

A LEXICON FOR
PRODUCT EXPERIENCE RELATED COMMUNICATION

A THESIS SUBMITTED TO
THE GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCES
OF
MIDDLE EAST TECHNICAL UNIVERSITY
AND
THE FACULTY OF INDUSTRIAL DESIGN ENGINEERING
OF
DELFT UNIVERSITY OF TECHNOLOGY

BY

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IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR
THE DEGREE OF MASTER OF SCIENCE
IN
DESIGN RESEARCH FOR INTERACTION

SEPTEMBER 2012

Approval of the thesis:

A LEXICON FOR
PRODUCT EXPERIENCE RELATED COMMUNICATION

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ABSTRACT

A LEXICON FOR PRODUCT EXPERIENCE RELATED COMMUNICATION

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M. Sc., International Joint Program of Design Research for Interaction

in the Department of Industrial Design

Supervisor: Assist. Prof. Dr. Elif Özcan Vieira

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September 2012, 116 pages

In this thesis, product experiences were analyzed in human-product interaction context. The terminology to describe product experiences were gathered and grouped with the studies carried out during the thesis. The conceptual network of product experiences were attempted to be established by examining the stages of human-product interaction in the limitations of the studies. The gathered terminology was composed of both concrete and abstract product features. The abstract product features which are used for defining product personality characteristics took part in the lexicon. The lexicon for product experience related communication resulting from the thesis, was used in designed instructional game for Bachelor degree industrial design students, in order to be informed and develop themselves on the subject. Hereby, while the students have fun, they will explore the terminology to use in design communications easily.

Keywords: Human-Product Interaction, Product Experiences, Product Personality Characteristics, Abstract-Concrete Product Features

ÖZ

ÜRÜN TECRÜBELERİ İLE İLGİLİ İLETİŞİM İÇİN SÖZLÜK

Onuşluel, Gonca

Yüksek Lisans, Etkileşim için Tasarım Uluslararası Ortak Programı

Endüstri Ürünleri Tasarımı Bölümü

Tez Yöneticisi: Assist. Prof. Dr. Elif Özcan Vieira

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Eylül 2012, 116 sayfa

Bu çalışmada, ürün tecrübeleri, insan ve ürün arasındaki etkileşim çerçevesinde incelenmiştir. Ürün tecrübelerini tanımlayan terminolojiler, tez süresinde gerçekleştirilen çalışmalar ile toplanmış ve gruplanmıştır. Ürün tecrübelerinin kavramsal ağı, insan ve ürün arasındaki iletişim safhaları yapılan çalışmalar sınırında incelenerek oluşturulmaya çalışılmıştır. Elde edilen terminoloji, soyut ve somut ürün özelliklerinden oluşturulmuştur. Ürün kişilik özelliklerini tanımlayan somut ürün özellikleri, sözlük içerisinde yer almıştır. Tez sonucu ortaya çıkan ürün tecrübeleri ile ilgili iletişim için sözlük, lisans düzeyi endüstriyel tasarım öğrencilerinin konu hakkında bilgi edinmelerini ve kendilerini geliştirmelerini sağlamak amacıyla tasarlanan eğitici oyun içerisinde kullanılmıştır. Bu sözlükte kullanılan kelimeler ürün kişilik özelliklerini tanımlayan soyut ürün özelliklerinden oluşmaktadır. Böylelikle öğrenciler eğlenceli vakit geçirirken, tasarım tartışmalarında kullanabilecekleri terminolojiyi kolayca keşfedebileceklerdir.

Anahtar Kelimeler: İnsan-Ürün Etkileşimi, Ürün Tecrübeleri, Ürün Kişilik Özellikleri, Soyut-Somut Ürün Özellikleri

To My Adoring Parents

ACKNOWLEDGMENTS

Firstly, I would like to thank for all positive and motivational supports of my mentors; Elif Özcan, Owain Pedgley and Jaap Daalhuizen. That was a pleasure for me to meet with you and study together on a research project.

This story had begun in Turkey at METU (Middle East Technical University) and has continued in the Netherlands at TU Delft (Delft University of Technology) for 1,5 years. During these 2 years, I have met wonderful people; Çağrı Tekinay (abi teslimim var ben gelmiyim yaa), Ayşegül Güçlü (minnoşlar), M. Erdem Kaydım (bir de kıkıkkık çıkı başımıza), Ekin Eraydın (at), Taner Sezgin Chakar (ne var la?), Çiğdem Demirel (ben bir soda alayım), Güncem Gültekin (ay ben yorgunum), Esin Kömez (bir fotoğraf çekeyim instagramla), D. Onur Dağlıoğlu (ben uyarım valla) and many more names who are always with me and have become the parts of my life. Thank you for your supports and great patience during the period I was trying to write this thesis. You made my life full of enjoy, thank you!

And the Oscar goes to my wonderful parents; Vacide Onuşluel and Kemal Onuşluel who are always full of love and support all my decisions. I would never touch my dreams without you. My mother Vacide Onuşluel has angst for flight and never tried to take on a flight before, until my graduation here in the Netherlands. Thank you for being here with me! My sisters Ayşegül Onuşluel, Gülay Onuşluel Gül; my brother Ali Gül my niece Elif Gül, I would never had a chance to be here in the Netherlands without your support, thank you for your guidance and endless love. I am very grateful to all my family members. It is great to feel your existence...

Thank you all my friends, who allowed their time to be ready for being participants of my studies during busy assignment submissions.

And my friends Nur Fındık, Aernout Kruithof, Floris van der Marel and Tirza Fennis, thank you for sharing all your valuable insights and friendship during this 2 years.

At the end, I would like to thank Sine Çelik and Argun Çençen who took me a housewarming party rather than a pub where I have met a special person Burak Sözgen. You have never left me alone during this path, and I always felt your hand on my shoulder even when you were not physically there. Thank you for your support and love.

I would like to thank all the people who embrace me with their respect, love and fellowship.

This is not the end; this is the beginning of a new era...

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CHAPTER 1

INTRODUCTION

1.1 Subject of the Thesis

In the conceptual product design stage, designers take into consideration the idea of creating new product expressions (abstract product features) beside product functions (the concrete product features) to convince consumers' needs and wants (Özcan & Sonneveld, 2009). The abstract product features such as an *aggressive* motor cycle, a *startling* alarm clock or a *sexy* dress have associations with semantics and these abstract product features are embodied on the product as concrete product features (Van Rompay, 2008). By coming into contact with products, and through interacting with them, people can decide for themselves whether, for example, a product can be reasonably termed *aggressive* or *pessimistic*.

Abstract product features define personality characteristics of product for communication in between designers. The vocabulary of a designer related with abstract product features define product clearly in design discussions and design communications. On the other hand, abstract product features may trigger the ideas in the group and develop effective outcomes. It may be a difficult task for an inexperienced Bachelor degree industrial design student dealing with abstract product features. The lack of the vocabulary related with abstract product features may cause difficulties during design communication within class. Because of this reason, having a lexicon about abstract product features that contains possible words may be a helpful tool for a Bachelor degree design student who is still immature about the topic on product personality characteristics.

Today it is possible to find several competing products on the market which are indistinguishable from the point of price and function, making it difficult to differentiate these criteria (Postrel, 2003; Veryzer, 1995). The consumers assess products depending on the experiential advantages, due to this reason. When consumers choose products for themselves, their personalities affect their selection criteria (Van Rompay, Pruyn & Tieke, 2009).

People use their sensory and cognitive systems to explore the environment (Hekkert and Leder, 2008). The product experiences such as tactile, auditory, visual, specific and emotional are parts of these systems which provide the necessary information for the memory (Spence and Schifferstein, 2008). According to Özcan (2011), product experience is defined as abstract concepts in cognitive linguistics.

In earlier work, Schneider et al (1979) presented the person perception process, suggesting that a similar process is present during product perception. While a product expresses itself to people in the pre-interaction and interaction phases, people express themselves consciously or not through, for example, their visual appearance, tone of their voices, attitudes and facial expression.

1.2 Structure of the Conducted Research

The structure of the research reported in this thesis is shown in Figure 1.

Firstly, in Chapter 2, a literature review is made on the interaction between people and products, whilst sensory and cognitive systems are explained. Human - product experiences with regard to emotions and meanings are reviewed later in Chapter 2, followed by an exploration of personality characteristics.

Following the literature reviews, in Chapter 3, the methodology for the original empirical research is presented. Three studies were conducted and are presented in chronological order: the first study comprises a workshop about personality characteristics of Senz Umbrella; the second study involves analysis of student assignments for a TU Delft master's course PUUE (Product Understanding, Use and Experience), and the third study is a quantitative study about categorization of the lexicon. The result of these combined studies was the uncovering of the vocabulary used to describe product personality characteristics by people. This vocabulary was analyzed and categorized to develop a lexicon for product experiences depending on the product personalities.

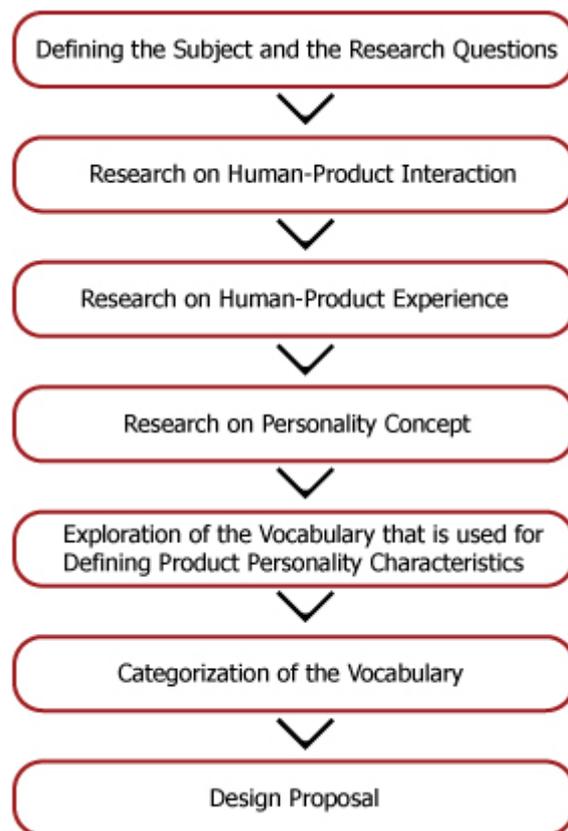


Figure 1. Structure of the Conducted Research

In the final chapter of the thesis, a design proposal for a board game is presented, so as to introduce the subject of product personality characteristics and their associated lexicon to Bachelor degree industrial design students.

1.3 Problem Definition

The previous studies of Govers et al (2004) have shown the potential of design students to form meaningful relationships between people and products, through the characteristics that are tried to be embodied in those products. In their study, students were asked to sketch irons depending on certain predefined personalities (happy, cute tough). Consequently, another group of people within their study evaluated the irons by using semantic differential scales, in order to find the happiest, cutest and toughest. This study is the most related one for the thesis subject. On the other hand, the study was conducted through only visual representation of products and the relationship between personality characteristics and the experience is not clear.

Bachelor degree students who are immature in their knowledge about product personality characteristics may fail to develop a relationship between product abstract and concrete features, or more simply may possess an inadequate vocabulary for expressing intended product experiences from a product. According to the experiences of DUT and METU tutors, Bachelor degree students have difficulties understanding the relationship between abstract and concrete product features and this affects the quality of their projects. Because of this reason, it is proposed that a lexicon that can assist designers, particularly design students, in understanding and articulating product expressions can be valuable for improving communication amongst design team members during conceptual design.

1.4 Aim

The aim of this research is to find the vocabulary used for the definition of product personality characteristics in relation to human-product experience. In order to achieve the objective of the study the literature and the performed studies were used as reference.

1.5 Research Questions

The presented research questions were prepared to conduct research about a lexicon for product experiences. Firstly, the present vocabularies about product personality characteristics of the participants are needed to be reviewed, whilst the lexicon which represents all vocabularies used for product personality characteristics, is categorized according to product experiences. Finally, the approach of using this lexicon in between Bachelor industrial design students is reviewed.

RQ1: What kinds of terminology (words, phrases etc.) do (non) designers use when considering the product experience?

RQ1.1: Can these terminologies be categorized within a framework of product experience (e.g., sensory experiences, aesthetic experiences, emotional experiences)?

RQ1.2: Is there an inherent relationship among these experience-driven categories?

RQ2: What is eventually the 'conceptual network' of product experiences based on the analysis of people's product experience vocabulary?

RQ3: Can a new communication tool be created that facilitates better within-design-team definition and communication of product personality characteristics? How should the aforementioned conceptual network be used in this tool?

RQ3.1: What form ought the tool take?

CHAPTER 2

REVIEW OF EXPERIENCES DERIVED FROM HUMAN – PRODUCT INTERACTION

In order to study on product personality characteristics, the existing literature about the perception and human-product interaction are needed to be reviewed because the process of interaction is the first step for exploration of a product. The human-product experience and meaning attribution were explored after understanding the perception and interaction processes from the point of product to explore the criteria of having a meaningful relationship with a product. Finally, the similarity between human personality and product personality were studied to look for related theories to the product personality characteristics.

2.1 Human-Product Interaction

The interaction is defined as mutual or reciprocal action or influence in the dictionary (Merriam-Webster, 2012c). At the same time, according to researchers Hekkert (2006); Schifferstein and Cleiren (2005), interaction includes senses, the product meanings, the product values, feelings and emotions which evokes subjective product experience. As understood from the definition, there is a relationship between interaction and experience.

People are able to understand their environment with the use of their senses, which are *sight, hearing, touch, smell* and *taste*. According to Desmet and Hekkert (2007), the interaction process can be divided into three which are (1) instrumental interaction, (2) non - instrumental interaction and (3) non – physical interaction.

1. Instrumental interaction is to use and control products physically. For example, managing the interface of a mobile phone.
2. Non – instrumental interaction is the interaction where there is no direct operation or management of product. For example, being disgusted from the wet feeling of a material.
3. Non – physical (passive) interaction is related with one's fantasy or imaginative world, in the realm of anticipation. For example, feeling desire towards high heeled shoes because of an associated feeling of being sexy.

In 2008 Hekkert published a model of human product interaction that shows interaction to be based not only on sensory systems but also on motor systems and cognitive systems, whilst instincts also play a vital role (Figure 2).

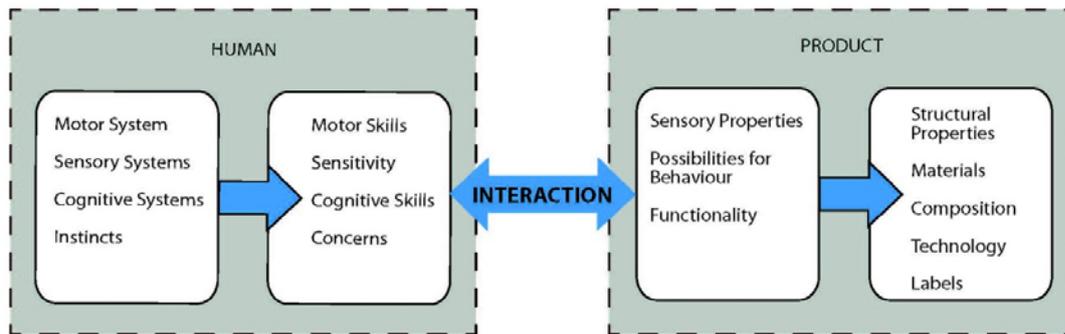


Figure 2. Model of Human Product Interaction (Hekkert, 2008)

As can be seen in the Figure 2, the product has variables which may affect the assessment of the interaction. This assessment of interaction takes place in the brain with the help of the stimulus gathered by the senses. The stimulus is transferred to the brain in order to appraise new stimulus with the restored ones (Cowan, 1995; Neisser, 1967; Sperling, 1960). It can be accepted that sensory system explores the environment and is used for gathering information. The cognitive system is used for assessing the experience which is the outcome of the interaction process.

2.1.1 Cognitive System

Cognition is a crucial subject of psychology and its study can be extremely complex and detailed. The Greek philosopher Aristotle proposed that mental imagery is essential for learning and memory. According to Sternberg (1999a), experience and observation are requirements to gain knowledge that is retained in memory.

The *sensory memory* records all data coming from each of the senses. The recorded information by sensory memory is transferred to *iconic memory* or *visual sensory memory* which creates an image of a visual stimulus (Cowan, 1995; Neisser, 1967; Sperling, 1960). A stimulus is caught by the retina of the eyes which is transferred by neurons to the visual cortex of the brain to create a visual image into the developable personal *impingement-experience dictionary* (Cowan, 1995; Neisser, 1967; Sperling, 1960). This dictionary is composed of the experiences both since birth and gained during life. The brain is able to keep all these experiences; however Leeper (1935) believes that people are able to select the experiences. Otherwise, all recorded stimuli would have turned one's world into a "messy experience playground". This massive data can be classified in the brain which is known as labeling or categorization (Figure 3). The cognitive process of product identification is the interpretation of the perception of sound figure which belongs to Özcan (2008). These categories may be derived from culture, old experiences, language, etc.

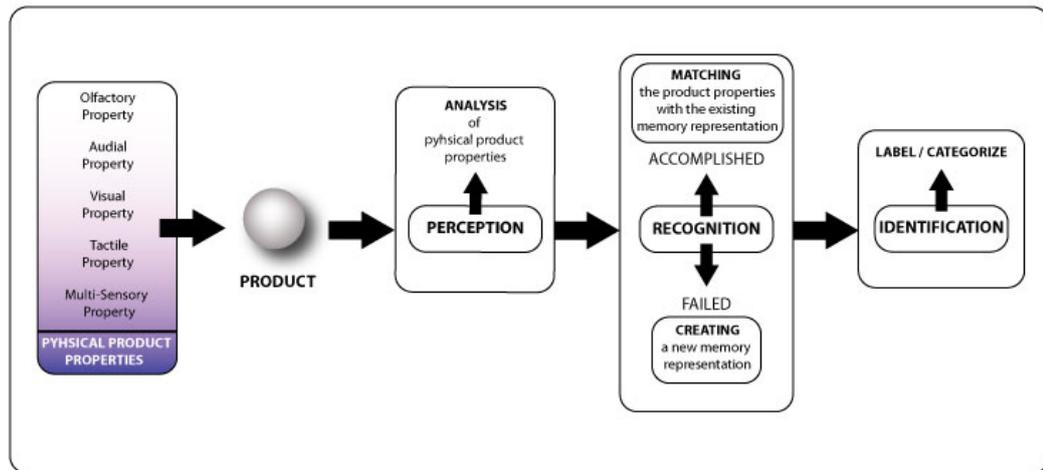


Figure 3. Cognitive Process of Product Identification

2.1.1.1 What is Bottom-Up and Top-Down Processing in Recognition?

The recognition of objects can be divided into two processes; bottom-up processing and top-down processing. According to Palmer (2002), bottom-up processing is the very early part of visual processing.

In Bottom-Up processing (data driven processing) first the receptors of the eyes capture data or features of the object such as colour, shape, and surface. The data are transferred into object recognition process, and this flow continues identification of the object. This process begins with the small pieces of elements and finally it grows in complexity.

Top-Down processing (conceptually driven processing) is related with higher level cognitive processes than bottom-up processing. The expectations, memory, and concepts may affect this process. For example, a delicious odor may recall freshly-made bread and cause feel hunger suddenly. According to the explanation given by Matlin (2005) about top - down processing, it can be identified also as an *association process*.

These two processes are analogous to each other but bottom – up processing focuses on details. On the contrary, top – down processing focuses on the bigger picture.

2.1.2 Semantic Memory

People have organized knowledge about their environment, which is called *semantic memory* (Wheeler, 2000). People manage this knowledge by creating concepts of mental representation of the objects. These concepts can be represented into the same or similar object groups. For example, an object, which looks like a pen, can be put into the pen concept. This categorization helps people to create a hierarchy of the information they have in their mind. Also, a person may develop a mental representation of the *friendly* coffee maker, *adventurous* car or a pair of *sporty* shoes which are led by the concrete product features (Figure 4).



Adventurous Car



Cute Coffee Maker



Sporty Shoes

Figure 4. Examples for Product Descriptions (google images)

According to Murphy (2002), the first condition is to determine the process of using the object to create a new concept in mind. For example, imagine that a person never came across a coffee machine before, and he / she did not know what it was for. If a description is given to that person such as, *coffee machine is the tool that one can prepare hot coffee with it. One will put water, insert coffee capsule and press the green button.* After this introduction, the memory reserves a space for this new concept. There are four models, which shall be taken into consideration, *the feature comparison model, the prototype approach, the exemplar approach and network models* (Markman & Gentner, 2001). The researchers Sternberg & Ben-Zeev (2001) argue that this coding system saves expansive storage into the mind because several objects are able to be stored under the same level. People are able to define abstract product features, and there should be a decision giving system that tells us what is *adventurous, cute* or *sporty* in order to assign those abstract features. In the following pages, the introduction of these models can be found in order to explain how the mind can make its' own categorization system.

1.The Feature Comparison Model

The semantic memory organizes the features of the objects according to the concepts. In the feature comparison model, people look for features which overlap or are comparable with the concept to accept the object into the proper group. For example, consider the concept of "bird". The relevant features for this concept may be;

has two wings

has two legs

has a tail

has feathers

has a beak...etc.

If any object has these features, is it possible to accept this object into the bird concept or not? The decision process can be described by the comparison model of Smith (1974) (Figure 5).

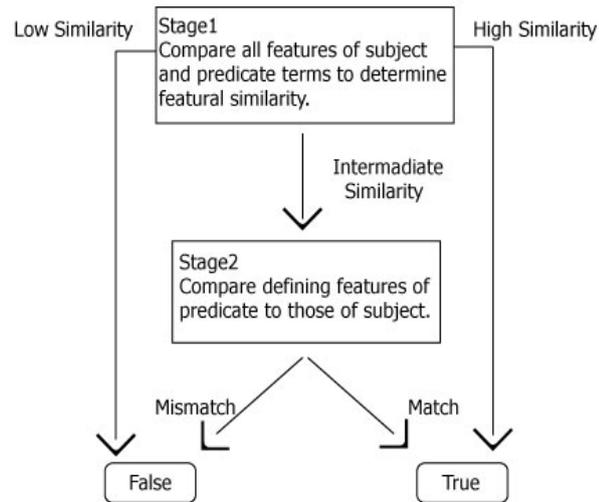


Figure 5. The Feature Comparison Model Of Semantic Memory (As presented by Smith, 1978)

The features used in the model of Smith were grouped as; *defining features* and *characteristic features*. The definition of features for this model;

- *Defining features* are the "must have" attributes which give meaning to the item.
- *Characteristic features* are the descriptive attributes, but not particularly essential.

2.The Prototype Approach

According to Eleanor Rosch (1973), the concepts are based on a prototype (Murphy, 2002). A prototype is the comparison element of the concept. If the compared element is similar to the prototype, it can be accepted into the same concept with the prototype. The prototype does not have to be an existing element. It is possible to describe a fully abstract or an idealized prototype.

3.The Exemplar Approach

The exemplar is known as the learned approach. First, examples of a concept are learned and stored in the memory then new stimulus is compared with these stored examples. (Wisniewski, 2002)

The definitions of the prototype approach and the exemplar approach are similar in comparing the new element with the learned or stored element in the memory. In the *exemplar approach*, if there is a strong similarity between the elements, the new element is directly sent to the same concept with the comparison element. In the *prototype approach*, the representation element in mind is a typical member of the concept. On the other hand in the exemplar approach, the stored representation is a collection which is also one of the members of the category (J. D. Smith, 2002).

“The poodles” can be an example for the exemplar approach; whereas “animal” is a suitable example for the prototype approach.

Additionally, depending on the researchers, there is no abstraction process in the exemplar approach because specific characteristics or idealized items eliminate the usefulness or specificity of the data on individual cases (Heit & Barsalou, 1996; Hintzman, 1986; Knowlton, 1997).

The categorization for the exemplar approach is more detailed than the prototype approach. The prototype approach for animal concept contains numerous members and produces a large amount of data. At the same time, the studies show that the exemplar approach is extremely bulky, and a classification strategy shall not be only based on this approach (Erickson & Kruschke, 1998, 2002).

4. Network Models

An object is composed of different meanings, and if this union is decomposed, the ‘formative meanings’ of the element can be reached. Collins and Loftus (1975) developed a network model to explain the relationship between the element and its formative meanings. In this network model; the semantic memory is represented as net-like structures; the concepts are called nodes or location and there are links which create connection between the nodes or concepts (Figure 6).

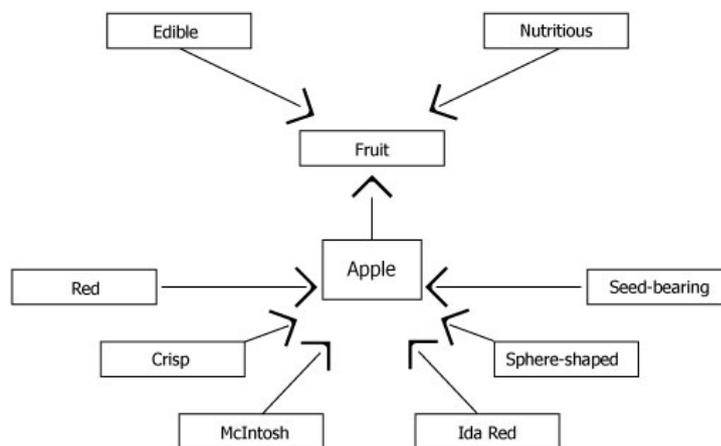


Figure 6. Network Structure for the Concept “Apple” (Collins and Loftus Network Model, 1975)

This action in the branch of concepts is defined as spreading activation (Markman, 2002). In the Figure 6, when the concept appears, first representation node of apple will be activated (fruit) and then this will be followed with the other nodes which are relevant with it. An example can be given with using the feature comparison model of semantic memory for this model,

The sentence “The fruit is crisp” is true. However, if the sentence is built as “An apple is a vegetable”, it is directly considered as false. Designers use these methods while decomposing the meaning in conceptual design.

Conceptualization, which is composed of idea generation and conceptual thinking, is defined as a creative process by Cross (2000). In this process designers are dealing with both abstract and concrete product features to create meaningful experiences. Designers and design students use a practical way of visualizing meaning of products which is known mind-maps during conceptual designing (Özcan, 2011).

2.2 Human-Product Experience

Up to now, the human-product interaction was explained in the context of sensory and cognitive systems. The experience has two dictionary meanings (Merriam-Webster, 2012b) which are;

“Direct observation of or participation in events as a basis of knowledge”

“The fact or state of having been affected by or gained knowledge through direct observation or participation”

As a consequence of the interaction with the products, people can try to verbalize their experiences. Desmet and Hekkert (2007) introduced a model, adapted from Russell (1980), to explain the experience concept which is known as *the core affect model* (Figure 7). The core affect model is considered in two axes. The vertical axis is from “calm” to “activated” and the horizontal axis is from “unpleasant” to “pleasant”.

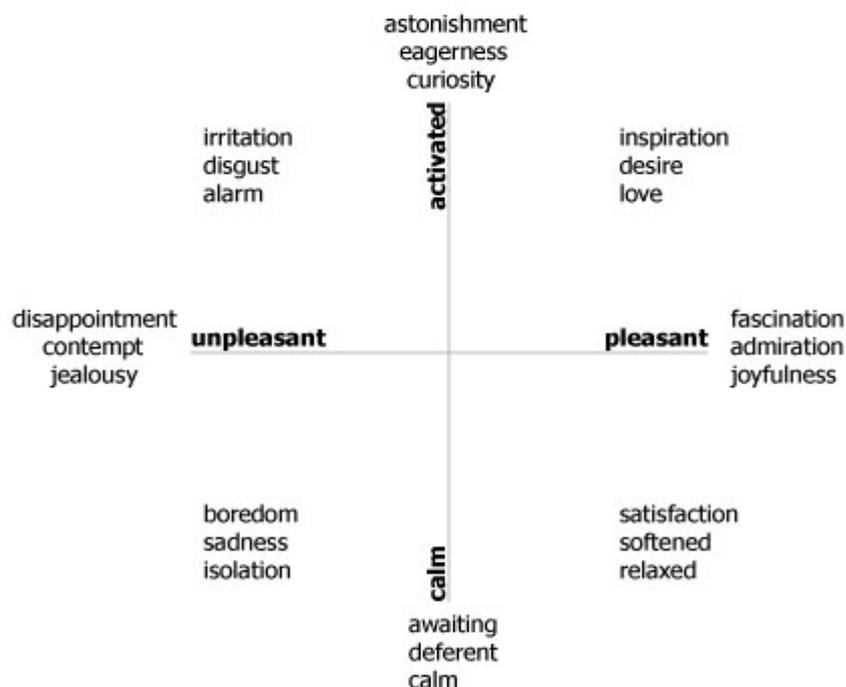


Figure 7. Model of Core Affect with Product Relevant Emotions (Desmet, 2007; adapted from Russell, 1980)

The axes of core affect model are sliding which means the effects may be moderate, extreme or neutral (on the central point) on the axes. Desmet and Hekkert (2007) defined the product experience as *mood changes* during human-product interaction. The reflections

of these mood changes can be seen as the facial or bodily expressions, vocal changes, and behavioral reactions of a person.

The experiences can be used for both evaluation and identification of the product. According to Desmet and Hekkert (2007) there are three main components of product experiences, which differ on the way of interaction with the product. They are *aesthetic experience*, *emotional experience* and *experience of meaning*. The cultural differences, the social differences and the quality of the context influence those experiences. For example, experience of cycling may differ when a person is late for an exam or goes to shopping alone or goes to the beach together with his / her friends.

Hekkert (2006) publishes a product experience framework to explain the product experience concept. He mentions about three components of product experience; *aesthetic pleasure*, *attribution of meaning* and *emotional response*. He defines the product experience as the blend of emotions, the attributed meanings outcome of experiences and also the gratification of aesthetics (Figure 8).

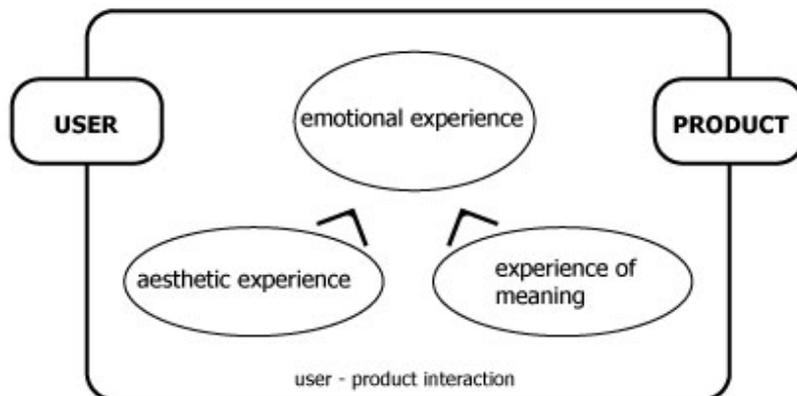


Figure 8. Framework of Product Experience

Aesthetic Experience

Aesthetic experience is related with the sensory modalities. A person can attribute some verbal expressions when he / she looks at the product and assesses the visual quality of it. The aesthetic experience is not limited to the visual. One can have aesthetic experience through touching, smelling, hearing and tasting.

Experience of Meaning

In the experience of meaning; the fantasies, metaphors, personality assignment, symbolic definitions play prominent roles of the process which is a cognitive one. According to Gover and Mugge (2004), users prefer products that appear to possess personalities that are similar to their own personalities.

Emotional Experience

Emotions are the outcome of appraisals about an environment, event, product or situation (Desmet, 2002) and people do not look for labels for them consciously. Emotions arise intuitively and out of control. The emotions are all people's individual interpretations, and they may change for each person potentially. A person may feel anger to the ring tone of a phone; on the contrary, same ring tone may be another person's favorite.

The interaction takes place within a rich context and variables affect experiences. For example a *rebellious* skateboard may be labeled because of its' physical attributes (having rough and sticky surface) or emotional reasons (feeling freedom while skating at high speeds).

2.2.1 Product Emotions

A product or using a product may elicit emotions such as anger, disappointment, shame, pride, disgust. On the other hand, the same product may evoke the opposite of these emotions. Because of this reason the emotions are extremely *broad* and *subjective* (Desmet, 2008). In the content of this thesis, the product emotions were divided into two which are *objective* and *subjective emotions*. Subjective emotions represent the emotions of the users' which are caused by external effects like the product itself or manipulation of the product. Objective emotions stand for the elicited emotions from the products' expressions. The objective emotions may be the outcome of the visual, audial, or tactile qualities of the product. Objective emotions are the same as subjective emotions, except that they are shared amongst a larger sample of people and are thus less personal. For example, "*I do not like to use a shaver because it makes me irritating*" is a subjective response and can change for each person. "*The surface of the cup seems to smile. It is a happy cup.*" can be an example for an objective response.

2.2.2 The Meaning of the Product

People do not only perceive shapes, colour, texture, etc. which are formal or technical specifications of the product, they also perceive symbolic meaning (Van Rompay, Pruyn & Tieke, 2009). Design is defined as a sense triggering activity and people look for products which are meaningful and understandable for them (Krippendorf, 1989). Every product has symbolic qualities and making these symbolic qualities noticeable is a concern for designers. If a designer achieves this goal, users can be satisfied as well.

The products with their symbolic meanings identify their users and become a communication tool in society (Crilly, 2008; Karjalainen, 2007). According to Karjalainen (2007), designers can create value-based features by applying explicit and implicit cues on design. Explicit cues are obvious, and they can be recognized easily because of being part of the brand meaning. Implicit cues are the sub-meanings which are better for communicating with the core value. The relationship between form and meaning is tried to be designed by designers from their way of objectifying (Figure 9).

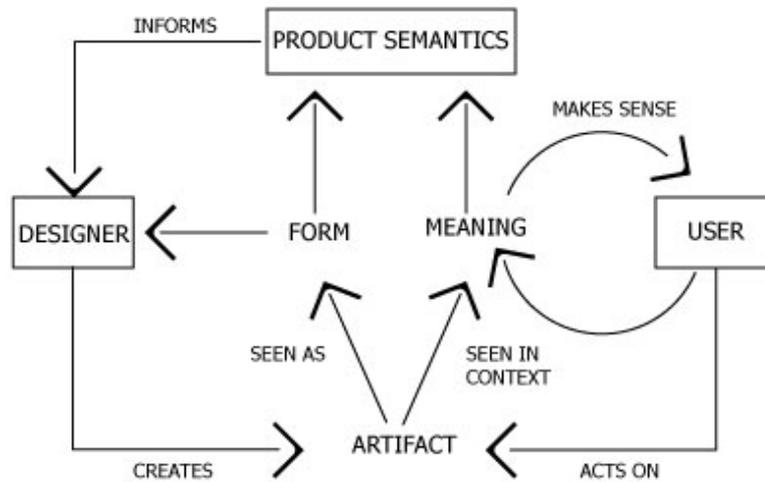


Figure 9. The Relationship between Designer's and User's Cognition (Klaus Krippendorff, 1989)

As a summary, in Figure 9, according to Krippendorff (1989) the meaning of a product or artifact makes sense only in the specific context for the users. This representation may be true for the products which have been already experienced, but there is no information about for the first sight of a product. This missing point will be explored in the further studies of this thesis.

2.3 Personality Explorations

Personality and the character may seem similar at a conceptual basis, but their meanings are different, as follows.

Definition of 'personality' (Merriam-Webster, 2012d)

- a. The complexity of characteristics that distinguish an individual, a nation or a group; especially the totality of an individual's behavioral and emotional characteristics
- b. Set of distinctive traits and characteristics

Definition of 'character' (Merriam-Webster, 2012a)

- a. one of the attributes or features that makes up and distinguishes an individual
- b. (1) a feature used to separate distinguishable things into categories; also a group or kind so separated
 - (2) the detectable expression of the action of a gene or group of genes
 - (3) the aggregate of distinctive qualities characteristics of a breed, strain or type

As understood from the definition of these two words, character is one of subsets of the personality. Using *personality characteristics* word is more appropriate for products in the

definition of product expressions than personality word due to having more intense for product concept according to Govers (2004).

Personality is an abstract concept and composed of person's behaviors, thoughts and feelings which other individuals do not have and makes that person appealing or attractive (Carver & Scheier, 1996; Hjelle & Ziegler, 1981; Murphy & Davidshofer, 1994). In other words, these personalities that define individuals can be used to set apart the persons from the group. The personality is seen as consistency in behaviors; because individuals behave differently towards different situations (Carver & Scheier, 1996; Murphy & Davidshofer, 1994).

The personality was tried to put into factors by researchers. Firstly, Eysenck introduced *two factor model* in 1947, and the late 70's this model was got the latest version and named *three factor model* (Eysenck, 1970) (About, 2012a). The three factor model divides personality into; *extroversion – introversion*, *neuroticism – emotional stability*, *psychoticism – self-control* (Figure 10). Secondly, Raymond Cattell who argued two factor model of Eysenck and released *16-factor model of personality* (1949). This model was finalized into the current version in 1993 (About, 2012b). In 1981, Goldberg introduced the *five-factor model of human personality "Big 5"* (About, 2012c), which is the widely used for personality traits, because this model can explain both theories mentioned above which are the most known ones (Table 1 and Table 2).

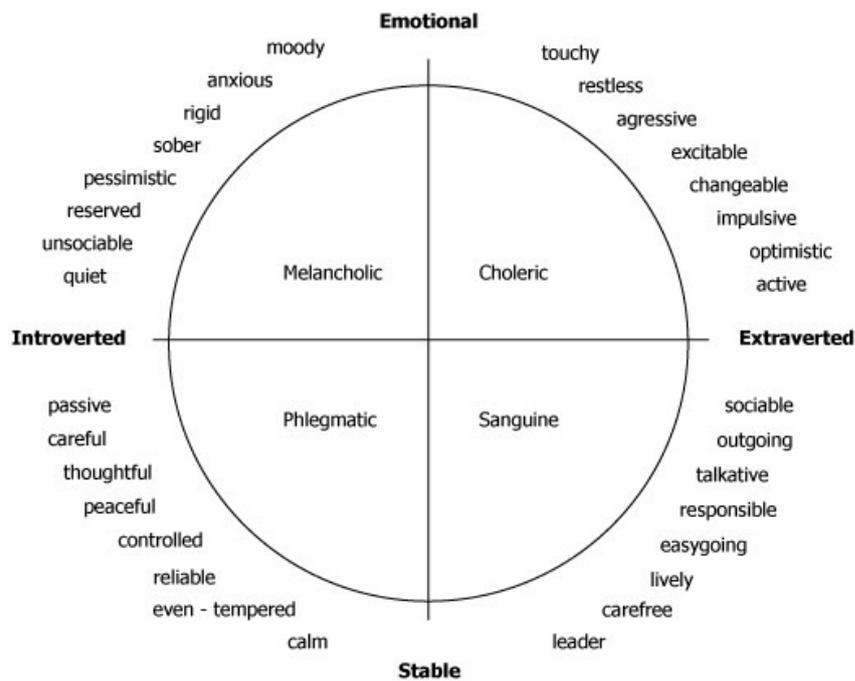


Figure 10. Eysenck's Three Dimensions of Personality (Psyche-yourself, 2012)

Table 1. The Five – Factor Model of Human Personality (Goldberg, 1981)

Factor	Description
Extroversion	People high on this factor are spontaneous, assertive, talkative and active
Agreeableness	People high on this factor are good – natured, polite, considerate, and supportive
Conscientiousness	People high on this factor are neat, serious, ambitious, and precise
Neuroticism	People high on this factor are nervous, anxious and high – strung
Openness to experience	People high on this factor are original, curious, intellectual, and open - minded

Table 2. Personality Measures and the Big Five (Personality-Project, 2012)

Theorist	Surgency	Agreeableness	Conscientiousness	Emotional Stability	Intellect/ Openness to Experience
Cattell	Exvia (vs. Invia) ¹	Pathemia ³ (vs. Cortertia)	Super Ego Strength	Adjustment vs. Anxiety	Openness to change
Eysenck	Extroversion ²	Psychoticism		Neuroticism ⁶	
Goldberg	Extroversion	Agreeableness ⁴	Conscientiousness ⁵	Neuroticism	Openness to experience ⁷

refers to “extraversion/introversion”

² used for people who are social, open to the environment

³ one pole of a personality dimension characterized by emotional immaturity with poorly focused feelings rather than realistic and objective attitudes (Encyclo, 2012)

⁴ used for people who are in harmony with warmth and emotional senses together

⁵ used for representing responsibility, correctness and the sense of goal achieving

⁶ used for definition for anxiety experience

⁷ used for people who are intellectual and open to new ideas

2.3.1 Humans’ Perception of Other Humans and Products

The first impression about a person is based on elements related with appearance such as colour of hair, clothing, used accessories (Jones, 1990; Borkeanu and Lieber, 1992a, b, 1995a). People are able to give quick decisions about other people’s personality by checking their visual appearances. The visual appearance was divided into two by Borkeanu and Liebler (1995b); (1) Visual – static and (2) Visual – dynamic characteristics. The visual - static characteristics represent hair colour, way of dressing, shape of eyes, and nose. The visual – dynamic characteristics represent mimics, gestures and the expressions. The researches show that all visual – static and visual – dynamic characteristics have influence on the decision of personality traits (Montepare and Zebrowitz – McArthur, 1988; Zebrowitz, 1990; Borkeanu and Liebler, 1992). Additionally, personality gives two notable clues to designers; (1) persons’ psychological processes and (2) individual differences (Carver and Scheier, 1996).

Additionally, products have their own personality characteristics like people and designers implement these personality characteristics on the design itself in order to make the product understandable and communicative (Hsu et al., 2000). People use these personality characteristics to describe product appearance (Janlert and Stolterman, 1997; Jordan, 1997; Gover, 2004). According to Schneider et al. (1979), the perceiving path for a person and product are highly similar. In the Figure 11, the person perception process was composed of six steps, which are (1) Attention, (2) Snap Judgement, (3) Attribution, (4) Trait Implications, (5) Impression Formation and (6) The Prediction of Future Behavior.

	1 Attention	2 Snap Judgement	3 Reactive Attribution	Purposive Attribution	4 Trait Implications	5 Impression Formation	6 The Prediction of Future Behavior
Stimulus	Appearance, context, behavior stream	Categorized appearance and behavior	Behavior units where the perceiver is dominated by the hypothesis that the actor has responded to a powerful internal or external stimulus	Behavior units where the experience is dominated by intentionality on the part of the actor	The attribution of a trait	Perceiver's hypothesis that a group of traits are attributed to the actor	Behavior units, snap judgements, traits, general impressions
Output	Selecting and categorizing	Immediate affective reactions (attraction or withdrawal) and stereotyped judgements	A casual hypothesis as to why the behavior occurred, pointing to the effects of particular stimuli and inferences about why the person responded to the stimuli	The attribution of a trait, intention, attitude, or ability	The hypothesis that certain other traits also exist	The formation of a general judgement, often likeability. Organization of the stimuli	Prediction as to how a person will behave in certain classes of situations

Figure 11. Person Perception Process (Schneider, Hastorf & Ellsworth, 1979)

The idea of acting products as symbols is very old and according to Veblen (1899), people consume not only products, but also their meanings too. The personality characteristics can be used for defining *brands* (Biel, 1993; Aaker, 1997), stores (Sirgy et al., 2000) and computers (Nass et al., 1995) beside product appearance. Also, the product affects the purchase decisions of the consumer with its appearance, meaning and personality characteristics (Biel, 1993; Aaker, 1997).

As mentioned in the literature, the appearance of the product is defined by the product personality characteristics. The products in Figure 12 may be associated with the happiness or joyfulness by just looking at the visual representation of them. Govers (2004) believes that the product personality refers to the personality characteristics which are created according to not only the appearance but also the nonvisible attributes of the product. From her point of view, the product personality is the overall impression combining these different personality characteristics concepts. The shoe seen in Figure 12 can be defined as sporty, happy, joyful, childish, etc., which are the typical personality characteristics examples, derived from the appearance of the product. On the other hand, if heart, smiley faces and dog graphics directly communicate happiness are taken away from the products; they cannot be recognized as happy, joyful, childish, etc any more. In this example, the graphics are more powerful determinant than the form of the object itself.



Figure 12. Example of Happy Products

Thus, products have personalities like human, and they are evaluated via the formal or technical specifications of them (Govers et al., 2002). Many researchers study on product personality and do experiments with users and designers. Govers et al performed a study with design students in 2002 and asked them to design happy, cute, tough iron. The respondents rated the selected sketches of the design students in order to approve the perception of the participants over happy, cute and tough irons. Govers et al focused on the appearances of products in their study and proved the possibility of designing a product with predefined personality characteristics. Desmet et al (2008) explored whether the predefined personality traits could be transformed into dynamic human product interaction. They built up their own designs using a 2-step study (Figure 13). In the first step, the participants were asked to define the personalities of the products and then in the second step they explored the effect of appearance on perceived personality.

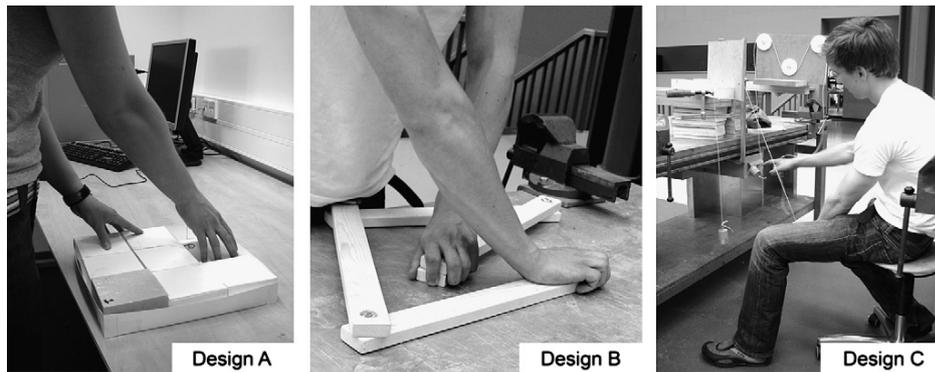


Figure 13. Three Interaction Device Concepts

As a consequence of the studies, Desmet et al (2008) arrive at three conclusions:

- *“designers can create predefined product personalities with dynamic interaction”*
- *“the effect of appearance on personality is more powerful than the effect of dynamic interaction”*
- *“perceived product personality is not a straightforward blend of the effect of appearance and the effect of dynamic interaction.”*

Govers et al (2004) conducted the experiment with the image of the products and Desmet et al (2008) with the designed devices in order to study about product personality phenomenon. In contrast to these two studies, the product personality characteristics will be explored by experiencing the real products in *decontextualized* environment (laboratory environment) , in order to explore the labeling of the participants at the first impression about the products.

2.4 Conclusion

The subject of *product personality characteristics* is still underdeveloped in the literature, and there are limited numbers of researchers who have worked on this topic. The prior research evaluated in this chapter was based on visual appearance of products. The visual appearance may be a powerful factor for defining personality characteristics, but it cannot be the only factor.

People need to have interaction with products in order to differentiate them by using abstract or concrete product features. On the other hand, there is not enough clear information about how the change of self-expression elements of the product would have an effect on the abstract product features.

The interaction and experience processes occur in order, and they are well-defined in the literature. The experience as a consequence of interaction triggers the abstract product features or personality characteristics in the mind. Additionally, if these personality characteristics are related with the human being, the vocabulary for product personality characteristics can be categorized according to the personality traits.

In order to find evidence to answer the research questions three studies will be conducted.

CHAPTER 3

ORIGINAL RESEARCH INTO VOCABULARY FOR PRODUCT EXPERIENCES

3.1 Research Methodology

In order to find answers to the research questions mentioned in Chapter 1, three studies were conducted. First, in Study 1 it was aimed to investigate how Senz Umbrella would be described by bachelor degree students. Two methods were given to the bachelor degree students in order to help them for inspiration. This study was intended to understand the concept of the similarity between human and product perception, as raised in the literature review.

In Study 2, PUUE (Product Understanding, Use and Experience) course assignments of interaction design master students (2007, 2008 and 2011) from Industrial Design Engineering Faculty of DUT were examined. The vocabulary of master students used for describing abstract and concrete product features was collected, and the relations between these features were listed.

In Study 3, free interaction processes of graduate and undergraduate students from DUT were observed. The participants were asked to give objective answers about products' personality characteristics during interacting with them without time pressure. As a consequence of the Study 3, how the participants explored the products and which words were used to describe the experience at which stages of the interaction were revealed.

To summarize, in the first study it is found out that the availability of using words for describing people can be used for describing products as well with the help of given two methods to the bachelor degree students. The vocabulary was analyzed and listed in the subsequent study. In the last study, how the participants explored and described the products features were observed in the first sight. The vocabulary they used during this study was listed. The details of each of the studies, including their associated hypothesis, set-up, conduct, data collection, analysis, results and conclusions are reported in the following sections.

3.2 Study 1 – Workshop on Personality Characteristics of Senz Umbrella

3.2.1 Hypothesis

"It is possible to describe a product by making use of human personality characteristics."

3.2.2 Set - up

Study 1 was carried out at one of the studios located at Delft University of Technology where it was possible to use a video projector with computer connection in order to show a short trailer for warm – up exercise. The participation was voluntary, and seven participants from the same age group attended this study from the first year industrial design engineering students from Delft University of Technology. Only five of the participants' data

could be used because the others did not finish the study due to limited time of those participants.

3.2.3 Conduct

Warm-Up Exercise

A4 sized Study 1 documents were prepared by using Adobe Illustrator and Microsoft Office Word 2007 programs on the computer. These documents were printed in colour and grouped according to the creative methods the participants would use. This study was composed of two sections. First section was a warm-up exercise. In this exercise, the trailer of *Closer* movie, which lasted 2 minutes, was projected to the wall of the studio (Figure 14). The purpose of selecting this trailer was the long observation time the participants could use before the characters start face-to-face dialogs in the trailer.



Figure 14. Screen Shot from the Movie "Closer" (Google Image)

The participants were asked to describe the elicited emotions that participants thought would best describe the characters and the characteristics of persons in the movie trailer. In order to loosen the tongue of the participants and prevent the pressure of fear of saying something wrong, talk aloud process was preferred to use in the warm - up exercise. Everybody was allowed to share their ideas beside the trigger reason of that idea.

Main Study

A black Senz umbrella was brought to the class to use as an object for this study (Figure 15). The reason to choose an umbrella was its' tactile qualities and availability of manipulation for the study. Amongst many types of umbrella, Senz umbrella was selected because of its' unusual design. The participants were allowed to manipulate the product during the Study 1.



Figure 15. Senz Umbrella (Google Image)

The participants were divided into two groups depending on the creative methods they would use after warm – up exercise as shown in Figure 16. The colours red, blue and black squares shown in the figure represented the colours of the umbrella. Even though, the number of the participants was less than expected, it was still possible to separate the participants into two groups. The participants who possessed different methods were placed opposed to each other in order to keep communication during Study 1. The person represented next to the black square in Figure 16, selected another table for himself after other two participants left the workshop.

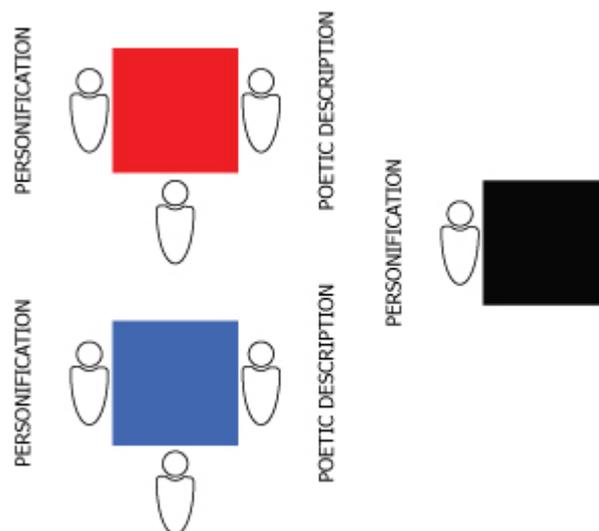


Figure 16. Seating Positions of the Participants

The participants of *the personification method* group were responsible for writing a short essay which would explain the umbrella with the human related features. Another group, which was responsible for *the poetic description method*, would write their own poems dedicated to the umbrella given with the printed Study 1 documents. Each group had different colored umbrellas in their documents (Figure 17).



Figure 17. Variations of Senz Umbrella (Google Image)

In order to make their cognitive stages easier, they were told to accept the product as a person rather than just an umbrella. By this way it was possible to simplify the mental thinking process by defining the product as a more familiar daily task because of having similar thought processes when we encounter someone unfamiliar for the first time (Schneider et al., 1979). The groups were recommended to assign names, characteristics, genders, etc to their umbrellas related with the human being. Subsequently, the participants created mind maps by picking up the words they used in their poems and essays. The mind maps help them to categorize the words they used in their poems and essays.

3.2.4 Data Collection

At the end of the Study 1, all participants shared their ideas and the reasons which elicited these ideas. The eventual ideas of the participants were written one by one on A0 sized paper by the study organizers (Gonca ONUSLUEL & Elif OZCAN) and hung on the board where everybody could see it clearly. Both A4 (Appendix A, Appendix B) and A0 paper documents were read and the verbal definitions, which they used for the personality characteristics, were transferred to the computer by using Microsoft Office Excel 2007. The mind maps of the students included entire data taken from their poems and essays. An example is located on Figure 18, and other mind maps with the poems and essays can be found at (Appendix C).

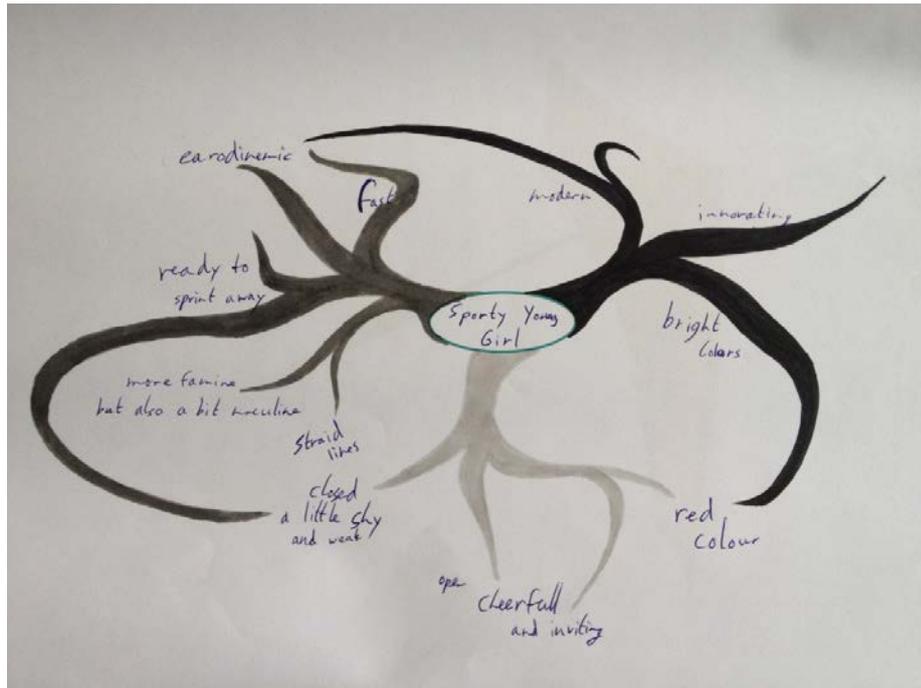


Figure 18. Example Mind Map from One of the Participants

3.2.5 Analysis

In the analysis stage of the Study 1, the collected definitions of the participants were compared according to variables which were colour and used creative methods. Depending on the ideas of the students the personality characteristics of Senz umbrella were figured out. In the table (Appendix D), it is possible to see the same definitions for the (dis)similar features. The definitions used more than one time can be seen in Figure 19. On the other hand, there is only one overlapped definition from the point of dissimilar creative methods.

Additionally, the amount of used definitions was bigger in the poetic description group compare to personification group. Two students who were from each creative method groups supported their ideas with metaphors which were proud knight (derived from poetic description method) and lawyer (derived from personification method). Furthermore, the words closer in meaning, were derived from the same creative method (personification) such as;

- Outstanding – Innovative – Different
- Confident – Reliable
- Strange - Unique

DEFINITIONS	FEATURES DERIVED from	
	PERSONIFICATION	POETIC DESCRIPTION
Shy	Closed Stage	When it is closed
Sportive	Aerodynamic Shape	Red Colour
Powerful		Sturdy Materials It can stand steady against wind
Fast	Automatic Opening	Aerodynamic
Wild		Shape allows wildness
		Different Shape
Proud	Side View	Sword like Shape

Figure 19. The Definitions Used Two Times

3.2.6 Results

As can be examined in Appendix D, the participants were able to set up links between product personalities and features that led to suggest those personalities. Both creative methods as *Poetic Description Method* and *Personification Method* were good enough to improve the participants look from the different perspectives to the umbrella concept. In this workshop, the participants used mind maps to organize their ideas written in their poems and essays. The advice about accepting the umbrella as a person led to create metaphors like lawyer knight and so on which had overlapped features with the umbrella or vice versa. Every participant felt the texture of the umbrella, checked it from different views, and they opened closed it several times to explain the sound of the mechanism and textile. At the end of the study, the features derived from the poetic and personification methods related with the *colour, shape, pattern, usability, material* and *weight* of the umbrella but there was no description related with sound.

3.2.7 Conclusion

Study 1 was the introduction study for entering the subject of product personality characteristics. After the evaluation of the answers of the participants, Study 1 was concluded with the descriptions related with human. On the other hand, these descriptions might be affected a lot from the creative methods. Metaphors helped students to look to the concepts from different perspectives, and the students were able to develop ideas easily with the directions of both creative methods and metaphors. Although the first insights were gained with the results of Study 1, there were not collected a lot of vocabulary which were not the primary purpose for this level.

3.3 Study 2: Analyzing Assignments with respect to Vocabulary

3.3.1. Hypothesis

"Product Understanding, Use and Experience (PUUE) course master degree design for interaction students are aware of personality characteristics of products."

3.3.1 Set – up

The figurative meaning assignments of 2007 (64 students), 2008 (85 students) and 2011 (82 students) periods were provided by Elif Özcan. In these assignments, the students were asked to write down abstract features of their selected products and the relationship with the concrete features.

3.3.3 Conduct

The researcher separated the files according to years and made ready the computer for note taking. All assignments were read, the vocabulary was tried to identify and the envisioned relations of abstract – concrete features were searched in between the lines of the students. The students were master degree due to this reason they have already had a level of knowledge about abstract and concrete features. The abstract feature definitions, which were written with their reasons, were searched while reading the assignments.

3.3.4 Data Collection

Data was collected and organized in the form of Excel files. The researcher received support from one of her friends who wrote down quickly with a computer keyboard whilst the researcher was processing the data before the analysis, due to the large number of assignments. The data were saved to the researcher's personal computer.

3.3.5 Analysis

The complete data set composed of 22 pages of A3 sized paper; therefore it was hard to show in a layout all the content of data. The first representation of data structure can be examined with an example in Figure 20.

The coloured dots represent the relevant categories of the partial – concrete definition in Figure 20. As seen in the representation of data structure with an example, the associations were created by the students by comparing product characters and product feature descriptions. The product feature descriptions were matched with the categories; *material, technology, emotional response, structural/formal properties, sensory properties* and *labels*. These categories were created depending on the assignment of students. On the other hand, there were still definition confusions in between the categories. The categories were very broad. Because of this reason, next version of data structure representation was prepared with the feedback of the thesis team (Figure 21). In this second version, categories were detailed, and almost the names of these categories were settled. The data seemed more complete and meaningful with this order.

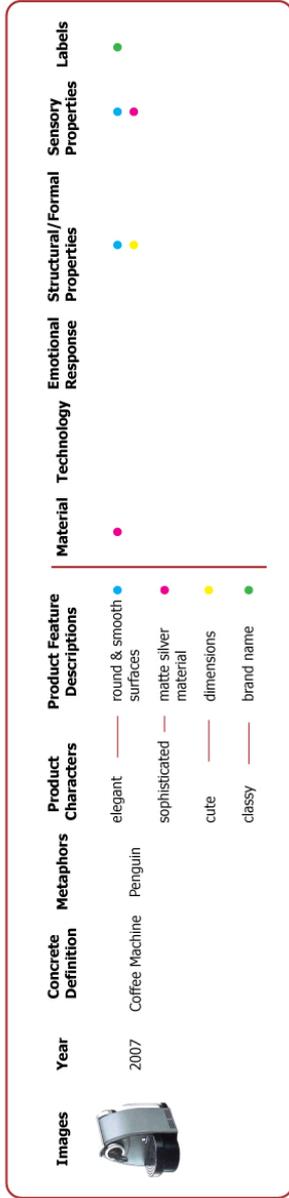


Figure 20. First Representation of Data Structure

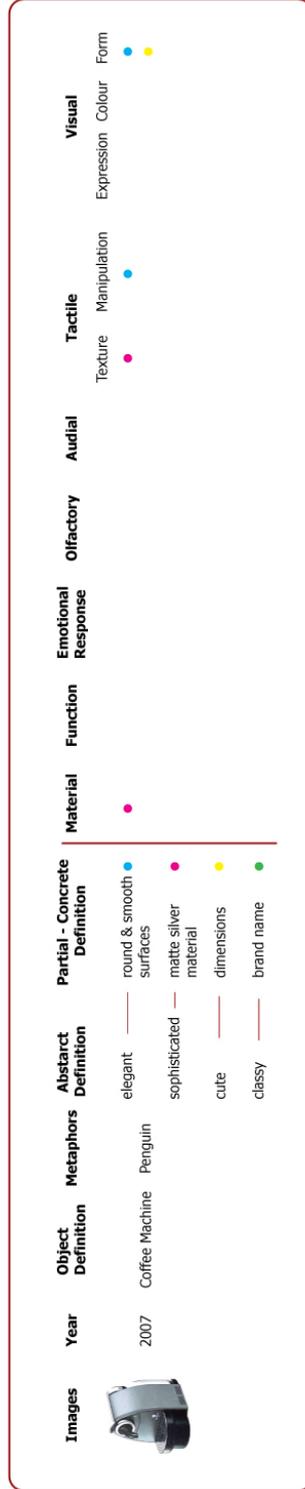


Figure 21. Second Representation of Data Structure

3.3.6 Results

As a result of the Study 2, the product feature descriptions and product characters were collected from the assignments of the students. The assignments were not prepared only paying attention to the visual qualities of the products but also students tried to write down their experiences with products in the assignments. At the end of this study, 236 words were collected, but there were level differences in between also some of the definitions were composed of phrases. The collected product personality characters can be found at the appendix part of the thesis (Appendix E).

3.3.7 Conclusions

Firstly, some of the words in the vocabulary were needed to be reviewed because they did not relate directly with the product personality characteristics. Furthermore, abstract definitions could be associated to partial – concrete definitions and these definitions reached until to sensory and emotional experiences such as *visual*, *olfactory*, *audial*, *tactile*, and *emotional* responses. One more study was needed to be done in order to clarify the categories that could be matched by the product personality characteristics.

3.4 Study 3: Experiment on Product Experiences

3.4.1 Hypothesis

"The experiences arising from human – product interaction help us to define product personality characteristics. Those product personality characteristics can be categorized in a similar way to the personalities ascribed to people."

3.4.2 Set – up

Twenty five graduate and undergraduate students (12 females and 13 males) attended to Study 3 from different disciplines (14 from industrial design engineering, 5 from architecture, 6 from other engineering departments) of Delft University of Technology. Their ages ranged from 20 to 28. Study 3 was performed at the Home Lab of DUT in decontextualized environment. The lab was reserved for one and a half weeks for this study. Each test lasted at least 25 minutes. In the Home lab, a laptop with a loudspeaker, a video camera with tripod and the products were settled (Figure 22). Participation was voluntary. The products used in the second exercise within Study 3 were provided by Elif Özcan, which were all Philips handheld products. Apart from being tactile and having functional properties, there were no specific criteria on the selection of these products (Figure 23).

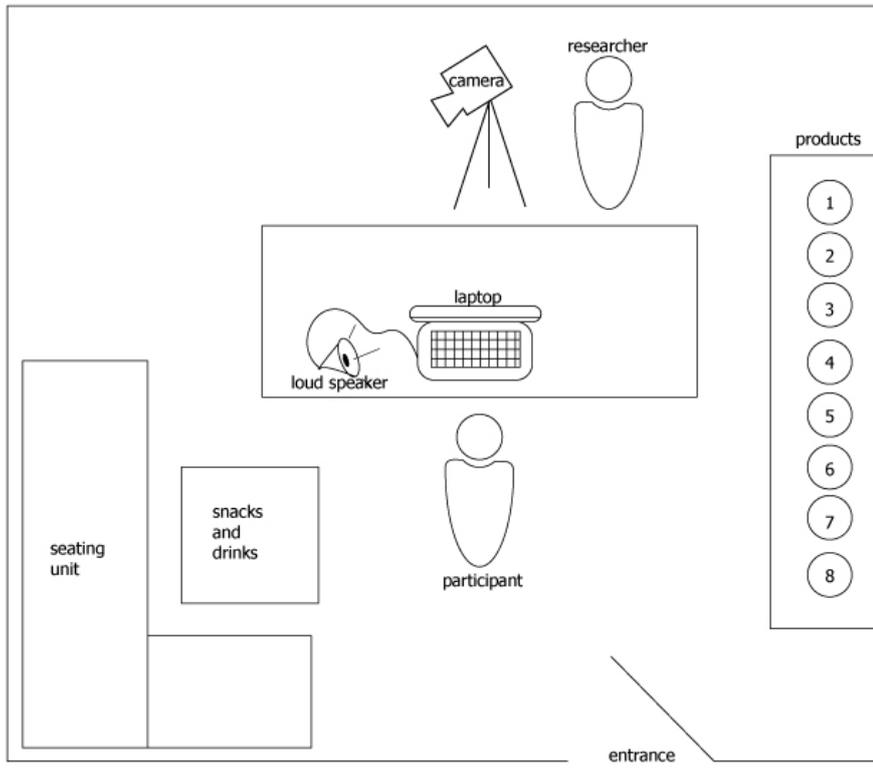


Figure 22. Arrangement at Homelab for Study 3



SHAVER



EPILATOR



TOOTH BRUSH



RECHARGEABLE VACUUM CLEANER



MIXER



HAIR TRIMMER



FOOD PROCESSOR



HAIR DRYER

Figure 23. Products used in Study 3

3.4.3 Conduct

The study composed of two steps, similar to Study 1. The participants were taken to the room one by one. First, they sat in front of the laptop to watch a video. At the beginning of the video, an introduction text as written below was given to them.

"Please, focus on the persons in the scenes and describe them and their personalities OBJECTIVELY. Please avoid describing the effect these people will cause on you."

This video was a combination of excerpts from three different movies; *Tourist*, *Ocean 13* and *Beautiful Mind*. It was shown to the participants as a warm – up exercise. These movies were combined by creating one minute footages of each movie. Special attention was paid to the selected footages where the characters were more understandable, observable and close-up recorded in a context. The video was created by using Adobe Premier Program which lasted three minutes. After each minute of the video, the following footage began and in between two footages, the participants evaluated the characters seen in the video one by one depending on the attitude, behavior and physical appearance of the characters. The participants had enough time to observe the characters in the video in order to come up with objective personality descriptions. This warm - up exercise took at least 10 minutes for each participant, and there was no time limitation during the Study 3.

Following completion of the warm-up exercise, the participants passed to the second (main) exercise, which was the product experience. Before the participants were welcomed at the laboratory, every product was covered with a piece of cloth after placing them on top of the table thus the participants were prevented to generate ideas before seeing the following product. The participants were asked to experience the products one by one freely to establish objective sentences in order to ascertain their experiences. The interaction was being performed in a meaningful order as "Visual", "Manipulation" and "Function" stages and the definitive words were accompanying to these stages. The aim of the researcher was improving the content of the lexicon and observing the stages of human product interaction. The ideas of the participants were expected to establish objective sentences due to the effect of the first impressions.

3.4.4 Data Collection

During the warm-up exercise and the main exercise, all participants were recorded with a video camera. These recordings were saved per participant and grouped by dates. After the study had finished, the recordings of the participants were watched one by one, and summary of the participants' dialogs was put on paper to be able to review the vocabulary.

3.4.5 Analysis

As a consequence of watching participants' recordings, a pattern emerged whilst the participants had interaction with the products. On the contrary, there were two elements that could not be put into an order of interaction which were "Emotions" and "Metaphors". These two elements always appeared in different time slots of the recordings during interaction.

Figure 24 was created depending on the data served by 25 participants at the end of the Study 3. The categories represented in Figure 24 are related with the concrete features of the products. There are abstract terms from the lexicon associated with each category headings. The categories were created according to the data gathered from the Study 3.

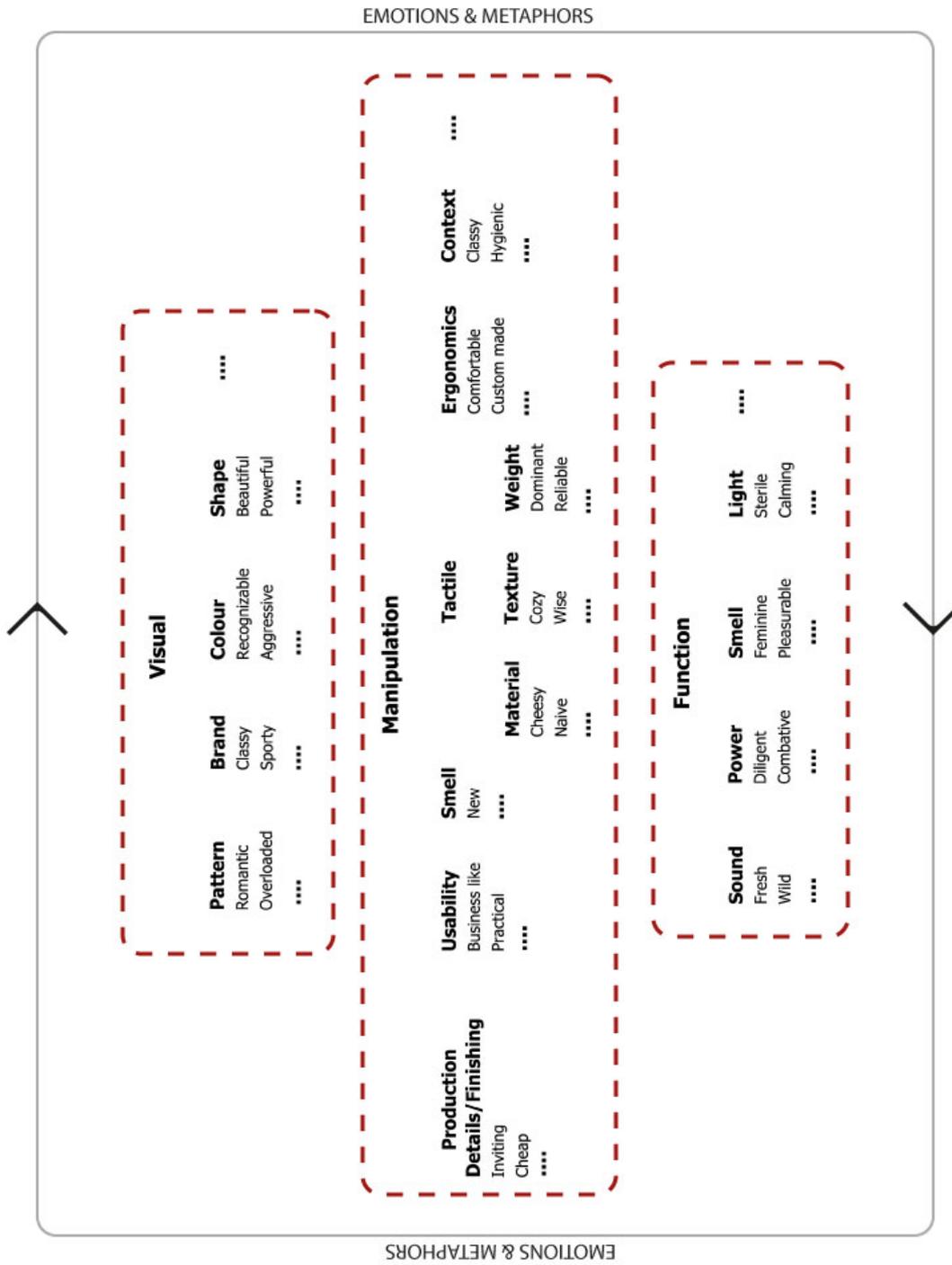


Figure 24. Lexicon Structure According to Different Stages of User-Product Interaction

In Figure 24, the main steps of interaction are depicted into an environment surrounded by emotions and metaphors.

1. **Visual** is the stage when participants just see the product and have ideas without touching or etc. It is the first impression about the product. There are four category headings for visual.

- 1.1 **Pattern:** The graphics which are applied on the product
- 1.2 **Brand:** The sign which shows the name of the producer
- 1.3 **Colour:** The main colour that can be perceived by visual sense
- 1.4 **Shape:** The geometric representation of the product

2. **Manipulation** is the second stage, participants begin to touch the product and have ideas about not only tactile qualities of the product, but also ergonomics, usability, production details and the possible context product may be into. In this stage, participants have closer interaction with the product, and they are able to turn and examine the product in 3D world by themselves. There are six category headings for manipulation.

- 2.1 **Production details/Finishing:** The quality of the production
- 2.2 **Usability:** The definition of the action when the product is used
- 2.3 **Smell:** The smell of the product or material that is made up of
- 2.4 **Tactile**
 - 2.4.1 **Material:** The definition of the material which the product is made up of
 - 2.4.2 **Texture:** The appearance of a product surface
 - 2.4.3 **Weight:** The feeling of the presence of the product
- 2.5 **Ergonomics:** The usage of the product
- 2.6 **Context:** The place where the product can be used

3. **Function** is the latest stage. This is the stage when participants push the on/off button and realize the product's sound, power, light and smell while it is working. There are four category headings for function.

- 3.1 **Sound:** The sound when the product is turned on
- 3.2 **Power:** The feedback when the product is turned on
- 3.3 **Smell:** The smell that product spreads while it is working
- 3.4 **Light:** The signals that can be experienced while the product is plugged in

3.4.6 Results

A lexicon was created which showed the variety of the participants' vocabulary while defining a product's personality characteristics. The data from both Study 2 and Study 3 were combined and created a comprehensive list, showing the relationship between abstract definitions and partial – concrete definitions. This list is provided in (Appendix F, G, H). Even visual experiences have been known dominant, other senses played significant roles during Study 3 to gain valuable insights. For example, most of the participants associated such as;

- *weight* with *quality*,
- *texture* with *use cue*,
- *smell* with the *condition* (old, new, used) of the product and so on.

During the classification of the words used on defining the products' personality characteristics, the difference between the levels of the definitions which were used in the vocabulary was observed (Figure 25). Therefore, the vocabulary was divided into two as "*Features*" and "*Attributes*".

- *Features* are the qualities which can be understood by using senses (ex: the surface of the table is bumpy)
- *Attributes* are the qualities which can be used to define experiences as the outcome of interaction (ex: this table looks chubby)

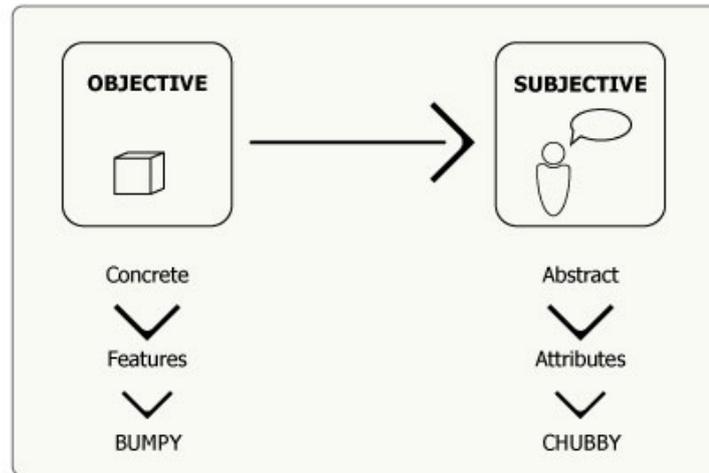


Figure 25. Depiction of Features and Attributes Concept

The usage frequency of the words in the lexicon has been checked, and the words which were used more than two times in the vocabulary, were represented in Figure 26 and Figure 27. The researcher could identify the most known and utilized words by the participants by checking these Figures, which belong to the feature and attribute groups.

In Feature Descriptions;

- *Sporty* had the most amount of use at *visual step* for feature descriptions.
- *Light* and *Cheap* had the most amount of use at *manipulation step* for feature descriptions.
- *Satisfying* had the most amount of use at *function step* for feature descriptions.

In Attribute Descriptions;

- *Strong, Elegant, Stylish, Cool, Classy, Feminine, Professional, Serious* and *Young* had the most amount of use at *visual step* for attribute descriptions.
- *Simple, Friendly, Protective,* and *Cozy* had the most amount of use at *manipulation step* for attribute descriptions.

- *Dangerous, Friendly* and *Scary* had the most amount of use at *function step* for attribute descriptions

Feature Descriptions		
Visual	incompatible	2
	tough	2
	sporty	3
Manipulation	durable	2
	fast	2
	flexible	2
	fragile	2
	matte	2
	robust	2
	sharp	2
	shiny	2
	slippery	2
	smooth	2
	sporty	2
	cheap	3
	light	4
	Function	satisfying

* numbers represent the repetition

Figure 26. Repetition of Vocabulary for Feature Descriptions

Attribute Descriptions

Visual	warm	2	luxurious	2	clumsy	2	active	2	
	sweet	2	sincere	2	fresh	2	young	3	
	sturdy	2	simple	2	foolish	2	serious	3	
	stark	2	funny	2	easy-going	2	professional	3	
	positive	2	scary	2	dynamic	2	feminine	3	
	playful	2	safe	2	cute	2	classy	3	
	ordinary	2	proud	2	confident	2	cool	3	
	old-fashioned	2	high-tec	2	friendly	2	stylish	4	
	mysterious	2	happy	2	clear	2	elegant	4	
	masculine	2	futuristic	2	attractive	2	strong	4	
	Manipulation	advanced	2	retro	2	friendly	4		
		comfortable	2	serene	2	simple	4		
		dynamic	2	stylish	2				
elegant		2	vintage	2					
gentle		2	warm	2					
happy		2	cozy	3					
inviting		2	protective	3					
Function	dangerous	2							
	friendly	2							
	scary	2							

* numbers represent the repetition

Figure 27. Repetition of Vocabulary for Attribute Descriptions

The vocabulary composed of attribute definitions (abstract definitions) was categorized according to the stages of human product interaction. These definitions which were accepted as product personality characteristics are presented in Appendix F for *visual* stage, in Appendix G for *manipulation* stage and in Appendix H for *function* stage. In this study, some of the participants used same words for the definition of different interaction stages. For example, *Aggressive* has been used for both "colour" and "sound" subgroups within the visual and function main categories. The concurrent words can be examined on the basis of visual, manipulation and function sets in Figure 28. As seen on this figure, the definitions related with visual and manipulation stages are more comprehensive than the definitions in function stage.

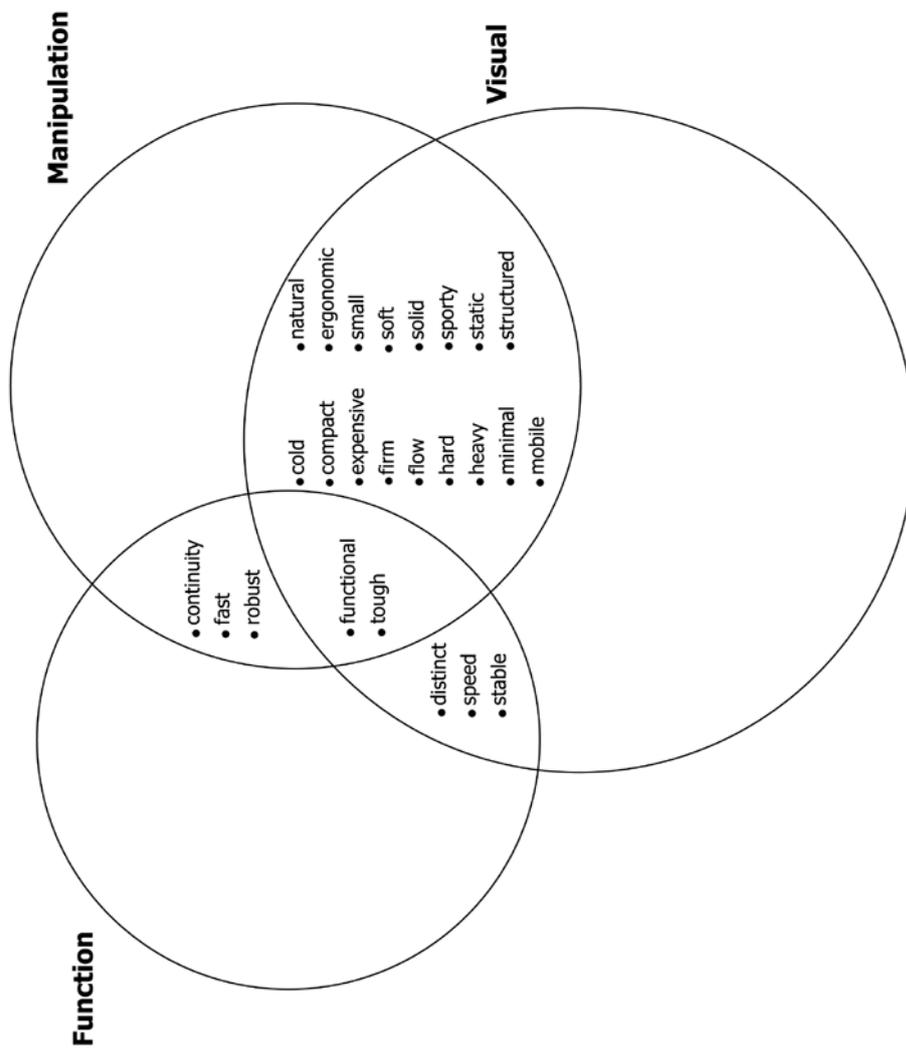


Figure 28. The Convergent Definitions of Attributes and Features

3.4.7 Conclusions

Study 3 was composed of two steps, in the same way as Study 1. First of all, the recordings of the participants were analyzed which nestled large amount of data about the interaction stages and the verbal definitions which were used for generating the product personality characteristics. These definitions were put into a layout according to the stages of human product interaction which was one of the outcomes of the study. The usage frequencies of the vocabulary were found stage by stage and the words which were used mostly by the participants were presented. As a conclusion, the way of categorizing product personality characteristics were explored and the lexicon was formed by using the data of both Study 2 and Study 3.

The product personality characteristics were classified with the use of Goldberg's Big Five Model (1981). The researcher interpreted this model within the product design and created the structure located in Figure 29. The lexicon composed of attribute definitions were categorized by taking product personalities into consideration (Appendix J). The categorization of the words was conducted by researcher with her own knowledge related with the topic. Additionally, the data belongs to personality traits and product personality characteristics in Appendix I and the relationship between partial-concrete definition and product personality characteristics (attribute definitions) can be found in Appendix J.

Extroversion / (-)	This trait can be explained by the characteristics such as exciting, talkative, social and high amount of emotional expressiveness.	 Friendly Coffee Maker
Agreeableness	This trait can be explained by the personality dimension attributes such as trust, altruism, kindness, affection, and other prosocial behaviors.	 Easy - Going Head Phones
Conscientiousness / (-)	This trait includes goal - directed and organized behaviours. High in conscientiousness means to be mindful of details and thoughtful with good impulse control.	 Reliable Mixer
Emotional (Neuroticism)	This trait can be explained by sadness, anxiousness, happiness, aggressiveness and etc.	 Shy Photo Camera
Openness to Experience / (-)	This trait is related with imagination and having high interest to new ideas.	 Traditional Amplifier
Gender	This factor is used for gender related definitions.	 Manly Power Tool
Time	This factor explains concepts related with time.	 Old Looking Watch
Aesthetics	This factor can be used to express the ideas related with the aesthetic definitions.	 Elegant Hair Dryer

Figure 29. Classification of Product Personalities

CHAPTER 4

DESIGN PROJECT – STREAM

“A Dictionarium on Product Experiences for Practicing Industrial Design Students”

Whether giving the lexicon to Bachelor degree design students and expecting from them to use it in their design communications, researcher decided to improve familiarity of the words in the lexicon via designing a game. This tool shall be a game which contains lexicon as a result of the thesis; because Garris et al (2002) concluded that the well designed instructional games can improve the quality of learning and judgment processes. Furthermore, games are the parts of educations of professionals from different fields. This lexicon form of a game is not a design practice tool, it is an educational tool. The aim is not assisting designers to create products such as the cutest or the most aggressive. The aim of the game is expanding individual designer's vocabulary besides improving designers' decision making processes to reach the embedded meaning with sensory properties. Bachelor degree design students will make practice on product experiences with this inspirational tool in the form of a game which is named STREAM. The players create groups consisting of two persons. The importance of being team was depicted in logo of the game (Figure 30). The story and details of the game can be found at following.



Figure 30. Logo of the board game

4.1 Story Arc

One day, four creative people from the different parts of the universe dream of being industrial designers. They all want to make changes to lives of people with their ideas and aspire to be perfect industrial designers. The fate drags them in to the small city of the Netherlands at a university which is named Delft University of Technology or DUT. They spend three years together, work on most of the design projects together as a group, and gain valuable knowledge. After lots of experiences, they have learnt the importance of being communicable in a group for the sake of success of the design projects. Now, they are the owners of one of the leading design firms, STREAM. They look for new industrial designers to their team like YOU, but first you should prove the power of telling your design ideas in a group. Let's Put Your Creativity into Action!

4.2 Game Dynamics

4.2.1 Pieces

- A game board (50cm x 50cm) (Figure 31)
- Four pawns
- A dice
- An hourglass
- Personality Characteristics Cards (Figure 32)
- Sensory Properties Cards (Figure 33)
- Product Stars (Figure 34)



Figure 31. Game Board

TIME	
-CLASSY-	
ANTONYMS	SYNONYMS
tacky	stylish
plain	fashionable
unstylish	voguish
inelegant	swank
	luxe
	glorious
	splendid
	plushy
	smart
tips :	
brown colour	
leather material	
good looking metal parts	
high-durable quality	

Figure 32. Personality Characteristics Card Example

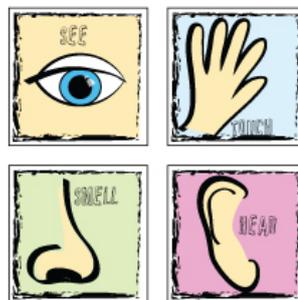


Figure 33. Sensory Properties Cards

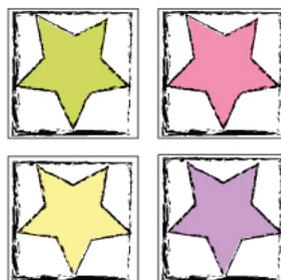


Figure 34. Product Stars

4.2.2 Patterns

In the game, the players should complete 6 sensory properties cards with telling and understanding the personality characteristics of the products. The personality characteristics are given as cards which is also complete lexicon found as the result of thesis. When a player complete one set of (6) sensory properties cards, he / she can put one star to the board.

4.2.3 Paths

There is a physical path in the content of the game (Figure 31). The players should follow the route until collecting all product stars and sensory properties cards.

4.2.4 Probabilities

Each couple will create a group and oversee their well-being during game. Their total numbers of the stars affect future of the game. If pawns stand on the image of dust bin, player loses his / her round and also the selected card is put on the image of dust bin on the board. There are three surprise boxes on the game board which give the opportunity to the players increasing numbers of their sensory properties cards. The player can add any sensory property card to his/her collection.

4.2.5 Prizes

The players get one star in every completing of six sensory properties cards. If their pawns stand on surprise box icons, they can select one free sensory property card. The winner group will be new designers of office STREAM.

4.2.6 Principles

- The game is composed of four players.
- Each couple settle against each other, but two couples from the same group cannot sit next to each other.
- The dice determine the group which one start the first.
- The game flow is clock wise.
- First, one of the person from the beginner group select one card from deck of personality characteristics cards.
- Then, player use dice to move forward the pawn.
- The pawn stays one of the sensory property images on the board path.
- Each player should give the most understandable duty to the teammate in order to be guessed the word written on selected personality card. The duties are related to the players' fantasy world and can be given individually.
- Every player should collect his/her own sensory properties cards and put them on the board. The cards can be given to the player by one of the players who is selected as card holder in the game.
- The couples should collect six stars together in order to win the game.
- One star equals to six sensory properties cards.
- The duties should be related with the sensory properties where the pawn stands on. For example if the pawn stands on *hear*, the player may ask the group mate to slap the door and explain the sound.

- The teller can use tips written on the cards whilst giving duties.
- The teller can check the antonyms and synonyms of the words in order to understand the meaning, but he / she cannot use/tell these words during the game. The player from other group can check the card, whether teller uses those words or not.
- The player should predict the personality characteristics via the directions of the teammate in 3 min. The hour glass will be used during the game.
- Only one laptop or one tablet can be used for four players.
- If there is any role violation, the group will lose turn and put the personality characteristics card back to the deck with face down position.
- The numbers of the collected stars determine the winner.

CHAPTER 5

GENERAL DISCUSSIONS AND CONCLUSIONS

The lexicon form of a game board has main advantages on education of Bachelor degree industrial design students. First of all, increasing familiarity with the words of this lexicon may lead students reaching almost equal level of knowledge and developing their decision-making skills on the issue. Secondly, the words in the lexicon may trigger the ideas of the students to develop new product experiences. Lastly, the students will learn this lexicon unconsciously while playing the game without memorizing the words one by one.

This lexicon related with product experience is pioneering study on product meaning subject. This study will be a guide with its content and innovative way of presenting a lexicon for the further studies. On the other hand, the product personality characteristics subject is very immature, and it was hard to find diverse resources directly related with the subject. Additionally, in Study 1 due to the limited number of participants and the timidity of the participants to talk about product personality characteristics, the results of this study were not comprehensive as much as Study 2 and Study 3.

The lexicon was categorized according to the gained insights from both Study 2 and Study 3; on the other hand, these categories would be more solid if further studies could be done with different product sets and a different range of participants. The lexicon related with product experiences was created according to different phases of user-product interaction by using the data gathered from Study 2 and Study 3. The interaction was occurred in decontextualized environment which means in the lab. There were no real life interactions (eg. brushing teeth in a bathroom). On the other hand, the aim was to learn the first impressions of the participants whilst they come across a product and to interact with it in short time experience. If the participants are allowed to use the products in long term, the definition of experiences may change in time.

In addition, the proficiency of the researcher was not enough to present strong relationships between cognition and human – product experiences. Even though, there are valuable insights of the thesis, there is still a need for linguistic analysis in order to clarify the content of the vocabulary. Furthermore, neither the participants nor the researcher were not native English speakers.

This thesis may be concluded by attempting to answer the research questions mentioned at the beginning of the thesis.

RQ1: What kinds of terminology (words, phrases etc.) do (non) designers use when considering the product experience?

RQ1.1: Can these terminologies be categorized within a framework of product experience (e.g., sensory experiences, aesthetic experiences, emotional experiences)?

RQ1.2: Is there an inherent relationship among these experience-driven categories?

The designers and also non – designers have a vocabulary to define products that can be divided as attributes and features. These words are mostly related with human beings. The composed lexicon, generated from individuals' vocabulary is located in Appendices D, E and F.

The two kinds of categorizations can be done by using these terminologies which were named as vocabulary in the content of the research. The vocabulary was categorized according to the stages of human – product interaction which was composed of the results of Study 2 and Study 3. Additionally, the words used for attribute definitions were categorized according to the interpreted Big 5 model. However, emotion is very subjective and hard to put into a category. As experienced from the Study 3, the emotions can raise any time during interaction. Therefore, the objective emotions were taken into consideration for this study which was mentioned in the literature research as well. For example, even though *happy* is a word used for explaining emotional state, the participant(s) used this word for explaining colour. The personal tastes were not deemed in the group of objective emotions.

The categories might be considered as triggering elements to evoke different memories in the mind of designers. These different memories may be inspirational to designers during their product ideation. On the other hand, the lexicon was prepared according to English language and the direct translation of the words to other languages may not correspond to the same meanings.

RQ2: What is eventually the ‘conceptual network’ of product experiences based on the analysis of people’s product experience vocabulary?

The conceptual network of product experiences begins with product itself and then divides into branches according to the product. In this thesis, the conceptual network of product experiences are composed of pattern, brand, colour, shape, product details/finishing, usability, smell, material, texture, weight, ergonomics, context, sound, power, light and smell (during functioning). The definitions of product experiences form product personality characteristics. On the other hand, during the interaction with the product participants told the concrete product features of products such as *the surface is smooth, the edges are round, and the top of the product is bouncy*.

Furthermore, overall expressions of product experiences elicit emotions. But the researcher could not extrapolate that emotions and metaphors belong to one of the main groups of stages of interaction which are visual, manipulation and function (Figure 34). These two elements may be arise any stages of the interaction. The stages of user-product interaction in Figure 34 were created according to the data from Study 2 and Study 3. The categories of the stages of user-product interaction are relevant with the act and definitions of the participants during the studies. For example, category *context* can be seen under the manipulation stage due to participants used definitions related with context (ex: this is for kitchen, this can be used in the professional saloons, etc.) while they were holding the product physically. The categories can be expanded and organized according to the type of products and aims of the designers.

As a consequence of the interaction, the users have cognitive and sensory experiences. The cognitive experiences and sensory experiences are composed of respectively product personality characteristics and product feature definitions.

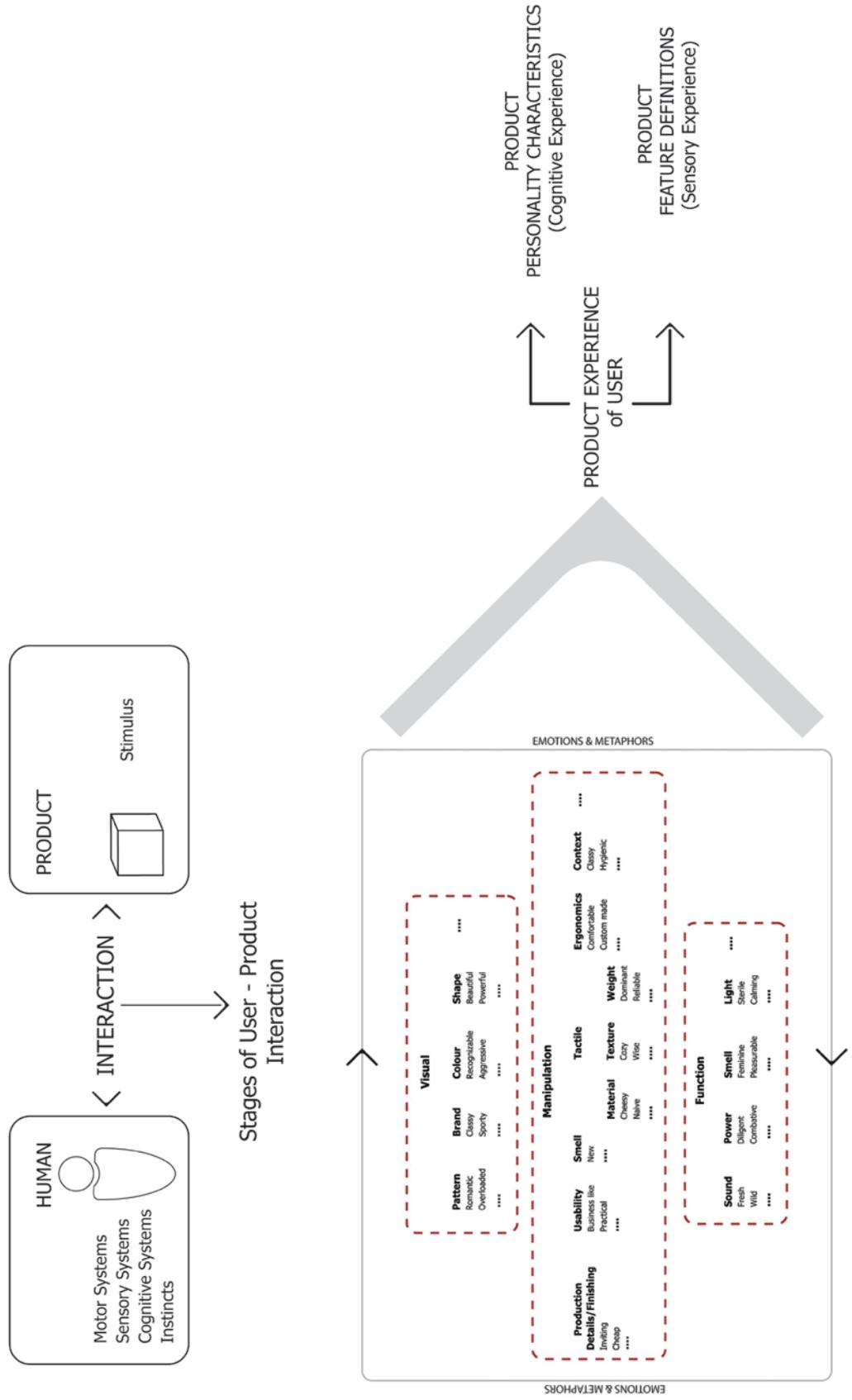


Figure 35. Conceptual Network of Product Experience

RQ3: Can a new communication tool be created that facilitates better within-design-team definition and communication of product personality characteristics? How should the aforementioned conceptual network be used in this tool?

RQ3.1: What form ought the tool take?

It is possible to design a tool to develop the knowledge about product experiences of Bachelor degree students. A board game was designed and the aforementioned conceptual network was embedded as decisions which players should give during the game. On the other hand, this tool which was designed in the form of board game for this thesis is not a guide for designing products with specific personality characteristics. This game is an educational tool which aims to increase the familiarity of the bachelor degree students to the lexicon.

In the game, the lexicon is given on the cards with tips and antonyms/synonyms definitions. The tips are the concrete product feature definitions for product personality characteristics or abstract product features which were told by the participants in the studies. The antonyms and synonyms were found by the researcher via searching dictionaries. The aim of the game is collecting stars together with the group mate by telling and understanding the personality characteristics located on the cards. During the game, the players will confront sensory properties on the path of board. The teller should combine the personality characteristics on the card and sensory property in his/her mind and should give a duty which is totally related with the imagination of the teller to the predictive. As a consequence of this duty, the predictive gain experience which can correspond to the word written on the card. If the prediction is true in the limited time, the player gain one sensory property card and get closer to being winner group.

The prototype of the game was created and it is ready for the user tests. Unfortunately, due to the time limitations it was not achieved to have any user tests after designing and preparing the game in the content of the thesis. The game should be played several times in order to notice the flexibility of the rules and different probabilities arising during the game. After this further study, the game should be ready for trials in the education of Bachelor degree industrial design students about product personality characteristics and product experience.

REFERENCES

- Aaker, J. L. (1997). Dimensions of Brand Personality. *Journal of Marketing Research, Vol 34*, 347–356.
- Biel, A. L. (1993). Converting Image into Equity. In Aaker, D. A. & Biel, A. L. (Ed.), *Brand Equity and Advertising* (67 - 82). Hillsdale, New Jersey: Lawrence Erlbaum Associates.
- Borkenau, P. and Lieber, A. (1992a). The Cross-Modal Consistency of Personality: Inferring Strangers Traits from Visual or Acoustic Information. *Journal of Research in Personality, Vol 26*, 128-204.
- Borkenau, P. and Lieber, A. (1992b). Trait Inferences: Sources of Validity Traits from Visual Zero Acquaintance. *Journal of Personality and Social Psychology, Vol 62*, 645-657.
- Borkenau, P. and Lieber, A. (1995a). Observable Attributes as Manifestations and Cues of Personality and Intelligence. *Journal of Personality and Social Psychology, Vol 62*, 645-657.
- Borkenau, P. and Liebler, A. (1995b). Observable Attributes as Manifestations and Cues of Personality and Intelligence. *Journal of Personality, Vol 63*, 1-25.
- Carver, C. S. and Scheier, M. F. (1996). *Perspectives on Personality* (3rd Ed.). Allyn & Bacon, Needham Heights, USA.
- Collins, A. M., and Loftus, E. F. (1975). A Spreading-Activation Theory of Semantic Memory. *Psychological Review, Vol 82*, 407-428.
- Cowan, N. (1995). *Attention and Memory: An Integrated Framework*. New York: Oxford University Press.
- Crilly, N. Moultrie, J., and Clarkson, P. J., (2008). Shaping Things; Intended Consumer Response and the Other Determinants of Product Form. *Design Studies, Vol 30*, 224-254.
- Cross, N. (2000). *Engineering Design Methods: Strategies for Product Design* (3rd Ed.). Chichester: John Wiley and Sons.
- Desmet, P. M. A. (2002). *Designing Emotions*. Delft: Delft University of Technology.
- Desmet, P. M. A. (2008). Product Emotion. In: H. N. J. Schifferstein, & P. Hekkert (Ed.), *Product Experience* (353-376). Amsterdam: Elsevier Ltd.
- Desmet, P. M. A. and Hekkert, P. (2007). Framework of Product Experience. *International Journal of Design, Vol 1*, 57-66.
- Desmet, P.M.A. and Hekkert, P (2002). The Basis of Product Emotions. In. W. Green and P. Jordan (Ed.), *Pleasure with Products, Beyond Usability* (60-68). London: Taylor & Francis.
- Desmet, P., Ortiznicolas, J., and Schoormans, J. (2008). Product Personality in Physical Interaction. *Design Studies, Vol 29(5)*, 458-477. doi:10.1016/j.destud.2008.06.003
- Encyclo (2012). Definition for the term 'pathemia', available at: <http://www.encyclo.co.uk/define/pathemia>. Last accessed: 12 March 2012.

- Erickson, M. A., and Kruschke, J. K. (1998). Rules and Exemplars in Category Learning. *Journal of Experimental Psychology: General*, Vol 127, 107-140.
- Erickson, M. A., and Kruschke, J. K. (2002). Rule-based Extrapolation in Perceptual Categorization. *Psychonomic Bulletin & Review*, Vol 9, 160-168.
- Garris, R., Ahlers, R., and Driskell, J. E. (2002). Games, Motivation, and Learning: A Research and Practice Model. *Simulation & Gaming*, Vol 33(4), 441-467. doi:10.1177/1046878102238607
- Goldberg, L. R. (1981). Language and Individual Differences; The Search for Universals in Personality Lexicons. In Wheeler, L. (Ed.), *Review of Personality and Social Psychology* (141-165). Beverly Hills, CA.; Sage.
- Govers, C. M., Hekkert, P and Schoormans, J. P. L. (2002). Happy, Cute and Tough: Can Designers Create a Product Personality that Consumers Understand? In D. McDonagh, P. Hekkert, J. Van Erp and D. Gyi (Ed.) *Design and Emotion: The Experience of Everyday Things*. Taylor and Francis. London, (345-349).
- Govers, P. C. M. (2004). Product Personality. Unpublished Doctoral Dissertation. Delft University of Technology, Delft, NL.
- Govers, P. C. M., and Mugge R. (2004). I Love My Jeep, Because It's Tough Like Me: The Effect of Product – Personality Congruence on Product Attachment. In A. Kurtgözü (Ed.), *Proceedings of the Fourth International Conference on Design and Emotion*. Ankara, Turkey.
- Heit, E., & Barselou, L. W. (1996). The Instantiation Principle in Natural Categories. *Memory*, Vol 4, 413-451.
- Hekkert, P. (2006). Design Aesthetics: Principles of Pleasure in Product Design. *Psychology Science*, Vol 48(2), 152-172.
- Hekkert, P. and Leder, H. (2008). Product Aesthetics. In: H. N. J. Schifferstein, & P. Hekkert (Ed.), *Product Experience* (259-285). Amsterdam: Elsevier Ltd.
- Hintzman, D. L. (1986). Schema Abstraction in a Multiple-Trace Memory Model. *Psychological Review*, Vol 93, 411-428.
- Hjelle, L. A., Ziegler, D. J. (1981). *Personality Theories: Basic Assumptions, Research and Applications*. McGraw-Hill. New York.
- Hsu, S. H., Chuang, M. C. and Chang, C. C. (2000). A Semantic Differential Study of Designers' and Users' Product Form Perception. *International Journal of Industrial Ergonomics*, Vol 25(4), 375-391.
- Janlert, L. E. and Stolterman, E. (1997). The Character of Things. *Design Studies*, Vol 18, 297-314.
- Jones, E. E. (1990). *Interpersonal Perception*. W.H. Freeman and Company, New York.
- Jordan, P. W. (1997). Products as Personalities, in Robertson, S. A. (Ed.), *Contemporary Ergonomics*, (77-78). Taylor & Francis. London.
- Karjalinen, T. M. (2007). It looks like a Toyota: Educational approaches to designing for visual brand recognition. *International Journal of Design*, 1 (1), 67-81.

- Knowlton, B. (1997). Declarative and Nondeclarative Knowledge: Insights from Cognitive Neuroscience. In K. Lamberts & D. Shanks (Ed.), *Knowledge, Concepts and Categories* (215-246). Cambridge, MA: MIT Press.
- Krippendorff, K. (1989). On the Essential Contexts of Artifacts or on the Proposition that "Design is Making Sense (of Things)". *Design Issues*, 5(2), 9-39.
- Leeper, R. (1935). A Study of A Neglected Portion of The Field of Learning the Development of Sensory Organization. *Journal of Genetic Psychology*, Vol 46, 41-75.
- Markman, A. B., and Gentner, D. (2001). Thinking. *Annual Review of Psychology*, Vol 52, 223-247.
- Markman, A. B., and Medin, D. L. (2002). Decision Making. In D. Medin (Ed.), *Stevens' Handbook of Experimental Psychology (3rd Ed.)*, Vol 2, 413-466. New York: Wiley.
- Matlin M. W (2005). *Cognition*; (6th Ed.). John Wiley & Sons, Inc. United States of America. ISBN 978-0-471-45007-8.
- Merriam Webster (2012a). Definition for the term 'character', available at: <http://www.merriam-webster.com/dictionary/character>. Last accessed: 10 May 2012.
- Merriam Webster (2012b). Definition for the term 'experience', available at: <http://www.merriam-webster.com/dictionary/experience>. Last accessed: 10 May 2012.
- Merriam Webster (2012c). Definition for the term 'interaction', available at: <http://www.merriam-webster.com/dictionary/interaction>. Last accessed: 10 May 2012.
- Merriam Webster (2012d). Definition for the term 'personality', available at: <http://www.merriam-webster.com/dictionary/personality>. Last accessed: 10 May 2012.
- Montepare, J M and Zebrowitz-McArthur, L (1988). Impressions of People Created by Age-Related Qualities of Their Gaits, *Journal of Personality and Social Psychology* Vol 55, 547-556.
- Murphy, G. L. (2002). *The Big Book of Concepts*. Cambridge, MA: MIT Press.
- Murphy, K. R. and Davidshofer, C. O. (1994). *Psychological Testing*. New Jersey: Prentice Hall.
- Nass, C., Moon, Y., Fogg, B. J., Reeves, B and Dryer, D. C. (1995). Can Computer Personalities be Human Personalities?. *International Journal of Human-Computer Studies*. Vol 43, 223-239.
- Neisser, U. (1967). *Cognitive Psychology*. New York: Appleton.
- Özcan, E. (2011). Conceptualization of Product Sounds: Learning from Mindmaps. *Proceedings of the 4th World Conference on Design Research (IASDR)*, Delft, 2011.
- Özcan, E. and Sonneveld, M. (2009). *Embodied Explorations of Sound and Touch in Conceptual Design*. Delft: Delft University of Technology.
- Palmer, S. E. (2002). Perceptual Organization in Vision. In S. Yantis (Ed.), *Stevens' Handbook of Experimental Psychology (3rd Ed.)*, Vol 1, 177-234. New York: Wiley.
- Personality Project (2012). Information about 'big 5', available at: <http://www.personality-project.org/theory/big5.table.html>. Last accessed 12 March 2012.
- Postrel, V. (2003). *The Substance of Style*. New York: Harper Collins.

Psyche Yourself (2012). Information about 'Eysenck's three dimensions', available at: <http://psyche-yourself.tumblr.com/post/11305639405/thisisnotpsychology-eysencks-three-dimensions> . Last accessed: 12 March 2012.

Psychology About (2012a). Information about 'Hans Eysenck', available at: <http://psychology.about.com/od/profilesal/p/hans-eysenck.htm>. Last accessed: 12 March 2012.

Psychology About (2012b). Information about 'Raymond Cattell', available at: <http://psychology.about.com/od/profilesal/p/raymond-cattell.htm>. Last accessed: 12 March 2012.

Psychology About (2012c). Information about 'trait theory', available at: <http://psychology.about.com/od/theoriesofpersonality/a/trait-theory.htm>. Last accessed: 12 March 2012.

Rosch, E. H. (1973). Natural Categories. *Cognitive Psychology, Vol 4*, 328-350.

Russell, J. A. (1980). A Circumplex Model of Affect. *Journal of Personality and Social Psychology* , 39(6), 1161-1178.

Schiffenstein, H. N. J. and Cleiren, M. P. H. D. (2005). Capturing Product Experiences: A Split – Modality Approach. *Acta Psychologica, Vol 118*, 293-318.

Schiffenstein, H. N. J. and Spence, C. (2008). Multisensory Product Experience. In: H. N. J. Schiffenstein, & P. Hekkert (Ed.), *Product Experience* (333-351). Amsterdam: Elsevier Ltd.

Schneider, D. J., Hastorf, A. H., Ellsworth, P.C. (1979). *Person Perception*; 2nd Ed. Addison-Wesley Publishing Company. Massachusetts.

Sirgy, M. J. (1982). Self – Concept in Consumer Behavior: A Critical Review. *Journal of Consumer Research, Vol 9*, 287-300.

Smith, C. A. and Ellsworth, P. C. (1987). Patterns of Appraisal and Emotion Related to Taking an Exam. *Journal of Personality and Social Psychology, Vol 52*, 475-488.

Smith, E. E., Shoben, E. J., and Rips, L. J. (1974). Structure and Process in Semantic Memory: A Featural Model for Semantic Decisions. *Psychological Review, Vol 81*, 214-241.

Smith, J. D. (2002). Exemplar Theory's Predicted Typicality Gradient Can be Tested and Disconfirmed. *Psychological Science, Vol 13*, 437-442.

Sperling, G. (1960). The Information Available in Brief Visual Presentations. *Psychological Monographs, Vol 74*, 1-29.

Sternberg, R. J., and Ben-Zeev, T. (2001). *Complex Cognition: The Psychology of Human Thought*. New York: Oxford University Press.

Van Rompay, T. J. L. (2008). Product Expression: Bridging the Gap between The Symbolic and The Concrete. In: H. N. J. Schiffenstein, & P. Hekkert (Ed.), *Product Experience* (333-351). Amsterdam: Elsevier Ltd.

Van Rompay, T. J. L., Pruyn, A. T. H., & Tieke, P. (2009). Symbolic Meaning Integration in Design and Its Influence on Product and Brand Evaluation. *International Journal of Design, Vol 3* (2), 19-26.

Veblen, T. (1899). *The Theory of the Leisure Class*. New York: The New American Library.

Veryzer, R. W. (1995). The Place of Product Design and Aesthetics in Consumer Research. *Advances in Consumer Research*, Vol 22, 641-645.

Wheeler, M. A. (2000). Episodic Memory and Autoegetic Awareness. In E. Tulving & F. I. M. Craik (Ed.), *The Oxford Handbook of Memory* (597-608). New York: Oxford University Press.

Wisniewski, E. J. (2002). Concepts and Categorization. In D. Medin (Ed.), *Stevens' Handbook of Experimental Psychology (3rd Ed.) Vol 2*, 467-531. New York: Wiley.

Zebrowitz, L. A. (1990). *Social Perception*. Buckingham, UK: Open University Press.

APPENDIX A

THE ORIGINAL STUDY 1 DOCUMENTS FOR THE PERSONIFICATION METHOD

14.12.2011

DEAR STUDENTS,

AS YOU ALSO HAVE KNOWN, EVERY PRODUCT DESIGN SESSION BEGINS WITH A BRIEF OR DESCRIPTION. DESIGNERS NEED TO UNDERSTAND AND EVALUATE THE BRIEF FROM HIS POINT OF VIEW TO DESIGN PRODUCTS. THIS BEGINNING LEVEL CAN BE VERY COMPLEX AND MEANWHILE THERE ARE LOTS OF THINGS TO CONSIDER.

TODAY, THIS WORKSHOP WILL HELP YOU TO EXPERIENCE HOW YOU CAN AWARE OF THE PROPER PRODUCT MEANINGS TO SOLVE COMPLEXITY IN MEANING WITH USING DIFFERENT METHODS.
(POETIC DESCRIPTION & PERSONIFICATION)

- THIS WORKSHOP WILL TAKE 1 HOUR AND TOMORROW YOU WILL HAVE SHORT ORAL PRESENTATION ABOUT WHAT YOU COME UP WITH DESIGN METHODS.
- YOU WILL WORK TOGETHER WITH YOUR BUDDY, BUT YOU WILL PREPARE YOUR OWN PRODUCT MEANING DESCRIPTION.
- EVERY GROUP WILL WORK ON SAME PRODUCT GROUP
- EVERY TABLE WILL COMPOSED OF 4 PEOPLE; 2 PEOPLE WILL WORK WITH POETIC DESCRIPTION AND ANOTHER 2 WILL WORK ON PERSONIFICATION. YOU ARE FREE TO SHARE OR DISCUSS YOUR IDEAS WITH OTHER TEAM SITTING ON SAME TABLE.

HAVE FUNNY AND JUICY WORKSHOP !

Elif OZCAN VIEIRA & Gonca ONUSLUEL

PART 1 - SENSITIZING



NOW, WE WILL WATCH THE TRAILER OF CLOSER MOVIE FOR 2:15 MIN. TO WARM UP THE WORKSHOP.

AFTER THE MOVIE TRAILER, I WANT YOU TO EXPRESS THE FEELINGS, PERSONALITIES, CONTEXT, ETC. YOU CATCH DURING THIS 2 MIN. AND EXPLAIN HOW YOU CAN COME UP WITH THESE IDEAS, WHAT ARE THE TRIGGERING POINTS TO AWAKE THE CERTAIN EMOTIONS FOR YOU?

YOU HAVE **5 MIN.** FOR THIS SMALL WARM UP EXERCISE, PLEASE USE THE AREA BELOW....

PART 2 - MEANING ANALYSE



THIS IS THE PRODUCT YOU WILL WORK FOR THIS WORKSHOP. PLEASE TEST THE PRODUCT, FEEL IT, TRY TO UNDERSTAND ITS SPECIFICATIONS, FEATURES, ETC.

THEN, EXPLAIN;

- WHAT KIND OF PRODUCT IS THIS?
- ITS FUNCTION(s)?

PRODUCT:

FUNCTION(s):

PART 3 - PERSONIFICATION

HERE YOU WILL FIND AN EXAMPLE FROM LITERATURE HOW A PERSON CAN BE DESCRIBED TO HELP YOU FOR THIS EXERCISE.

READ IT CAREFULLY AND TRY TO UNDERSTAND THE PERSONS IN THE STORY.

DURATION: For Reading 2MIN.

Sense and Senbility Chapter 7 - Jane **Austen** (1981)
.....
Mrs. Jennings, Lady Middleton's mother, was a good-humoured, merry, fat, elderly woman, who talked a great deal, seemed very happy, and rather vulgar. She was full of jokes and laughter, and before dinner was over had said many witty things on the subject of lovers and husbands; hoped they had not left their hearts behind them in Sussex, and pretended to see them blush whether they did or not...

Colonel Brandon, the friend of Sir John, seemed no more adapted by resemblance of manner to be his friend, than Lady Middleton was to be his wife, or Mrs. Jennings to be Lady Middleton's mother. He was silent and grave. His appearance, however, was not unpleasing, in spite of his being in the opinion of Marianne and Margaret an absolute old bachelor, for he was on the wrong side of five-and-thirty; but though his face was not handsome his countenance was sensible, and his address was particularly gentlemanlike.
.....

NOW ACCEPT THIS PRODUCT AS A PERSON AND GIVE DETAILS ABOUT FOR EXAMPLE;

ITS AGE, NAME, GENDER, HOW IT IS STANDING, MOVING OR HOW YOU FEEL WHEN YOU TOUCH IT, ETC... TELL AS MORE AS YOU CAN ABOUT THIS PERSON, ACCEPT THAT YOU ARE TRYING TO EXPLAIN IT TO SOMEONE WHO HAS NO IDEA ABOUT IT.



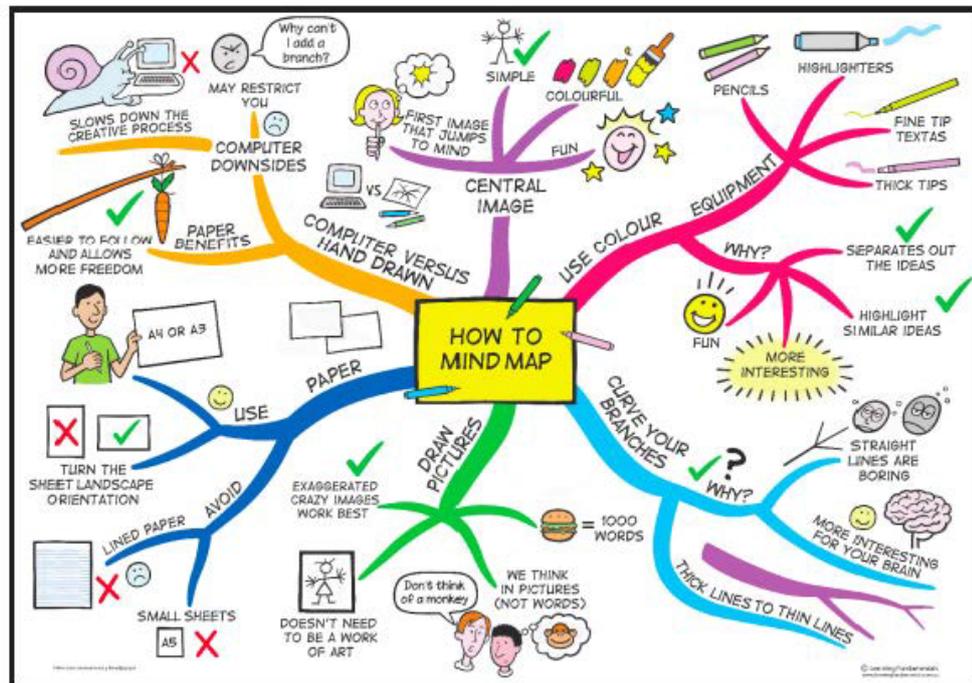
PART 3 - PERSONIFICATION

PLEASE WRITE YOUR ESSAY HERE : (DON'T FORGET TO GIVE TITLE TO YOUR ESSAY)

PART 4 - MIND MAPPING

YOU ARRIVED TO 4TH STAGE AND KNOW LOTS OF THINGS ABOUT YOUR PRODUCT. NOW I WANT FROM YOU TO ANALYZE ALL THE SPECIFICATIONS, KEYWORDS, ETC. AND PUT THE MOST DOMINANT CHARACTER OF THE PRODUCT MIDDLE AND CREATE A MINDMAP.

HERE YOU WILL FIND AN MINDMAP EXAMPLE ABOUT HOW CAN YOU CREATE MINDMAP.



APPENDIX B

THE ORIGINAL STUDY 1 DOCUMENTS FOR THE POETIC DESCRIPTION METHOD

14.12.2011

DEAR STUDENTS,

AS YOU ALSO HAVE KNOWN, EVERY PRODUCT DESIGN SESSION BEGINS WITH A BRIEF OR DESCRIPTION. DESIGNERS NEED TO UNDERSTAND AND EVALUATE THE BRIEF FROM HIS POINT OF VIEW TO DESIGN PRODUCTS. THIS BEGINNING LEVEL CAN BE VERY COMPLEX AND MEANWHILE THERE ARE LOTS OF THINGS TO CONSIDER.

TODAY, THIS WORKSHOP WILL HELP YOU TO EXPERIENCE HOW YOU CAN AWARE OF THE PROPER PRODUCT MEANINGS TO SOLVE COMPLEXITY IN MEANING WITH USING DIFFERENT METHODS.
(POETIC DESCRIPTION & PERSONIFICATION)

- THIS WORKSHOP WILL TAKE 1 HOUR AND TOMORROW YOU WILL HAVE SHORT ORAL PRESENTATION ABOUT WHAT YOU COME UP WITH DESIGN METHODS.
- YOU WILL WORK TOGETHER WITH YOUR BUDDY, BUT YOU WILL PREPARE YOUR OWN PRODUCT MEANING DESCRIPTION.
- EVERY GROUP WILL WORK ON SAME PRODUCT GROUP
- EVERY TABLE WILL COMPOSED OF 4 PEOPLE; 2 PEOPLE WILL WORK WITH POETIC DESCRIPTION AND ANOTHER 2 WILL WORK ON PERSONIFICATION. YOU ARE FREE TO SHARE OR DISCUSS YOUR IDEAS WITH OTHER TEAM SITTING ON SAME TABLE.

HAVE FUNNY AND JUICY WORKSHOP !

Elif OZCAN VIEIRA & Gonca ONUSLUEL

PART 1 - SENSITIZING



NOW, WE WILL WATCH THE TRAILER OF CLOSER MOVIE FOR 2:15 MIN. TO WARM UP THE WORKSHOP.

AFTER THE MOVIE TRAILER, I WANT YOU TO EXPRESS THE FEELINGS, PERSONALITIES, CONTEXT, ETC. YOU CATCH DURING THIS 2 MIN. AND EXPLAIN HOW YOU CAN COME UP WITH THESE IDEAS, WHAT ARE THE TRIGGERING POINTS TO AWAKE THE CERTAIN EMOTIONS FOR YOU?

YOU HAVE **5 MIN.** FOR THIS SMALL WARM UP EXERCISE, PLEASE USE THE AREA BELOW....

PART 2 - MEANING ANALYSE



THIS IS THE PRODUCT YOU WILL WORK FOR THIS WORKSHOP. PLEASE TEST THE PRODUCT, FEEL IT, TRY TO UNDERSTAND ITS SPECIFICATIONS, FEATURES, ETC.

THEN, EXPLAIN;

- WHAT KIND OF PRODUCT IS THIS?
- ITS FUNCTION(s)?

<p><u>PRODUCT:</u></p>
<p><u>FUNCTION(s):</u></p>

PART 3 - POETIC DESCRIPTION

HERE YOU WILL FIND AN EXAMPLE FROM LITERATURE HOW A PRODUCT CAN BE DESCRIBED TO HELP YOU FOR THIS EXERCISE.

READ IT CAREFULLY AND TRY TO UNDERSTAND THE MOOD OF WRITER AND DESCRIBED PRODUCT IN THE POEM.

DURATION: For Reading 2MIN.

.....
And the silken, sad, uncertain rustling of each purple curtain
Thrilled me- filled me with fantastic terrors never felt before;
So that now, to still the beating of my heart, I stood repeating,
"Tis some visitor entreating entrance at my chamber door-
Some late visitor entreating at my chamber door; -
This it is, nothing more"
..... *The Raven (1845), Edgar Alan Poe*

NOW ACCEPT THIS PRODUCT AS A PERSON AND WRITE A POEM FOR IT, REFLECT THE FEELINGS, CHARACTERISTICS ABOUT PRODUCT BY EXPLAINING FOR EXAMPLE;

ITS AGE, NAME, GENDER, HOW IT IS STANDING, MOVING OR HOW YOU FEEL WHEN YOU TOUCH IT, ETC...
TELL AS MORE AS YOU CAN ABOUT THIS PERSON, ACCEPT THAT YOU ARE TRYING TO EXPLAIN IT TO SOMEONE WHO HAS NO IDEA ABOUT IT.



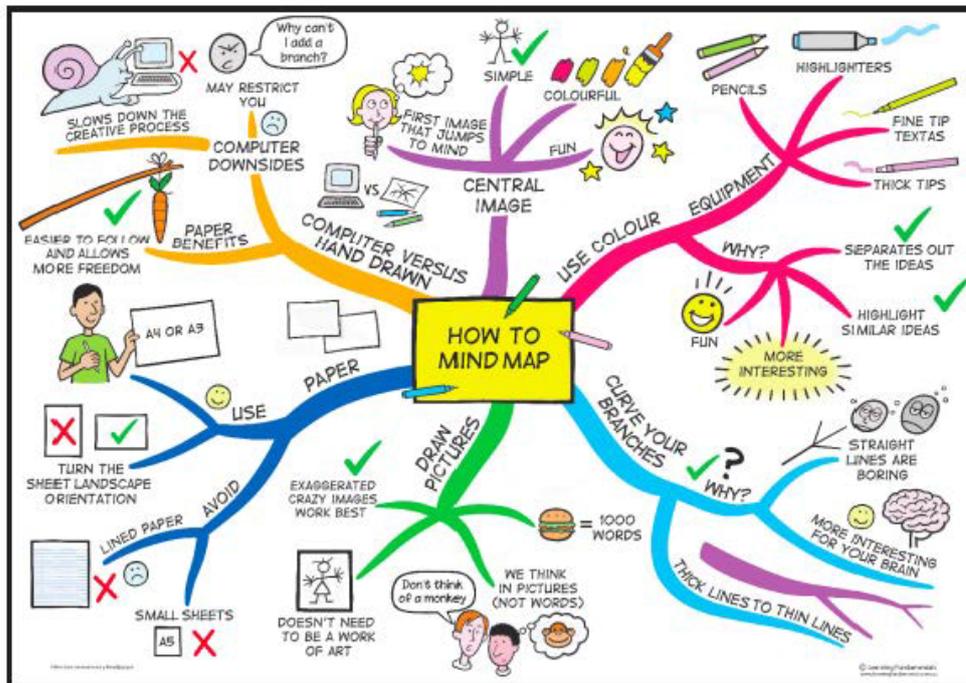
PART 3 - PERSONIFICATION

PLEASE WRITE YOUR POEM HERE : (DON'T FORGET TO GIVE TITLE TO YOUR POEM)

PART 4 - MIND MAPPING

YOU ARRIVED TO 4TH STAGE AND KNOW LOTS OF THINGS ABOUT YOUR PRODUCT. NOW I WANT FROM YOU TO ANALYZE ALL THE SPECIFICATIONS, KEY WORDS, ETC. AND PUT THE MOST DOMINANT CHARACTER OF THE PRODUCT MIDDLE AND CREATE A MINDMAP.

HERE YOU WILL FIND AN MINDMAP EXAMPLE ABOUT HOW CAN YOU CREATE MINDMAP.



APPENDIX C

POEMS, ESSAYS AND MINDMAPS OF THE PARTICIPANTS AT STUDY 1

Student 1 (Poetic Description)

When the rain is gathering
And the others are boring
This one is restless and wild
Proud with its own agenda
Will conquer all
Since this is one of a
Proud with its head in the wind

Student 2 (Poetic Description)

You are a classic one,
I can rely on you
Robust and strong are you characters and that make me feel safe
But when you come home,
You can become weak
You make me happy because you are also
Playful and happy
I really like you.

Student 3 (Poetic Description)

A proud knight!
Conquering a And land
With fast and powerful strokes
Ploughing through flesh
Protecting the kingdom

..... and brave
But never shall you
Flying home to your family
To take care on a man
A proud knight
A simple man

Student 4 (Poetic Description)

Fun suits you well,
You don't keep you happiness inside you
You gave me safety with your strong body
As manly as you are outside as tough as you look
Your warmth enlightens my world
We run fast through the woods where you
Let me be myself
You understand what I want, but do not always want to help me.
But still I can be proud of you and
You are proud that you are mine
No one will get you down; you are one of a kind.

Student 5 (Personification)

James is a 35 years old lawyer, one that looks a bit serious but with his heart in the right places. He is unique but not in an overly eccentric way; he is different in a classy way. He is decisive and strong / confident when he talks, being with him feels safe. When an argument, he helps you and backs you up. He is a broad; not fat but slender. He has black straight hair (short / medium length). When you are in trouble, he will shelter you at his home. He is sharp dressed, refined and classy. He walks strong and confident. Proud but not cocky.

Student 6 (Personification)

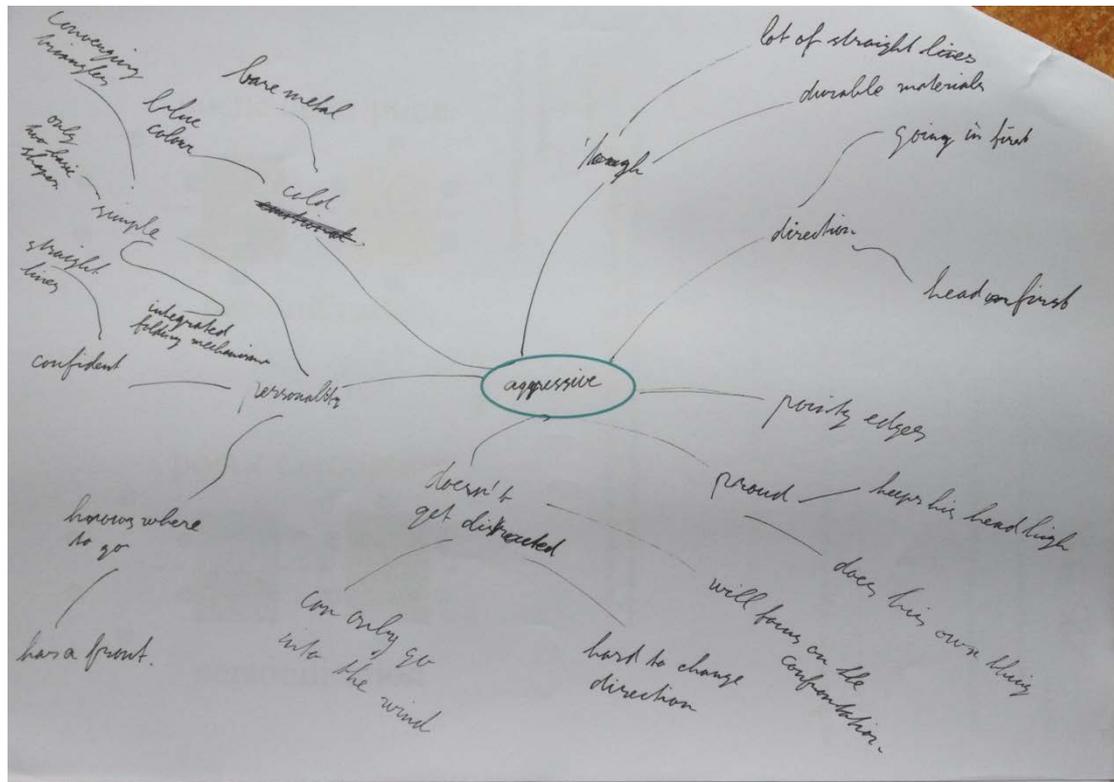
The Shy Man

Mr. James was a 30 years old strange and outstanding man. He never shows his inside to others. He always wanted to do it on his way, but he was shy and always on his own. Besides that he was sportive and has a masculine and strictly. When he walked across the streets, everyone turns their heads because he has something different than others.

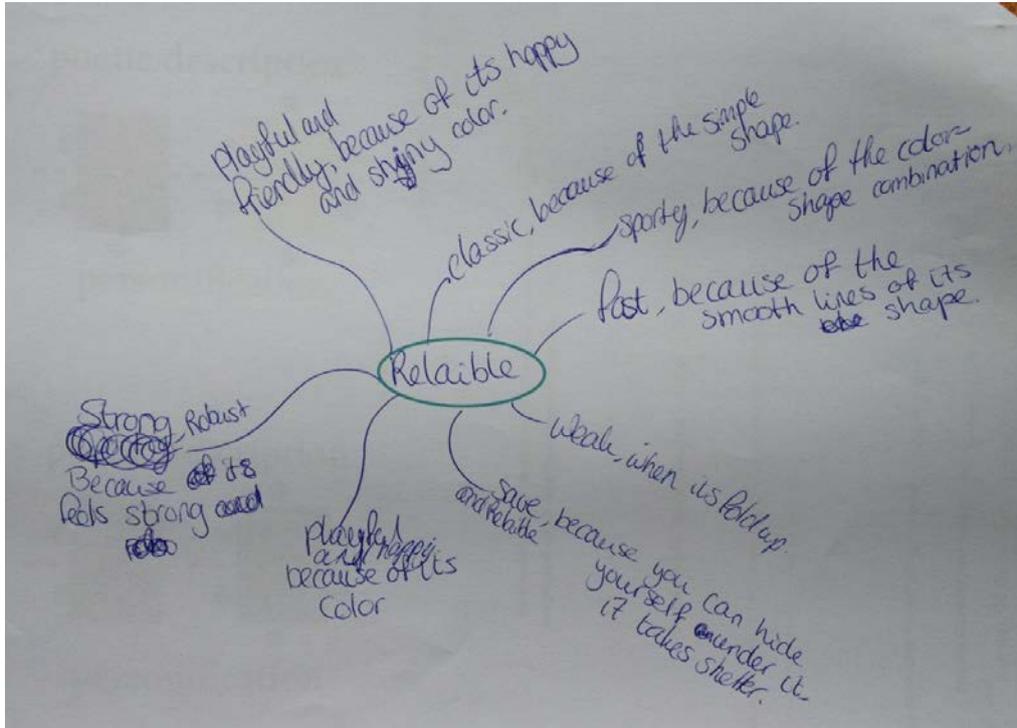
Student 7 (Personification)

I am modern and innovative. I am also inviting and cheerful when I am open. Closed I am a little shy. Although I am feminine on the one side, other side of me is a bit masculine. I am constructed mostly out of straight lines. I am quite fast an always ready to go away. But of all the rest I am smooth and easy to go along. I am a sporty young girl.

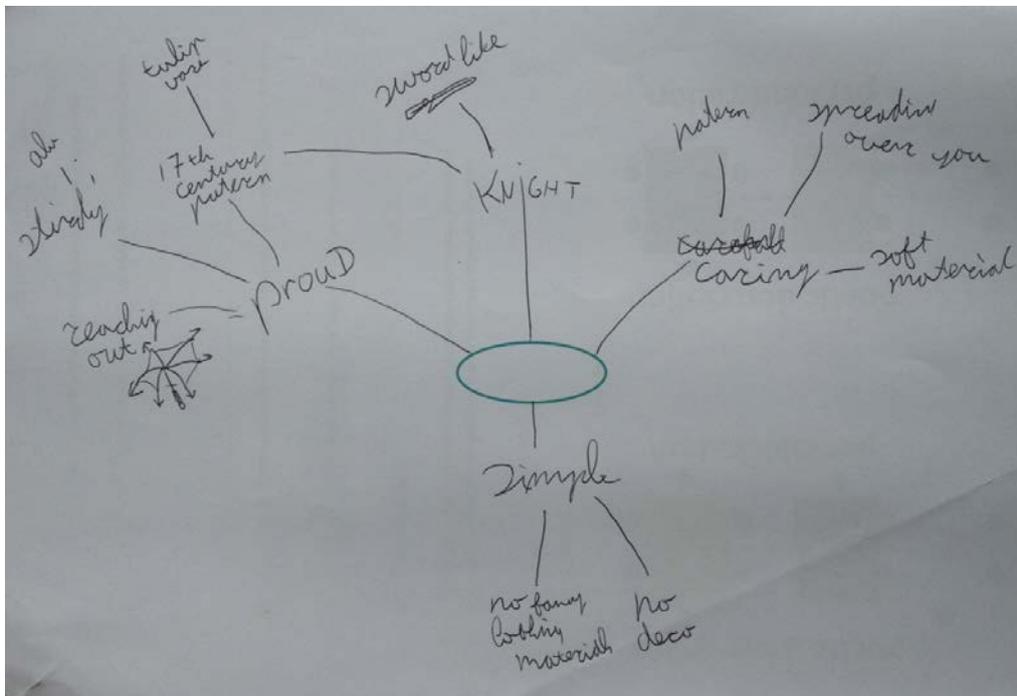
Student 1 (Mindmap)



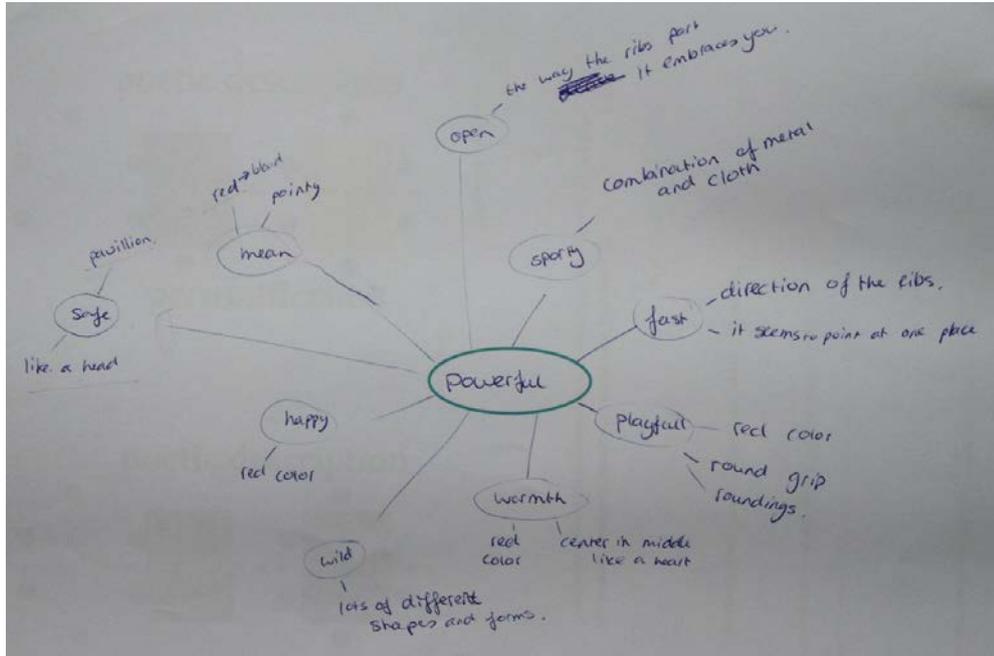
Student 2 (Mindmap)



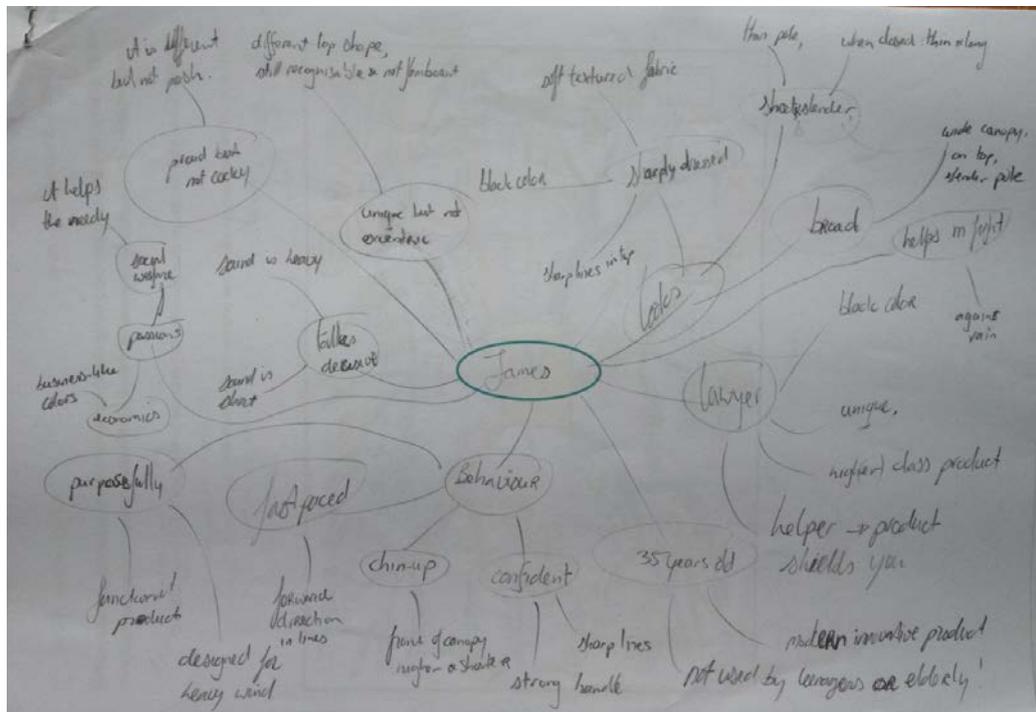
Student 3 (Mindmap)



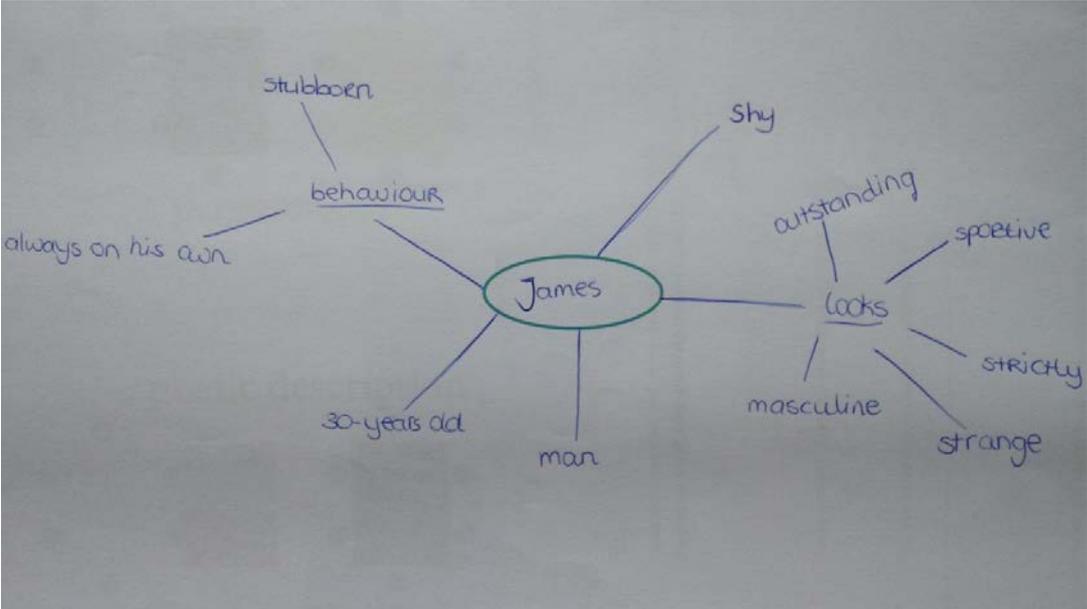
Student 4 (Mindmap)



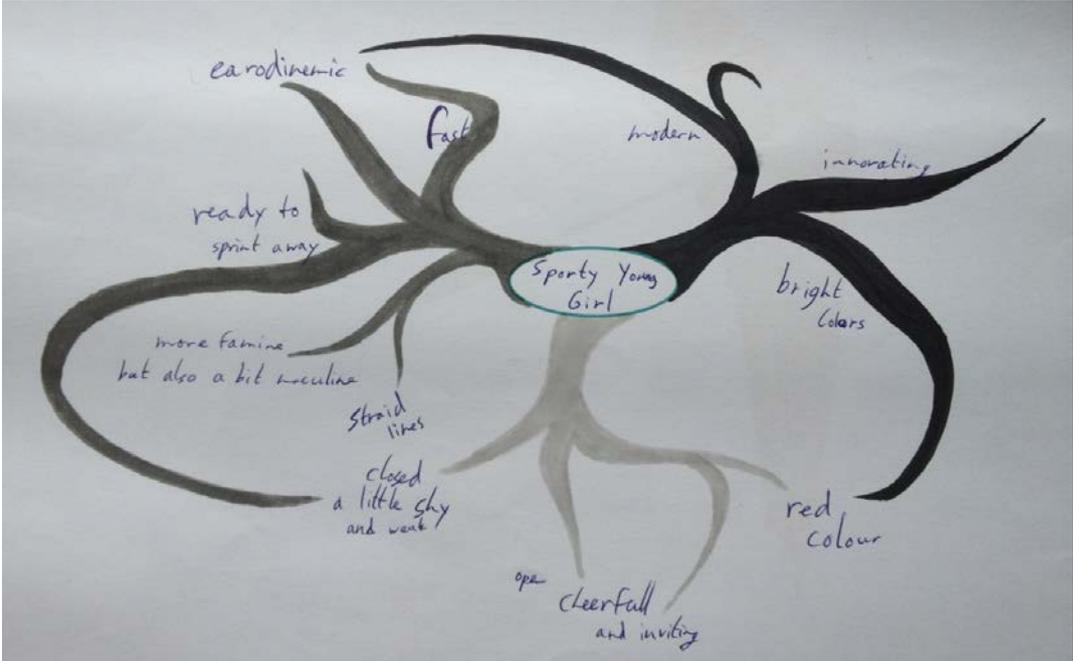
Student 5 (Mindmap)



Student 6 (Mindmap)



Student 7 (Mindmap)



APPENDIX D

ANSWERS OF THE PARTICIPANTS AT STUDY 1

Table 3. Answers of the Participants at Study 1

Participant2		<i>POETIC DESCRIPTION</i>	
		Proud knight	Sword like shape
		Brave	Related with knight metaphor
		Protecting	Aim
		Powerful	Sturdy materials
		Fast	Aerodynamic
		Simple	The whole image
		Caring	Softness
		Boring	Pattern
		Wild	Shape allows wildness
Participant3		<i>POETIC DESCRIPTION</i>	
		Powerful	It can stand steady against wind
		Fun	Opening up
		Warmth	Colour – Heart
		Wild	Different shape
		Reliable	Rigid
		Happy	Colour
		Weak	
		Pleasantness	
Participant4		<i>PERSONIFICATION</i>	
		Sportive	Red Colour
		Modern	
		Innovative	Functional
		Shy	When it is closed
		Feminine / Masculine	
		Fast	Automatic opening
	Light		
Participant5		<i>PERSONIFICATION</i>	
		Unique	Not eccentric shape
		Proud	Side view
		Confident	Functional
		Lawyer	Defend / Stand out
	Decisive		

APPENDIX E

A To Z Verbal Descriptions Of The Participants From Study 2 And Study 3

Table 4. A to Z Verbal descriptions of the Participants from Study 2 and Study 3

Active	Eye Catcher	Mysterious	Sensitive
Advanced	Fast	Naive	Serious
Aerodynamic	Feasible	Natural	Sexy
Aggressive	Feminine	Neat	Shabby
Aloud	Firm	New	Sharp Angled
Annoying	Flow	Nice	Silent
Assertive	Freedom Given To Others	No Pain Feeling (Flower)	Silly
Attractive	Fresh	Nobleness	Similar
Austere	Friendly	Noisy	Simple
Awful	Frustrated	Not Chic	Sleek
Awkward	Functional	Not Disturbing	Slender
Bam Bam Bam..	Funny	Not Elegant	Slender
Beautiful	Gibbous	Not Noisy	Slippery
Bends Over A Bit Like Apologizing	Girly	Not Stable	Small
Big	Glorified	Not User Friendly	Smooth
Bisexual	Glossy	Not Very Attractive	Sneaky
Bizz...	Good	Not Very Expensive	Soft
Boring	Good Looking	Not Very Powerful	Soft
Boring/Bored	Graceful	Offbeat	Solid
Bulky	Handy	Old	Sophisticated
Burn	Happy	Old Style	Sorrowful
Business Looking	Hard To Realize	Ordinary	Speed
Calm	Harsh	Organic	Sportive
Casual	He Is Simulating The Sound	Organized	Sporty
Cheap	Heavy	Oval Form	Stabile
Cheesy	High	Overloaded	Standard
Chic	High Tec	Painful	Stark
Childish	Honest	Pale	Sticky
Chic	Horrible	Peace	Strenuous
Chubby	Huge	Peace/Peaceful	Strong
Classical	Iiiii...	Perturbation	Sturdy
Classy	It Is Forcing You	Plain	Stylish
Clean	Idiosyncratic	Playful	Surprising/Surprised
Clear	Impatient	Pleasant	Swagger
Cliché	Impropportionate	Portable	Sweetie

Table 4 (continued)

Cold	Inclined Lines Of Design	Powerful	Sympathetic
Comfortable	Incompatible	Poww..	Tacky
Compact	Inconvenient	Precise	Tak Tak Tak..
Confident	Independency Given To Others	Prepared	Tall
Confused	Independent (Stand Steady)	Problem - Free	Tense
Constant	Intense	Professional	Terrifying
Contradicting	Inviting	Prolix	Thick
Convenient	Irritable/Irritated	Proportional	Thrashy
Cool	Lazy	Pudgy	Tiny
Crappy	Light	Rackety	Tough
Crawling On Skin	Long	Reasonable	Trustful
Crazy	Low	Rebellious	Trustworthy
Curvaceous	Luxurious	Reliable	Typical
Curvy	Made In China	Repeating/Repetitive	Ugly
Cute	Mangy	Responsive	Unassured
Dandy	Masculine	Retro	Unclear
Dangerous	Massive	Roarr...	Uncomfortable
Dashing	Matte	Robust	Uncontrollable
Deceiving	Mechanical	Romantic	Unpleasant
Decent	Men	Round	Unsafe
Decisive	Metro Sexual	Safe	Untrustful
Decorated	Minimal	Satiated	Unusual
Deep	Mobile	Satisfying	Useful
Dependable	Modern	Scary	User - Friendly
Different	Modest	Secure	Value
Diligent	Intense	Professional	Vociferous
Dirty	Inviting	Prolix	Warm
Disappointed	Irritable/Irritated	Proportional	Warm - Blooded
Disturbing	Lazy	Pudgy	Weak
Dominant	Light	Rackety	Weird
Dull	Long	Reasonable	Well Thought
Durable	Low	Rebellious	Wild
			Willowy
			Woman

APPENDIX F

WORDS FOR VISUAL GROUP

Table 5. Pattern Subgroup under Visual

VISUAL-Pattern		
Features	Attributes	
	Artistic	No pain feeling (flower)
	Assertive	Overloaded
	Clear	Professional
	Clumsy	Rackety
	Deceiving	Remarkable
	Decorated	Romantic
	Distinctive	Strong
	Educational	Stylish
	Elegant	Subtle
	Exotic	Thrashy
	Feminine	Unclear
	Foolish	Unwieldy
	Friendly	Warm
	Functional	Young
	Hard to realize	

Table 6. Brand Subgroup under Visual

VISUAL-Brand		
Features	Attributes	
	Classy	Good taste
	Confident	Hip
	Cool	Luxury
	Debendable	Reliable
	Decent	Serious
	Elegant	Sporty
	Emanticipating	Strong
	Expensive	Stylish
	Fashionable	Trustworthy

Table 7. Shape Subgroup under Visual

VISUAL-Shape				
Features		Attributes		
Aerodynamic	Proportional	Active	Happy	Serious
Asymmetric	Pudgy	Attractive	Harmonious	Sexy
Baggy	Rectangular	Awkward	Harsh	Sharp Angled
Balanced	Round	Basic	Helpful	Silly
Big	Shabby	Beautiful	High Tec	Similar
Bold	Small	Bends Over A Bit Like Apologizing	Impressive	Simple
Bulky	Soft	Business Looking	Incompatible	Sincere
Chubby	Solid	Casual	Independent (Stand Steady)	Sleek
Closed	Stable	Chic	Joyful	Slender
Compact	Static	Classical	Lively	Sober
Curvaceous	Steady	Classy	Lovely	Speed
Curvy	Stiff	Clear	Luxurious	Sportive
Fat	Straight-Forward	Clumsy	Masculine	Sporty
Firm	Structured	Cohesive	Modern	Stark
Flow	Symmetrical	Cool	Mysterious	Strict
Gibbous	Tall	Cute	Naive	Strong
Handy	Thick	Defenseless	Natural	Sturdy
Hard	Tiny	Delicate	Nostalgia/Retro	Stylish
Heavy	Tough	Different	Not Elegant	Subservient
Hefty	Ungainly	Dignified	Not Stable	Swagger
Horizontal	Wide	Distant	Not Very Attractive	Sweet
Huge		Distinct	Offbeat	Sweetie
Improportionate		Dumb	Old Style	Tacky
Inflexible		Dynamic	Old-Fashioned	Tasty
Long		Easy-Going	Ordinary	Trustful
Loose		Elegant	Passive	Typical
Minimal		Excitement	Playful	Ugly
Mobile		Eye Catcher	Positive	Unpleasant
Narrow		Feminine	Powerful	User - Friendly
Old		Fresh	Professional	Well Thought
Organic		Friendly	Proud	Willowy
Oval Form		Funny	Safe	Woman

Table 7 (continued)

VISUAL-Shape				
Features		Attributes		
Plain		Futuristic	Scary	Young
Portable		Good Looking	Secure	

Table 8. Colour Subgroup under Visual

VISUAL-Colour				
Features	Attributes			
Bright	Active	Elegant	Manhood	Scary
Cold	Aggressive	Energetic	Masculine	Serious
Dark	Anger	Enthusiastic	Mysterious	Simple
Dull	Attractive	Feminine	Nobleness	Sincere
Homogeneous	Boring	Foolish	Not Chic	Sporty
Neutral	Business Like	Freedom	Novel	Standard
Pale	Calm	Fresh	Old Fashioned	Stark
	Childish	Friendly	Ordinary	Sterile
	Chic	Funny	Outspoken	Strength
	Classy	Futuristic	Peace	Strong
	Clean	Girly	Peaceful	Sturdy
	Cliché	Graceful	Peppy	Stylish
	Competitive	Happy	Perky	Sweet
	Confident	High-Tec	Playful	Timeless
	Cool	Hygienic	Positive	Tough
	Cute	Incompatible	Professional	Warm
	Dandy	Industrial	Proud	Weird
	Dashing	Kindness	Recognizable	Wild
	Dynamic	Love	Rest	Wise
	Easy-Going	Luxurious	Safe	Young

APPENDIX G

WORDS FOR MANIPULATION GROUP

Table 9. Usability Subgroup under Manipulation

MANIPULATION-Usability		
Features	Attributes	
	Business Like	Open
	Challenging	Painful
	Cozy	Personal
	Discreet	Playful
	Dynamic	Practical
	Environmental Friendly	Prolix
	Fast	Protected
	Friendly	Protective
	Functional	Secure
	Happy	Simple
	Hard	Sincere
	Informing	Sorrowful
	Inviting	Warm
	Non Complicated	

Table 10. Smell Subgroup under Manipulation

MANIPULATION-Smell	
Features	Attributes
burn	
odourless	new

Table 11. Tactile-Material Subgroup under Manipulation

MANIPULATION-Tactile				
Material				
Features		Attributes		
Cold	Strength	Active	Fierce	Retro
Durable	Strong	Advanced	Friendly	Scary
Firm	Sturdy	Beautiful	Futuristic	Serene
Flexible	Tough	Calm	Gentle	Serious
Fragile		Casual	Hip	Sexy
Glossy		Cheap	Huggable	Simple
Hard		Cheesy	Indestructible	Sober
Heavy		Chic	Luxurious	Sophisticated
Light		Comfortable	Naive	Stark
Matte		Confident	Neat	Stylish
Metallic		Crappy	Nice	Timeless
Natural		Delicate	Ordinary	Unpleasant
Old		Different	Outgoing	Used
Resistant		Distant	Peaceful	Useful
Robust		Distend	Playful	Vintage
Sharp		Dynamic	Powerful	Warm
Shiny		Easy-Going	Precious	Warm - Blooded
Soft		Elegant	Rebellious	Worn Looking
Solid		Expensive	Refinement	
Sticky		Experienced	Reliable	

Table 12. Tactile-Texture Subgroup under Manipulation

MANIPULATION-Tactile			
Texture			
Features		Attributes	
Crystal Like	Organic	Active	Wise
Dirty	Polished	Casual	
Edgy	Shiny	Clean	
Flow	Sleek	Cozy	
Fluffy	Slippery	Different	
Foamy	Smooth	Friendly	
Hairy	Soft	Gentle	
Light	Spiky	High-Tec	
Matte	Spongy	Sporty	
Napless	Translucent	Supporting	
Neutral Temperature	Transparent	Vintage	

Table 13. Tactile-Weight Subgroup under Manipulation

MANIPULATION-Tactile	
Weight	
Features	Attributes
Empty	Cheap
Heavy	Dominant
Light	Made in China
Moderate	Majestic
Solid	Masculine
	Not Very Expensive
	Reliable
	Satiated
	Strenuous
	Sturdy

Table 14. Finishing / Production Details Subgroup under Manipulation

MANIPULATION-Finishing / Production Details			
Features		Attributes	
Compact	Traditional	Advanced	Inclusive
Contemporary	Unbalanced	Attentive	Innovative
Continuity		Cheap	Inviting
Dangerous		Childish	Minimal
Durable		Clumsy	Moody
Flexible		Controllable	Mysterious
Fragile		Detailed	Professional
Retro		Easy	Protective
Retro-Futuristic		Elegant	Secure
Sharp		Feminine	Sensitive
Sharp Edges		Foolish	Serene
Smooth		Functional	Simple
Solid		Funny	Special
Static		Futuristic	Surprising
Strength		Grumpy	Ugly
Structured		Harmonious	

Table 15. Ergonomics Subgroup under Manipulation

MANIPULATION-Ergonomics			
Features		Attributes	
Compact	Slippery	Clear	Fits in Very Well
Firm	Small	Comfortable	Friendly
Light		Cozy	Good
Massive		Custom Made	Problem - Free
Mobile		Different	Reliable
Rigid		Easy To Control	Secure
Robust		Ergonomic	Uncomfortable
Rough		Feasible	Unsafe

Table 16. Context Subgroup under Manipulation

MANIPULATION-Context		
Features	Attributes	
Bathroom	Accessible	Heritage
Bed Room	Active	Hygienic
Home Sweet Home	Adventure	Idiotic
Kitchen	Business-Like	Loyal
Party	Classy	Old Italian Culture
Professional Hair Saloon	Clean	Ordered
	Culture	Playful
	Curious	Protective
	Dignified	Pure
	Entertainment	Quality
	Excitement	Rational
	Fast	Romantic
	Freedom	Safe
	Fresh	Simple
	Happy	Sporty
	Happy Event	Sterile
	Harmonious	Stylish
	Health	Wise

APPENDIX H

WORDS FOR FUNCTION GROUP

Table 17. Sound Subgroup under Function

FUNCTION-Sound			
Features		Attributes	
Aloud	Silent	Aggressive	Lively
Bam Bam Bam..	Tak Tak Tak..	Annoying	Mangy
Bizz...	Weak	Awful	Naive
Clear		Boring	Nice
Click		Calm	Playful
Constant		Cheerful	Precise
Crisp		Classical	Reliable
Deep		Clean	Robust
High		Contradicting	Satisfying
High Pitched		Dangerous	Scary
Iiiii...		Dashing	Slender
Loud		Disturbing	Startling
Low		Dominant	Terrifying
Mechanical		Exaggerated	Toy Like
Noisy		Familiar	Trustworthy
Not Noisy		Fresh	Typical
Not Very Powerful		Grumpy	Unexpected
Powerful		Hard Worker	Unfriendly
Poww..		Horrible	Unpleasant
Repeating/Repetitive		Idiosyncratic	Unsafe
Roarr...		Inconvenient	Wild

Table 18. Power Subgroup under Function

FUNCTION-Power		
Features	Attributes	
Continuity	Active	Intense
Endless	Aggressive	Intriguing
Fast	Combative	Not Disturbing
Powerful	Crawling On Skin	Not User Friendly
Responsive	Crazy	Prepared
Speed	Dangerous	Professional
Stable	Decent	Pugnacious
Strong	Diligent	Satisfying
Tough	Disappointed	Scary
	Friendly	Smart
	Functional	Uncontrollable
	It Is Forcing You	Wise

Table 19. Smell Subgroup under Function

FUNCTION-Smell	
Features	Attributes
Burn	Distinct
Fruity	Feminine
Percolated Coffee	Glamorous
	Heavenly
	Like Dusty Workshop
	New
	Pleasurable

Table 20. Light Subgroup under Function

FUNCTION-Light	
Features	Attributes
Flickering	Aggressive
	Calming
	Friendly
	Futuristic
	Like Someone Breath During Sleep
	Nonconformist
	Novel
	Slick
	Sterile
	Sturdy
	Cool

APPENDIX I

CLASSIFICATION OF PRODUCT PERSONALITIES

Table 21. Classification of Product Personalities – EXTROVERSION

Classification of Product Personalities – EXTROVERSION			
Product Personality Characteristics/Attribute Definitions	Visual	Manipulation	Function
Active	X	X	
Assertive	X		
Combative			X
Curious		X	
Dangerous		X	X
Diligent			X
Discreet		X	
Distant	X	X	
Dynamic	X	X	
Energetic	X		
Exaggerated			X
Familiar			X
Free	X	X	
Friendly	X	X	X
Impressive	X		
Intriguing			X
Inviting		X	
Lively	X		X
Mysterious	X	X	
Outgoing		X	
Outspoken	X		
Passive	X		
Peppy	X		
Perky	X		
Playful	X	X	X
Powerful	X	X	X
Precious		X	
Pure		X	
Rackety	X		

Table 21 (continued)

Classification of Product Personalities – EXTROVERSION			
Product Personality Characteristics/Attribute Definitions	Visual	Manipulation	Function
Rebellious		X	
Secure	X	X	
Sincere	X	X	
Smart	X		X
Sportive	X		
Stark		X	
Straightforward	X		X
Strong (Strengthful)	X	X	X
Sturdy		X	X
Supporting	X	X	
Swagger			
Unfriendly	X		X
User-Friendly	X		X
Warm		X	
Warm-Blooded		X	
Weak	X		X
Wild	X		X

Table 22. Classification of Product Personalities - AGREEABLENESS

Classification of Product Personalities - AGREEABLENESS			
Product Personality Characteristics/Attribute Definitions	Visual	Manipulation	Function
Casual	X	X	
Cohesive	X		
Comfortable		X	
Controllable		X	X
Decent	X		X
Defenceless	X		
Dominant		X	X
Easy		X	
Easy To Control		X	
Easygoing	X		
Feasible		X	

Table 22 (continued)

Classification of Product Personalities - AGREEABLENESS			
Product Personality Characteristics/Attribute Definitions	Visual	Manipulation	Function
Good	X	X	
Grumpy		X	X
Inconvenient			X
Ordered		X	
Positive	X		
Practical		X	
Prepared			X
Problem-Free		X	
Professional	X	X	X
Rational		X	
Safe	X	X	X
Satiated		X	
Strenuous		X	
Trustful	X		
Trustworthy	X		X
Unclear	X		
Uncontrollable			X
Unpleasant	X	X	X

Table 23. Classification of Product Personalities - CONSCIENTIOUSNESS

Classification of Product Personalities - CONSCIENTIOUSNESS			
Product Personality Characteristics/Attribute Definitions	Visual	Manipulation	Function
Advanced		X	
Attentive		X	
Business Like	X	X	
Dependable	X		
Deceiver	X		X
Dignified	X	X	
Disturbing			X
Enthusiastic	X		
Environmental Friendly		X	
Foolish	X	X	

Table 23 (continued)

Classification of Product Personalities - CONSCIENTIOUSNESS			
Product Personality Characteristics/Attribute Definitions	Visual	Manipulation	Function
Healthy		X	
Helpful	X		
Hygienic		X	
Idiot		X	
Indestructible		X	
Informing		X	
Loyal		X	
Mangy			X
Nobleness	X		
Painful		X	
Proud	X		
Reliable	X	X	X
Sophisticated		X	
Subservient	X		
Terrifying			X
Unsafe		X	X
Wise	X	X	X

Table 24. Classification of Product Personalities - EMOTIONAL

Classification of Product Personalities - EMOTIONAL			
Product Personality Characteristics/Attribute Definitions	Visual	Manipulation	Function
Aggressive	X		X
Angry	X		
Annoying			X
Boring	X		X
Calm	X	X	X
Cheerful			X
Cool	X		X
Cozy		X	
Entertaining		X	
Fierce		X	
Gentle		X	

Table 24 (continued)

Classification of Product Personalities - EMOTIONAL			
Product Personality Characteristics/Attribute Definitions	Visual	Manipulation	Function
Happy	X	X	
Harsh	X		
Joyful	X		
Kind	X		
Love	X		
Moody		X	
Peaceful	X	X	
Pleasurable			X
Prolix		X	
Pugnacious			X
Romantic	X	X	
Scary	X	X	X
Sensitive		X	
Serene		X	
Serious	X	X	
Sorrowful		X	

Table 25. Classification of Product Personalities – OPENNESS TO EXPERIENCE

Classification of Product Personalities - OPENNESS TO EXPERIENCE			
Product Personality Characteristics/Attribute Definitions	Visual	Manipulation	Function
Adventurous		X	
Challenging		X	
Confident	X	X	
Crazy			X
Dashing	X		X
Different	X	X	
Emancipating			X
Funny	X	X	
Independent	X		
Innovative		X	
Naive	X	X	X
Nonconformist			X

Table 25 (continued)

Classification of Product Personalities - OPENNESS TO EXPERIENCE			
Product Personality Characteristics/Attribute Definitions	Visual	Manipulation	Function
Novel	X		X
Offbeat	X		
Precise			X
Protected		X	
Protective		X	
Recognizable	X		
Remarkable	X		
Similar	X		
Simple	X	X	
Special		X	
Standard	X		
Startling			X
Strict	X		
Subtle	X		
Surprising		X	
Typical	X		X
Unexpected			X
Useful		X	

Table 26. Classification of Product Personalities – GENDER

Classification of Product Personalities - GENDER			
Product Personality Characteristics/Attribute Definitions	Visual	Manipulation	Function
Feminine	X	X	X
Girly	X		
Manhood	X		
Masculine	X	X	
Woman	X		

Table 27. Classification of Product Personalities – TIME

Classification of Product Personalities - TIME			
Product Personality Characteristics/Attribute Definitions	Visual	Manipulation	Function
Chic		X	
Childish	X	X	
Classical	X		X
Classy	X	X	
Cliché	X		
Experienced		X	
Fashionable	X		
Fresh	X	X	X
Futuristic	X	X	X
High-Tech	X	X	
Hip	X	X	
Modern	X		
New		X	X
Nostalgia/Retro	X		
Old	X	X	
Old-Fashioned	X		
Old-Style	X		
Ordinary	X	X	
Retro		X	
Retro-Futuristic		X	
Timeless	X	X	
Traditional		X	
Vintage		X	
Young	X		

Table 28. Classification of Product Personalities – AESTHETICS



Classification of Product Personalities - AESTHETICS			
Product Personality Characteristics/Attribute Definitions	Visual	Manipulation	Function
Artistic	X		
Attractive	X		
Awful			X
Awkward	X		
Beautiful	X	X	
Cheesy		X	
Chubby	X		
Clean	X	X	X
Clear	X	X	X
Clumsy	X	X	
Crappy		X	
Cute	X		
Dandy	X		
Delicate	X	X	
Elegant	X	X	
Glamorous		X	
Good Looking	X		
Good Taste	X		
Graceful	X		
Harmonious	X	X	
Heavenly		X	
Horrible			X
Lovely	X		
Luxurious	X	X	
Majestic		X	
Massive		X	
Neat		X	
Nice		X	X
Overloaded	X		
Pudgy	X		
Refined		X	
Sexy	X	X	
Shabby	X		
Silly	X		
Sleek	X	X	
Slender	X		X
Sober	X	X	
Sterile	X	X	X
Stylish	X	X	
Sweet	X	X	
Trashy	X		

Table 28 (continued)

Classification of Product Personalities - AESTHETICS			
Product Personality Characteristics/Attribute Definitions	Visual	Manipulation	Function
Ugly	X	X	
Ungainly	X		
Unwieldy	X		
Used		X	
Weird	X		
Willowy	X		

APPENDIX J

PARTIAL-CONCRETE DEFINITONS

Table 29. Partial-Concrete Definitons

Attribute Definitions	Partial - Concrete Definitions
Active	flow form
	high power
	cheerful colours
	energizing function
	durable materials
Advanced	complexity of buttons
	transparent material
Adventurous	feeling excitement
	feeling freedom
	masculine details
	bright colours
	durable materials
	context affect
	roughness
Aggressive	motor sound
	high pitched sound
	red light
	red colour
	black colour
Angry	silver colour
	shade of grey
	black colour
	red colour
Annoying	constant sound
	very high level sound
	repeating sound
	typical sound
	howling sound
Artistics	silver coloured decoration

Table 29 (continued)

Attribute Definitions	Partial - Concrete Definitions
Assertive	sparkling details
Attentive	over accessorized
Attractive	modern appearance
Awful	the sound is like somebody is yelling
Awkward	uncommon geometric proportion
Beautiful	simple form
	matte material
Boring	grey colour
	constant sound
	stringent shape
Business like	black colour
	sharp edges
	functionality
	innovativeness
	flatness
Calm	low amount of buttons
	low pitched sound
	blue colour
	white colour
	neutral colours
	fatness
	shortness
Casual	frosted glass material
	velvety material
	transparent material
Challenging	everyday use in function
	to force user to do something
Cheerful	lively sound
	round shape
	smiling face
Cheesy	glossy material
	cheap looking material
	too much feminine details
	blue coloured silicon
Chic	gold and white colour combination
	precious materials such as crystal and stainless steel
Childish	baby blue colour
	small parts
	red coloured plastic
	bright colours
	simple details
Chubby	fatness
	round appearance
	big size

Table 29 (continued)

Attribute Definitions	Partial - Concrete Definitions
Classical	ordinary appearance
	ordinary sound
	traditional lines
	glossy white colour
	natural colour (brown, beige, black, white)
	natural material
	simple details
	rounded details symmetric details
Classy	brown colour
	leather material
	gold looking metal parts
	high-durable quality
Clean	white colour
	blue colour
	metal material
	cubic shape
	smooth surface
Clear	understandable layout, usecue
	one piece
Cliché	purple colour (used for ladies)
	white colour (used for ladies)
Clumsy	awkward geometric proportion
	shapeless
Cohesive	vertical shape
	symmetrical layout
Combative	being ready for the task
Comfortable	ergonomic handlig
	soft silicon material
	clear layout of the buttons
	round shape
	foam material
Competitive	red colour
Confident	matte material
	black colour
	heavy
	good selected material
	big size
	thick body
	stand steady alone
	chin up position

Table 29 (continued)

Attribute Definitions	Partial - Concrete Definitions
Controllable	straight lines
	easy to manage
Cool	black colour
	blue colour
	silver colour
	spike details
	appearance is look like from the future
Cozy	small size
	round form
	long shape
	narrow shape
	fit into hand
Crappy	weak sound
	nonelegant black colour
Crazy	very weak soundd
	unexpected reaction
Curious	surprising flash
	protruding details
Cute	small size
	round form
	organic form
	curvaceous
	soft surface
	ball like shape
	fluffy
	circlar details
	related with girls
	baby blue colour
	pink colour
	fatness
Dandy	unproper colour combination
Dangerous	sharpness
	high pitched sound
	powerful vibration
	hard to control
Dashing	powerful sound
	black colour
Debendable	brand affect
	tough materials
Deceiver	unproprate sound and appearance relation
Decent	round surface
	creamy white colour
Defenceless	tiny size
Delicate	glassy material
	organic form
	female contours

Table 29 (continued)

Attribute Definitions	Partial - Concrete Definitions
Different	unordinary appearance
	unordinary material
	unordinary texture
	atypical sound
	colour differences
Dignified	heavy weight
	dark colours
	symmetrical form
	rectangular form
	shiny details
	natural materials
Diligent	powerful sound
	powerful vibration
Discreet	small size
	easy to carry
Distant	metal material
	hard material
	cold feeling
	impersonal appearance
Disturbing	mechanical sound
	exaggerated sound
Dominant	high pitched sound
	massive size
Dynamic	flow surface
	metallic colour
	strong colour
	lightweight
	easy to manipulate
	energizing
Easy	plain surface
	manageable
	understandable layout, usecue
Easy to Control	no need much effort
Easygoing	desaturated colour
	flexibility
Elegant	matte black colour
	gold and metallic colour
	creamy white colour
	no necessary decoration
	shiny gloss surface
	round surface
	smooth surface
	simple form
	flow shape
	metal material
	shape unity

Table 29 (continued)

Attribute Definitions	Partial - Concrete Definitions
Emancipating	no need other person to do job
Energetic	spinnig coil
	bright colours
	fast
	generating energy
Entertaining	round shape
	bright colours
	puzzling
	context affect
	funny sound
Enthusiastic	bright colours
Environmental friendly	power generation
Exaggerated	high pitched sound
Experienced	decolorization
	damaged material
Familiar	similar sound
Fashionable	up to dated
	brand affect
Feasible	small size
	comfortable handling part
Feminine	round shape
	purple and white colours
	pink colour
	flow surface
	soft surface
	hour glass figure
Fierce	metal material
	cold feeling
Foolish	bright colours
	awkward details
Free	blue colour
	hard to control
	uncontrollable
	feeling of excitement
Fresh	blue colour
	white colour
	light colours
	clear sound
	sparkling sound
Friendly	lightweight
	round shape
	organic form
	warm colours
	lively sound
	no sharpness

Table 29 (continued)

Attribute Definitions	Partial - Concrete Definitions
Funny	solid (one piece) shape
	baby blue colour
	shiny silver colour
Futuristic	high gloss material
	metallic details
	extraordinary visual appearance
	fast
	strong
	pure white colour
	spike details
	stylish
Gentle	warm colours
	wool material
	smooth surface
	metallic surface
	soft curves
Girly	tiny size
	glossy colours
	bright pink colour
Glamorous	nice smell
Good	comfortable usage
	easy and simple solutions
	high quality
	user-friendly manipulation
Good looking	visually satisfactory
Good Taste	being fashionable
Graceful	cute design
	flower patterns
Grumpy	dominant sound
	small buttons
	like an old man

Table 29 (continued)

Attribute Definitions	Partial - Concrete Definitions
Happy	blue colour
	white colour
	small shape
	round shape
	bright colours (pink, yellow, green, red,orange)
	unusual form
	smiling face
Harmonious	compatible dimensions
	rounded details
Harsh	big size
Healthy	context affect
	being advantageous for you
	good for your health
Heavenly	perfume scent
Helpful	position of the figure looks like a servant
	to include a lot of information
High-tech	chrome details
	deep black colour
	silver colour
	smooth surface
	shiny surface
	transparent material
Hip	chrome details
	brand affect
Horrible	disturbing sound
Hygienic	water friendly
	white colour
Idiot	put user into laughing conditions
Impressive	heavy weight
	dark colours
	wood material
	shiny surface
	symmetrical form
	rectangular form
	horizontal lines

Table 29 (continued)

Attribute Definitions	Partial - Concrete Definitions
Inconvenient	able to adjust
Independent	flexibility of material
	to be able to stand steady
Indestructible	durable materials
Informing	to include a lot of information
Innovative	the new way of representing the product
Intriguing	surprise affect
	transparency help user to see the mechanism inside
Inviting	small size
	round form
	light weight
	metallic colour
	gold and black colour combination
	shiny material
	ease of use
	the figure is like opens its arms
Joyful	look up posture
Kind	soft material
	soft colours
Lively	awake user up
	energetic
Love	red colour
	pinkish colours
Lovely	fat form
	large-big belly
Loyal	feeling confidence with the product
	brand affect
	word famous
Luxurious	silver colour
	pearl white colour
	gold colour
	shiny surface
	matte surface
	mirror shine materials
	metallic materials
	expensive appearance

Table 29 (continued)

Attribute Definitions	Partial - Concrete Definitions
Majestic	large and big size
Mangy	the sound represents finish and go affect
Manhood	silver colour
	black colour
	blue colour
Masculine	darkness
	dull and black colour
	strong functions
	sharp square form
	angular shape
	heavy weight
	thick parts
	strong lines
	chrome details
	mechanical
	physically looks like a man
Massive	heavy weight
	big size
Modern	up to dated
	trendy colours
	shiny silver colour
	clean and simple lines
	plastic and metal material combination
	no button
Moody	nice click sound
	round edges
	bright happy colours
Mysterious	deep black colour
	silver colour
	smooth material
	semi transparent material
	closeness to the public

Table 29 (continued)

Attribute Definitions	Partial - Concrete Definitions
Naive	low pitched sound
	slender form
	undefined shape
	transparent material
Neat	adjustable
New	the smell of unused product
Nice	comfortable fitting of user's hand
	feeling the smooth surface
	meaningful contrast between materials
Nobleness	black colour
Nonconformist	extraordinary visual appearance
	pattern with leds
Nostalgia/Retro	old style
	hard edges
	geometrical form
Novel	not analogous
Offbeat	unusual details
Old	brass coverage
	wooden details on electronics
	brown colour leather details
	worn looking metal
Old Fashioned	brass coverage
	character of the 40's
Old Style	belonging to old years
Ordered	basic shape
	small rectangle shape
	symmetrical appearance
	straight layout of the elements
Ordinary	being similar to others
Outgoing	lightweight
	easy to carry
	canvas material
Outspoken	bright colours
	eye-catching colours

Table 29 (continued)

Attribute Definitions	Partial - Concrete Definitions
Overloaded	too much decorated
Painful	high pitched sound
	metallic details
Passive	horizontal form
	gaunt details
Peaceful	light blue colour
Peppy	appealing to young users
	contrast colour combination
Perky	yellow colour
	cheerful sound
Playful	round shape
	circular details
	organic form
	bright colours
	smooth texture
	soft rubber material
	flickering light
context affect	
Pleasurable	the context of interacting with the product
Positive	bright colours
	light colours
	look-up posture
Powerful	heavy weight
	thick metal parts
	robust shape
	horizontal orientation
	deep black colour
	satiated sound and vibration
Practical	easy to use
	no extra elements
Precious	golden material
Precise	constant sound(there is no up and down)
Prepared	ready for the job
Problem-Free	brand affect
	confident and tough sound

Table 29 (continued)

Attribute Definitions	Partial - Concrete Definitions
Professional	black colour
	silver colour
	sturdy shape
	simple details
	user-friendly manipulation
	multiple functions
	shiny details
	written info on the product
Prolix	hard to use
	heavy weight
Protected	having enclosed parts
Protective	enclosed shape
	function of the product(to save from harmful elements)
Proud	attractive bright colours
	round and smooth shape
	head-up position
	tall
Pudgy	round and fat form
Pugnacious	ready for the task
Pure	white colour
	light colours
	sound
Rackety	high pitched sound
	sparkling button
Rational	rectangular form
	symmetrical
	horizontal lines
	heavy weight
Rebellious	hard to control
	metal studs-spikes
	futuristic details
	rough
Recognizable	contrast colour combination

Table 29 (continued)

Attribute Definitions	Partial - Concrete Definitions
Refined	aesthetic
	aerodynamism
	smooth surface
	curvy details
Reliable	silent sound
	deep sound
	matte material
	thick material
	strong material
	cold metal material
	symmetrical
	solid shape
	heavy weight
	big size
Remarkable	different from the same group of products
Retro	old style
	black leather details
	metallic look
	old style production details
Retro-Futuristic	round edges
	detailed air vents
	circular details
Romantic	type of writing on the product
	pinkish colours
	embraced shape
Safe	blue colour
	white colour
	thick walls
	soft material
	supportive material

Table 29 (continued)

Attribute Definitions	Partial - Concrete Definitions
Satiated	big size
	heavy weight
Scary	high speed
	sharpness
	metallic sound
	powerful vibration
	black-gray colours
	visible metal parts
Secure	ergonomic handling
	non-slippery material
	zipper detail
	context affect
Sensitive	round shape
	soft surface
	purplish colours
Serene	golden ratio
	symmetry
	chrome details
	plane surface
	round edges
	bright colours
Serious	cold metal parts
	black colour
	masculine details
	minimalistic form
	straight lines
	loud sound
	formal product
	brand affect
Sexy	curvy
	smooth surface
	ultra-thin design
	feminine-round shapes

Table 29 (continued)

Attribute Definitions	Partial - Concrete Definitions
Shabby	tiny details
Silly	fat and skinny part combination
Similar	nothing remarkable
Simple	one kind of material
	functional
	less details
	easy to control
	asymmetric shapes
	shiny metal materials
Sincere	short
	clean curves
Sleek	green colour
	clear and simple details
	unibody metal shape
	aerodynamism
	straight lines
Slender	glossy and metallic details
	thin and tall geometry
Smart	user-friendly interface
	entertainment feature
Sober	seriousness
	realistic
	slightly roundings
Sophisticated	multi purpose
	black and gray colour combination
	matte silver details
Sorrowful	the interaction with the product
Special	having small and round shape when comparing to similar products
Sportive	red colour
	black colour
	round surface
	brand affect
	context affect
Standard	ordinary colours
Stark	steel material
	durable materials
	heavy weight
Startling	the sound awakes you
	put you into action (sound)
Sterile	white colour
	blue colour
	clear metal
Straight-Forward	having only one function

Table 29 (continued)

Attribute Definitions	Partial - Concrete Definitions
Sincere	clean curves
	green colour
Sleek	clear and simple details
	unibody metal shape
	aerodynamism
	straight lines
	glossy and metallic details
Slender	thin and tall geometry
Smart	user-friendly interface
	entertainment feature
Sober	seriousness
	realistic
	slightly roundings
Sophisticated	multi purpose
	black and gray colour combination
	matte silver details
Sorrowful	the interaction with the product
Special	having small and round shape when comparing to similar products
Sportive	red colour
	black colour
	round surface
	brand affect
	context affect
Standard	ordinary colours
Stark	steel material
	durable materials
	heavy weight
Startling	the sound awakes you
	put you into action (sound)
Sterile	white colour
	blue colour
	clear metal
Straight-Forward	having only one function

Table 29 (continued)

Attribute Definitions	Partial - Concrete Definitions
Strengthful	strong
	high contrast colours
	metallic details
Strenuous	heavy weight
Strict	straight lines
	sharp angles
	clearly defined surfaces
Strong	functional
	big form
	tectonic form
	dynamic shape
	steady plastic
	non-breakable
	rough material
	shell-like pattern
	thick steel
	heavy weight
Sturdy	harsh and big size
	metal parts
	sharp and bold rectangular shape
	heavy weight
Stylish	black colour
	golden colour
	metallic details
	fashionable colours
	translucent material
Subservient	humble/willing to serve
Subtle	several textures
Supporting	soft grip
Surprising	interactive
Swagger	metallic details

Table 29 (continued)

Attribute Definitions	Partial - Concrete Definitions
Sweet	round form
	flower patterns
	purple colour
	like a candy
Terrifying	noisy sound
Trashy	unusable
	lots of sparkling details
	awkward proportions
Timeless	durable metal materials
	classical design
Traditional	standard look
	looks like older models
Trustful	heavy weight
	satisfying power
	satisfying sound
	round form
	straight lines
	brand affect
Trustworthy	strong material
	durable materials
	thick walls
	solid shape
	brand affect
Typical	look like other models
	similar sound
Ugly	awkward geometric proportion
Unclear	difficult to understand
Uncontrollable	high vibration
	shaking
Unexpected	high pitched sound
Unfriendly	unpleasant sound
	edgy shape
	squared shape
Ungainly	round edges

Table 29 (continued)

Attribute Definitions	Partial - Concrete Definitions
Unpleasant	high level sound
	intense vibration
	rough material
	awkward visual details
Unsafe	small size
	very light weight
	big noise
Unwieldy	big shape
	big size
Used	dirty looking
Useful	context affect (silicon material in bathroom)
User-Friendly	ease of use
	mangeable
	comfortable
Wintage	old leather material
	chrome details
Warm	flower patterns
	wood material
	red and chocolate brown colours
Warm-Blooded	silicon material (usecuc)
Weak	low pitched sound
Weird	uncommon colour
Wild	black colour
	harsh sound
Willowy	thin and tall geometry
Wise	symmetric shape
	white and silver colours
	includes a lot of information
	functional
Woman	user definition
	feminine-round shapes

Table 29 (continued)

Attribute Definitions	Partial - Concrete Definitions
Young	sobber design
	light colours
	colourful
	playful graphics
	asymmetry
	fast appearance