabilirim sandığımda da son taktığım priz on-off düğmesine basar şekilde oldu. <i>I wanted to plug in the computer to a multiple outlet with TV, phone and modem connected. We wanted to watch a movie from YouTube. There were available slots to plug in, but i couldn't plug in the computer adapter. I thought that I could manage it by changing the plugs, but at the end the last adapter was pressing the on/off button.</i> Prize takılı ürünlerin zor çıkması sonucu fiş yüzüme çarptı. <i>the plug smashed on my face because it was hard to take off</i> Uzatma fişi duvara moteli prizden çıkarmak isterken priz duvardan çıktı, fiş çıkmadı. <i>The socket mounted on the wall disassembled while I was trying to take the plug of multiple off.</i> Adaptörü çok zor çıkarıyorum. <i>I can hardly take the adapter off.</i> Çok tozlanıyor, küçük delikleri olduğu için temizlenmesi zor. <i>It gets dirty very much, it is hard to clean because of the small holes on it</i>	Evimde odamda üçlü prizim var ve gece lambası, bilgisayar sürekli bunlara takılı, dolayısıyla hayat kurtarıyor. <i>I have a triple multiple outlet at home in my room and night lamp and the computer are always plugged in, so it is lifesaving.</i> Farklı fişlerin girebileceği farklı boyutlardavardı. Bir kısmı ince bir kısmı adaptör fişleri rahat takabilmek güzeldi <i>There were outlets for diferent king of plugs, some were thinner and some were adapter type. It was nice to plug in all.</i> Açma kapama düğmesiyle tüm aletleri kapatabilme avantajı var. <i>Turn on/off all the electrical devices with the switch</i> Uzunluğu işime yaradı. <i>The length was working.</i> Taktığım aletleri koruyacak tipte olanlardan kullanıyorum, memnunum. <i>I learned that there are kinds of multiple outlets that protects the devices. I started to use one, I am thankful.</i>

Table C.3 : Physical environment poster.

KULLANIM ORTAMI / PHYSICAL ENVIRONMENT	
KÖTÜ / BAD	İYİ / PLEASANT
Arasıra takılıp düşme tehlikesi geçiriyorum. Birşeyleri deviriyorum. <i>I sometimes hook up and fall down. No more bad experiences.</i> Kullanım esnasında kablo çok dolaşıp takılıyor. <i>The cable gets really messed up while using.</i> Kablo karmaşası (TV+UYDU+VS.) <i>Cable mass</i> Elektrikli süpürgeyi taktığımda her yere ulaşmak güzel ama sağa sola takılıyor, rahatsız ediyor. <i>It is nice to reach anywhere when I plug in the vacuum cleaner, but it tackles to somewhere, irritating.</i> Kablolar sürekli toplanıp sarıldığı için kablolarda kırılma oluyor, kablolar burkuluyor ve açılmaz oluyor. <i>Cables are always tide up and released so that come cracks are made in the cables, and they got tangled</i>	Bilgisayar ve tarayıcının bağlı olduğu prize, yeni aldığım speaker fişini takmak istedim, masanın arkasından sarkıttığım fişi, yerden ayağımın hizasından kolaylıkla prize takabildim. <i>I wanted to plug in the speaker to the multiple outlet with computer and scanner, I let the cable behind the table and plugged in near my foot on the floor easily. I used the slimmer slot near the switch, it was easy.</i> Evi süpürürken her odada priz aramam gerekmiyor. <i>I don't need to look for a socket in every room while cleaning.</i> İhtiyaç duyduğum fişlere kolaylıkla erişebiliyorum. <i>I could use the materials needed easily.</i> Aynı masada birkaç kişi aynı anda kullanabildik. <i>Many people used at the same time.</i>

APPENDIX D: Semantic Differential Scale Questionnaire

Page 1 of Semantic Differential Questionnaire

Resume participation »

Çoklu Kablolu Priz Tasarım Değerlendirme0 %

Merhaba,

Bu anket çalışması İstanbul Teknik Üniversitesi Endüstri Ürünleri Tasarımı Bölümünde devam etmekte olan bir Yüksek Lisans Tezi araştırması için veri oluşturmak amacıyla hazırlanmıştır.

Ankette "çoklu kablolu priz", "uzatma kablosu", "uzatmalı priz" isimleriyle anılan grup priz deneyimleriniz ile ilgili sorular bulunmaktadır. Sorular için doğru ya da yanlış cevap yoktur, sadece sizin çoklu kablolu grup priz ile ilgili deneyimlerinizi gözlemleyebilmek için cevaplarınıza ihtiyaç vardır. Verdiğiniz cevaplar gizli tutularak sadece araştırma verisi olarak kullanılacaktır. Dilerseniz e-posta adresinizi bırakarak araştırma sonucu ile ilgili bilgi alabilirsiniz.

Şimdiden teşekkürler..

Page 2 of Semantic Differential Questionnaire

Resume participation »

Çoklu Kablolu Priz Tasarım Değerlendirme13 %

Sizinle ilgili..

Yaşınız..

Cinsiyetiniz..

Eğitiminiz..

Mesleğiniz..

Page 3 of Semantic Differential Questionnaire

Resume participation »

Çoklu Kablolu Priz Tasarım Değerlendirme25 %

Ankette size gösterilecek çoklu kablolu priz tasarımlarını tablolara göre değerlendirmeniz beklenmektedir. Değerlendirmenizi daha hızlı ve kolay yapabilmeniz için sağ üst köşede standart bir çoklu kablolu priz örneğini bulabilirsiniz.

Gösterilen tasarımlara değerlendirme tablosundaki iki uç kavram arasında bir değer vermeniz beklenmektedir. Örneğin...

pratik	☐	☐	☒	☐	☐	pratik değil	NÖTR anlamına gelir
pratik	☐	☒	☐	☐	☐	pratik değil	KISMEN PRATİK anlamına gelir
pratik	☐	☐	☐	☐	☒	pratik değil	KESİNLİKLE PRATİK DEĞİL anlamına gelir

Page 4 of Semantic Differential Questionnaire

Aşağıda gördüğünüz çoklu kablolu prizi değerlendirme kriterlerine yakınlığına göre değerlendiriniz.



Yukarıda gördüğünüz tasarımın ikili kelime grubundan hangisine ne kadar yakın olduğunu düşünerek ilgili yuvarlağı işaretleyiniz.

güvenli	☐	☐	☐	☐	☐	tehlikeli
sıradan	☐	☐	☐	☐	☐	orijinal
amatör	☐	☐	☐	☐	☐	profesyonel
taşınabilir	☐	☐	☐	☐	☐	sabit
alışılmış	☐	☐	☐	☐	☐	yaratıcı
şatafatlı	☐	☐	☐	☐	☐	zarif
kolay	☐	☐	☐	☐	☐	zor
temkinli	☐	☐	☐	☐	☐	cesur
erkeksi	☐	☐	☐	☐	☐	kadınsı



Çoklu Kablolu Priz Tasarım Değerlendirme

38 %

Aşağıda gördüğünüz çoklu kablolu prizi değerlendirme kriterlerine yakınlığına göre değerlendiriniz. Sağ üst köşedeki standart çoklu kablolu priz tasarımı ile karşılaştırabilirsiniz..



Standart Grup Priz

Tasarım 1



Yukarıda gördüğünüz tasarımının ikili kelime grubundan hangisine ne kadar yakın olduğunu düşünerek ilgili yuvarlağı işaretleyiniz.

güvenli	☐	☐	☐	☐	☐	tehlikeli
sıradan	☐	☐	☐	☐	☐	orijinal
amatör	☐	☐	☐	☐	☐	profesyonel
taşınabilir	☐	☐	☐	☐	☐	sabit
alışılmış	☐	☐	☐	☐	☐	yaratıcı
şatafatlı	☐	☐	☐	☐	☐	zarif
kolay	☐	☐	☐	☐	☐	zor
temkinli	☐	☐	☐	☐	☐	cesur
erkeksi	☐	☐	☐	☐	☐	kadınsı



Resume participation »

Çoklu Kablolu Priz Tasarım Değerlendirme
50 %

Aşağıda gördüğünüz çoklu kablolu prizi değerlendirme kriterlerine yakınlığına göre değerlendiriniz. Sağ üst köşedeki standart çoklu kablolu priz tasarımı ile karşılaştırabilirsiniz..



Tasarım 1



Standart Grup Priz



Tasarım 3



Tasarım 2

Yukarıda gördüğünüz tasarımının ikili kelime grubundan hangisine ne kadar yakın olduğunu düşünerek ilgili yuvarlağı işaretleyiz.

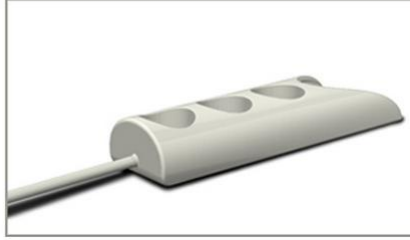
güvenli	☐	☐	☐	☐	☐	tehlikeli
sıradan	☐	☐	☐	☐	☐	orijinal
amatör	☐	☐	☐	☐	☐	profesyonel
taşınabilir	☐	☐	☐	☐	☐	sabit
alışılmış	☐	☐	☐	☐	☐	yaratıcı
şatafatlı	☐	☐	☐	☐	☐	zarif
kolay	☐	☐	☐	☐	☐	zor
temkinli	☐	☐	☐	☐	☐	cesur
erkeksi	☐	☐	☐	☐	☐	kadınsı

◀ ▶

Çoklu Kablolu Priz Tasarım Değerlendirme

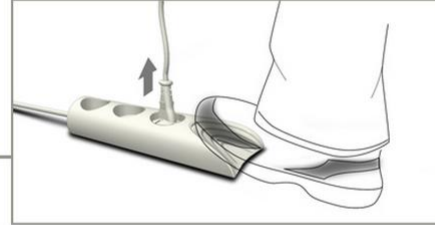
63 %

Aşağıda gördüğünüz çoklu kablolu prizi değerlendirme kriterlerine yakınlığına göre değerlendiriniz. Sağ üst köşedeki standart çoklu kablolu priz tasarımı ile karşılaştırabilirsiniz..



Standart Grup Priz

Tasarım 3



Yukarıda gördüğünüz tasarımının ikili kelime grubundan hangisine ne kadar yakın olduğunu düşünerek ilgili yuvarlağı işaretleyiz.

güvenli	☐	☐	☐	☐	☐	tehlikeli
sıradan	☐	☐	☐	☐	☐	orijinal
amatör	☐	☐	☐	☐	☐	profesyonel
taşınabilir	☐	☐	☐	☐	☐	sabit
alışılmış	☐	☐	☐	☐	☐	yaratıcı
şatafatlı	☐	☐	☐	☐	☐	zarif
kolay	☐	☐	☐	☐	☐	zor
temkinli	☐	☐	☐	☐	☐	cesur
erkeksi	☐	☐	☐	☐	☐	kadınsı



Çoklu Kablolu Priz Tasarım Değerlendirme

75 %

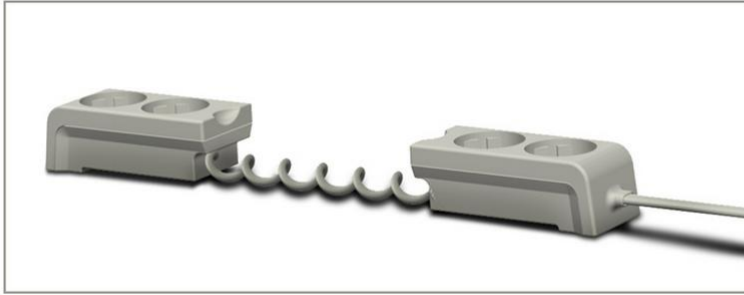
Aşağıda gördüğünüz çoklu kablolu prizi değerlendirme kriterlerine yakınlığına göre değerlendiriniz. Sağ üst kösedeki standart çoklu kablolu priz tasarımı ile karşılaştırabilirsiniz...



Tasarım 4



Standart Grup Priz



Yukarıda gördüğünüz tasarımın ikili kelime grubundan hangisine ne kadar yakın olduğunu düşünerek ilgili yuvarlağı işaretleyiniz.

güvenli	☐	☐	☐	☐	☐	tehlikeli
sıradan	☐	☐	☐	☐	☐	orijinal
amatör	☐	☐	☐	☐	☐	profesyonel
taşınabilir	☐	☐	☐	☐	☐	sabit
alışılmış	☐	☐	☐	☐	☐	yaratıcı
şatafatlı	☐	☐	☐	☐	☐	zarif
kolay	☐	☐	☐	☐	☐	zor
temkinli	☐	☐	☐	☐	☐	cesur
erkeksi	☐	☐	☐	☐	☐	kadınsı



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Resume participation »

Çoklu Kablolu Priz Tasarım Değerlendirme88 %

Anket burada tamamlandı.
İlginiz ve hassasiyetiniz için teşekkürler..

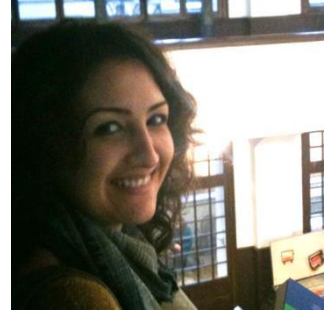
İletişim bilgileriniz.. (isteğe bağlı)

◀ ▶

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Thank you very much for your participation!

CURRICULUM VITAE



Name Surname: Fulya Traş

Place and Date of Birth: Adana - 12.01.1982

E-Mail: fulyatras@gmail.com

EDUCATION:

B.Sc.: Middle East Technical University

Department of Industrial Design (2005)

PROFESSIONAL EXPERIENCE AND REWARDS:

She started her career in automotive industry at Temsa Global, a bus and coach manufacturer in Adana, Turkey. After four years of experience, she continued with electrical and electronics field in Viko by Panasonic located in Istanbul, Turkey. She has been working as a full time industrial designer in the same company since 2010.