E-COMMERCE WEB DESIGN
- THE IMPORTANCE OF A FIRST IMPRESSION

Bachelor’s thesis in Informatics (15 credits)

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Abstract

The technical society we live in is in a constant state of advancement and we are continually introduced to new innovative ways of mediating information through. Today, plenty of media channels exist, for organizations to use when they strive to reach larger groups of people, but to achieve web site success; researchers have stated that considerations of user preferences implemented in web design are crucial. This makes understanding and addressing which characteristics will be valued from the moment a user enters a site something that is considered helpful to the web designer in order to maintain user traffic and create an interest. In other words, something to catch the user’s attention to create a good first impression is necessary.

The constant state of advancement of technology prevailing today has resulted in even more complex websites and a countless number of design principles to apply when designing for the web. In spite of this, usability and visual appeal have remained central in prior research. To test these theories, a study was conducted by using a qualitative method in form of an experiment consisting of eye tracking and an open-ended questionnaire. To perform the eye tracking the researchers created two mock-ups representing the main page of two different websites. Each mock-up was developed with considerations towards two different design approaches, one striving to achieve visual appeal and the other towards usability, to determine which one the participants preferred.

The study contained 50 participants who performed the experiment and answered the questionnaire. Results from the eye tracking were presented in gaze plots and heat maps and the result from the questionnaire was presented and analyzed through coding by the researchers.

Final findings showed that the website preferred by most participants were the one developed with the usable design approach. Additionally, the discussion presented the findings and reaches a conclusion of the study which finds connections between the chosen design approach of the webpage and the participant’s choice of preferred webpage.

Keywords: First impression, perceived usability, web design, eye-tracking, visual appeal
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Figure 1. Research process

Figure 2. Heat gradient

Figure 3. Heat map after 50 milliseconds after first instructions. Mock-up 1 to the left and Mock-up 2 to the right.

Figure 4. Heat map after 10 seconds after first instructions. Mock-up 1 to the left and Mock-up 2 to the right.

Figure 5. Heat map after 5 seconds after second instructions. Mock-up 1 to the left and Mock-up 2 to the right.

Figure 6. Gaze plot after 50 milliseconds after first instructions. Mock-up 1 to the left and Mock-up 2 to the right.

Figure 7. Gaze plot after 10 seconds after first instructions. Mock-up 1 to the left and Mock-up 2 to the right.

Figure 8. Gaze plot after 5 seconds after second instructions. Mock-up 1 to the left and Mock-up 2 to the right.

Figure 9. Presents the age spread in the experiment.

Figure 10. Presents the users shopping habits where frequently are associated with more than once a month, occasionally associates with once a month, and rarely associates with participants who shops once every three months or less.

Table 1. Headline explanation.

Table 2. Describe your first impression of the webpage. Was it good or bad? Please motivate your answer.

Table 3. Can you write down two things you remembered from the webpage?

Table 4. What navigation tools did you find on the webpage?

Table 5. Did you experience the web page to be easy to use?

Table 6. Did you understand what the webpage was selling?

Table 7. Describe your first impression of the webpage. Was it good or bad? Please motivate your answer.

Table 8. Can you write down two things you remembered from the webpage?

Table 9. What navigation tools did you find on the webpage?

Table 10. Did you experience the web page to be easy to use?

Table 11. Did you understand what the webpage was selling?

Table 12. Which web page did you prefer the first one or the second one? Please motivate your answer.
1 INTRODUCTION

This chapter will acquaint the reader with the concepts: Generation Y, usability, and aesthetics, which will be appearing continuously through this paper. The reader will also become aware of the researchers view of the importance of understanding website requirements from large segments existing on the Swedish online market.

The internet usage in Sweden is increasing for every year and during 2015, 93% of the Swedish population reported that they had internet access, a spread also shown to have a large impact on the Swedish market by a remarkable increase in annual turnovers (Svenskar och Internet 2015). A specific case is the online clothing industry of Sweden, which alone was reported to have a turnover of 8.3 billion SEK 2015 (Svenskar och Internet 2015).

Today, there are few organizations that are not represented with a website and as a tool to reach out to larger groups many also choose to develop web shops (The Swedish bureau of Statistics). This has resulted in a large selection of electronic commerce websites, or e-commerce websites (i.e. an online marketplace selling products or services) and due to competition where good web design is considered a key to success and a way to compete. So, the question is: What is good web design?

There are plenty of theories to find of what design principle to use when wanting to create a good e-commerce website and among these are the philosophical study of beauty and taste and the ease of use and learnability. In other words, aesthetics and usability. These two design approaches are central in the context of web design when the target is to achieve success, which is derived by pleasing the user by understanding them, their preferences and their needs (Beaird 2010; Michailidou, Harper & Bechhofer 2008; Azam 2015).

In Sweden, the most active segment of e-consumers (e.g. consumers who shop for products or services online) were reported to be women between the ages of 18 and 29 and out of all young female e-consumers, 60% were reported shopping especially for clothes (E-barometern Q3 2015; E-barometern helårsrapport 2015). Judging from this information, young women between those ages should be the targeted audience when you operate an e-commerce website selling clothes. What remains unspoken though is how the stated design approaches above are perceived and valued when presented to that specific segment.

1.1 Previous Research

Human-computer interaction is a subject concerning several areas of research and has contributed to the evolution of beneficial solutions for users where the common goal is to facilitate the interaction between them and the system (Ghaoui 2006). Among the areas of research concerning interactive systems such as e-commerce websites, aspects in graphical design and business are mentioned by stressing the importance of keeping the user satisfied to achieve a successful business as well as a good web design (Garrett 2011).

To design an interface of a website that is perceived to be attractive by the users is on the other hand expressed as a challenge in prior studies (Djamasbi, Siegel, Tullis, Skorinko 2011; Bonnardel et al. 2010). But from the research performed by Djamasbi, Siegel, Tullis and Skorinko (2011) certain common characteristics were found especially within the segment of,
“Generation Y” which refers to individuals between the ages 18 and 31.

These characteristics were detected by using an eye-tracking device. Eye-tracking is described as “a usability testing technique that provides a visual overlay of where visitors most commonly look at on the screen (heat maps) and individual or common paths (gaze trails)” (Chaffey 2011, s.601). The eye-tracker provides the researcher with detailed information about how a user interacts with a specific interface elements (Cyr, Head & Larios 2010) by identifying areas where the individual pays his or her attention (Sari, Ferdiana, Santos & Nugroho 2015).

The outcome of the performed experiment in the study by Djamasbi, Siegel, Tullis & Skorinko (2011) showed that the younger generation of users had become less interested in massive texts and multiple pictures and does instead require quick information gathering, recognition and fast impressions.

Per Lindgaard, Fernandes, Dudek & Brown (2006): “You have about 50 milliseconds to establish a first impression”. The first impression is another aspect discussed in the context of retaining users at websites as it has been proved to contribute to the user’s choice of remaining at a site. It has also been discussed that the way you perceive the website from the first glance, positively or negatively, will affect the way a user interprets the entire content they are exposed to (Lindgaard & Dudek 2002; Garrett 2011).

1.2 Problem statement

The design of a website is highly dependent and controlled by the targeted audience and intended purpose, which means that the content needs to be mediated in a way that it will be positively perceived by the recipient (Chaffey 2011). In order to accomplish that, you also need to know who the target may be.

Regarding consumers operating on the e-commerce market in Sweden, four out of ten e-commerce consumers reported that they had bought clothes online (E-barometern helårsrapport 2015). The same report also showed that 60% of all young women (i.e. ages 18-30) who purchase products online were especially shopping for clothes, which indicates a quite large subset. But when searching for documentations investigating specifically that segment and their preferences in web design, little were to be found apart from the research conducted by Djamasbi, Siegel, Tullis and Skorinko (2011) and Djamasbi, Siegel, Tullis (2010) where the target were to specifically capture the characteristics contributing to what the female and male users in the specified ages, perceived to be visually appealing (e.g. the user’s aesthetical evaluation of a web page). What remains unclear, is how the investigated segment value usability aspects, which is mentioned in their research but did not dug further into.

When prior studies stressed the importance of keeping the user central in the design process of a website (independent on age), both aesthetical and usability aspects are mentioned. Though, there has been deviations in the how the researchers described the importance of them in relation to each other. Some explained that a combination of both were necessary to claim user interest and to maximize the website quality (Eccher 2014; Beaird 2010), while others stressed that the aesthetics had gained more importance and that bad usability had a tendency
of being overlooked when a website was considered visually pleasing (Djamasbi, Siegel, Tullis & Skorinko 2011; Lindgaard & Dudek 2002; Lindgaard, Fernandes, Dudek & Brown 2006). It all seems to imply to the importance of the users first impression and the understanding of how the website should be designed to be valued in their eyes. But as there exists divided sentences in how to prioritize the web design, it urges for a gap necessary to fill in to understand if the advancement in technology in some way have affected the younger generation (referred to as people between the ages 18-35 during this thesis), their preferences and perception of e-commerce websites.

1.3 Purpose of Study

The goal when you create a website is to make sure that people find it interesting enough to stay at your site. One step towards achieving that is to understand the users and what they require from you. Therefore, this study seeks to understand the preferences of females born into the younger generations as they are a large segment highly relevant for an e-commerce website to understand if striving to achieve website success in Sweden.

The aim is towards gaining an understanding of where a user look when entering a main page for the first time to determine areas of interest and certain focal points. But also, to search for a certain pattern reflecting the characteristics that distinguish between attitudes of web pages, and why the users prefer one site over another.

1.4 Research Question

With an attempt to fill the gap of how to design websites in order to attract and retain female users of younger generations from the moment they are entering an e-commerce website, the researchers strive towards contributing with further knowledge to the subject Human-computer interaction and web design. The following research question were established:

What considerations need to be made when shaping the young user's first impression of the main page of an e-commerce website?

To narrow down the main research question of this study, the decision of developing two sub-questions were made:

1. Will usability highly valued in a pre-usage state when the user is shaping her first impression?

2. Will young users prefer a web design with more graphical considerations?

1.5 Delimitations

For this research, focus has been chosen to be towards the structure of the main page with visual as well as usable considerations.
The researchers therefore have chosen to make delimitation when it comes to measurements of usability consisting of task performance and learning time through a live website and will instead investigate the perceived usability by creating static images. The researchers have also chosen to limit their research to e-commerce websites selling clothes to get a more focused research. Finally, the geographic area of research will be delimited to the Swedish city Borås where equipment necessary for the study will be available.

1.6 Target Group

The hopes are to provide an initial idea of the preferences and values of a part of the major segment operating on the e-based market of Sweden and to contribute with additional knowledge within the subject of web design. The findings from this study could be of interest for individuals or companies developing e-commerce websites reaching out to women between the ages 18 and 35.

1.7 Disposition

Chapter 1  This chapter will acquaint the reader with the concepts: Generation Y, usability, and aesthetics, which will be appearing continuously through this paper. The reader will also become aware of the researchers view of the importance of understanding website requirements from large segments existing on the Swedish online market.

Chapter 2  Prior research in Human-Computer interaction with focus on the importance of first impressions, eye movements and web design are presented in this chapter to provide a theoretical base for the methodology.

Chapter 3  In this chapter the reader will be introduced to the choice of conducting a qualitative research by implementing an experiment combined with an open-ended questionnaire. Furthermore the reader will gain an insight of how the research proceeded by a flow chart.

Chapter 4  The results reclaimed from the performed experiment will in this chapter be presented through two separate parts. Firstly, the results from the eye-tracking will be introduced followed by an analysis. Secondly, the researchers will present the coding of the answers from the questionnaire.

Chapter 5  In the discussion, findings reclaimed from the performed experiment will be compared to findings from prior research mainly directed to the subjects of usability and first impression.

Chapter 6  In this final chapter the researchers will present the answers of the research question and present their contribution to the field of informatics and Human Computer Interaction.
2 THEORY

Prior research in Human-Computer interaction with focus on the importance of first impressions, eye movements and web design are presented in this chapter to provide a theoretical base for the methodology.

Human-computer interaction (HCI) is described as a multi-disciplinary subject (Ghaoui 2006; Dix, Finlay, Abowd & Beale 2004), attracting innovation and technology which over the last 25 years has been the inspiration for new solutions directed to the benefit of the user as a human being (Ghoul 2006). HCI concerns several areas such as psychology, graphic design, ergonomics and business among others. The common goal is to make it easier for the user interacting with a system (Ghaoui 2006; Dix, Finlay, Abowd & Beale 2004). Understanding the users and to make them central in the design of an interactive system is crucial for many e-based businesses. Partly since users have a tendency of blaming themselves and feel stupid when the interaction is not running as smoothly as they had hoped to, which gives bad associations with the site (Garrett 2011), but also for a successful business, considering return of investment (ROI), safety, ethics and sustainability (Benyon 2014).

In the early 1990s, human-computer interaction established itself as an important area of study about the evolution of the World Wide Web (WWW) (Benyon 2014; Ghaoui 2006). At that point of time, the possibility of owning personal computers increased as well as people's demands and expectations. This in pace with the starting shot of the rapid change of technology (Ghaoui 2006). Today, an interactive system could be a phone, a social network (e.g. Facebook) or, as for this study, an e-commerce web site, which stores and displays information as well as responds to people's actions. (Benyon 2014).

2.1 Designing websites

As an outcome from the rapid increase of technology and new ways of exposing information, designers have tended to become overzealous and carried away in their attempt to be creative in their designs (Dawson 2012). The product from this is websites becoming more complex with an overload of information (Michallidou, Harper & Bechhofer 2008), which as well as a negative impression could entail that the user won't return or use the site (Garrett 2011; Michallidou, Harper & Bechhofer 2008).

Per Beaird (2010, s.8) most websites are structured by mainly six components. Container (the frame for the page), logotype (the sites identity), navigation (how the users can use the site), content (anything from images, text or video that can be found on the webpage), footer (the bottom on the page) and white space (areas without illustrations or typing) (Beaird 2010, s.8). For this, web designers use wire frames as a sketch over the page design and a guidance for where to place the different elements (Beaird 2010; Lynch & Horton 2009). The structure of the wire frame has evolved as a trend and shapes a basis for what is presented as “best practice recommendations in web page composition” (Lynch & Horton 2009). Best practice is a praxis origin from research of where on a website a user expects to find certain web elements (Lynch & Horton 2009). Such locations are presented by Eccher (2014) in the book
“Professional web design” where he explains that the logotype usually is placed at the upper left corner of the websites as the users are habituated to look there when searching for it. Eccher (2014) also explains that the placement of the navigation is a key component of efficient web design and that it either should be aligned vertically on the upper area of the page or descending along with the left side.

As web developers are aiming towards making the website components intelligible across all kinds of browsers and to reach the broadest set of consumers, standards for web development have increased their importance (Purwati 2011). The website is a “self-service product” that comes without a manual or any further instructions (Garrett 2011) which means that there must be a consistency in the way you design the website to make it easy for the user to interact and comprehend with the content they are exposed to (Eccher 2014; Laurence & Tavakol 2007). A key-solution to preventing the users from perceived difficulties is to constantly be aware of the prevailing design trends and conventions that might aid to reduce possible entry barriers for the users. If they are familiar with a certain structure and recognize the same characteristics at another web page, the user will find it easier to locate him- or herself around (Dawson 2012). By having these traditional ways of designing the website layout in mind, the users will perceive a more natural way of browsing (Dawson 2014). Deviations from the use of the stated standards above may frustrate the user by obstructing the search out process (Eccher 2014).

2.1.1 E-Commerce websites

Lee & J.Koubek (2010, 330) refers an e-commerce website to “an online marketplace where goods and services are purchased” which gives a good description of what this kind of websites serves as. The basic design of an e-commerce website does not differ that much from the way you design websites in general since the layout of most web pages consists of the same kind of building blocks (e.g. title/logo, navigation and content) (Chaffey 2011; Beaird 2010).

According to the article Purwati (2011), navigation, search, contact us and shopping cart are four features especially important to consider at an e-commerce site. But as for any other website, design is highly dependent and controlled by the website audience and purpose, which means that content and services need to be provided in a way that is found to be appealing to a major audience (Chaffey 2011). A well-constructed and thought-through website might be the determinant of the user’s willingness to remain at a site, to revisit it or, in best case scenario, affect the intention of purchasing from it (Purwati 2011) which is very relevant to the context of e-commerce. Per prior studies, buying intention can be brought from the colour scheme chosen for the web design (Beaird 2010), or from the sense of trust, as Chaffey (2011) explains in the book “Digital business and e-commerce management”. Since the online environment lack of the presence of physical reassurance, online consumers look for cues of trust on the site they enter (Chaffey 2011). Among those cues, the web site design was considered as a driver that could be traced from navigation and presentation. Another evidence on the importance of web design were to be found in the study by Fogg, Soohoo, Danielson, Marable, Stanford & Tauber (2003) where over 2500 answers were collected from a questionnaire asking about perceived credibility of different websites. From this study (Fogg, Soohoo, Danielson, Marable, Stanford & Tauber 2003), a correlation was presented between the looks of the web design and the users perceived credibility of the sup-pliers with a percentage answering rating of 46.1.
As the navigation of a website has showed to have an impact on the sense of trust, Chaffey (2011) stresses the importance of the “flow” concept. This refers to how easy it is to find the information needed to redirect oneself from one page of the site to another page. To manage this to the lowest extent of clicks possible is also stated as a rule of thumb when designing websites to retain usability (Chaffey 2011).

Nielsen (2000) does as well discuss considerations to be made when developing navigation systems. For this, he explains that the user needs to know where he or she is located, which could be achieved by mediating the placement of a logotype (in accordance with the conventions also stated earlier in the text describing the structure of a website). He also stresses the importance of giving the users the option of navigate wherever they would like to.

2.1.2 Usability on websites

A website needs to have a purpose when it is developed; this means that the company behind the site need to have an idea of why they need a website; is it to reach more consumers, to share information or to sell goods? Regardless, the developer of the website needs to keep this in mind to make sure that the site can solve the website user’s problems (Perker, Kucukozer-Cavdar & Cagailtay 2016; Nielsen 2000).

Usability can be defined in several ways depending on the context, but for this study it has been referred to as how easily a user can “find and process information as well as perform certain tasks” (Eccher, 2014). When a website is developed, there are two basic approaches; design the artistic ideal of expressing yourself (the site graphics) and the engineering ideal of solving the customer’s problem (Nielsen 2000; Perker, Kucukozer-Cavdar & Cagailtay 2016). To satisfy the user, web designers must consider both usability and design factors. If the website is hard to use, gaze over or has complex functions, the users will get confused and move on from the website. (Perker, Kucukozer-Cavdar & Cagailtay 2016; Eccher 2014)

According to Perker, Kucukozer-Cavdar & Cagailtay (2016) there is a proposition for two factors that can measure usability; the survey ability and the find ability. Where the survey ability is a measurement of the user’s satisfaction with the site, the find ability is a factor that measures the user’s ability to find information on the pages (Perker, Kucukozer-Cavdar & Cagailtay 2016). User involvement is therefore vital to be able of evaluating the usability of the design (Chaffey 2011). Traditionally, focus groups have been used in the process of website prototyping but eye-tracking has as well occurred for the same purpose (Chaffey 2011).

2.1.3 Graphical design on websites

Graphical design is described as a discipline of visual communication embracing several areas (Gomez-Palacio & Vit, 2009). It engages us everywhere we go and includes everything from the magazine we read to the signs we can see on the streets. By acting on our emotions and help us to form our attitudes towards things, graphic design could be a determinant of what differentiates one organization from another (Newark, 2007).

If graphical design is the language, then visual communication is what we chose to speak to a targeted audience through things such as images, types, colours or symbols. To create
meaningful and understandable visual communication, graphic design has been applied as a framework of how to use elements to appropriately and efficiently achieve it (Poulin 2011). The process of visual communication is affecting the receiver by first evolving a feeling, and then creates a thought which will contribute to a final act. The arrangement of visual elements in the graphic design of a website will quickly evoke a feeling from the user, which makes him or her think something. She is then judging the message by putting it in relation to herself which will lead to an action based on the attention, perceived relevance; feeling and thought the user have experienced (Bergström, 2016).

By using different elements, you can quickly transmit messages and communicate efficiently through visual elements such as; colours, typography and images (Poulin, 2011; Ambrose, 2015; Gomez-Palacio & Vit, 2009; Beaird, 2014). A truly spoken adage suitable in the context of web design is - “A picture is worth a thousand words” (Beaird 2013, s.154; Ambrose, 2015) this as the brain processes images quicker than texts. By using images instead of longer texts, the user’s frustration is estimated to be minimized by the quick mediation of what is wanted to be said (Eccher 2014).

Colours on the other hand, are perceptual features contributing to a person's first impression of a website by evolving emotional reactions and behavioural intentions from individuals, Bonnardel, Piolat & Le Bigot (2010) explained in their article. The effect colours have on users, not the least users as consumers, is a topic highly relevant to e-commerce developers mentioned in prior studies. For them, the choice of colour may be a matter of evolving the consumer’s intention to spend money (Beaird, 2010). The effects of colour on buying intention have been tested in previous research where a correlation between the two has been proved (Pete & Papadopoulou, 2010; Cyr, Head & Larios, 2009).

When investigating user preferences of colours in the context of e-commerce web sites, or rather on web sites in general, blue have shown significant results in the perceived appeal from the users. The blue colour is also argued to be a cross-cultural colour, meaning that it can be associated with similar things (such as blue skies or water) and is possibly perceived similarly independent of the culture of the individual. (Cyr, Head & Larios, 2009; Bonnardel, Piolat & Le Bigot, 2010; Beaird, 2010).

2.2 User interpretation and perception of websites

When people observe the world, they do it through their five senses – through vision, hearing, touch, taste and smell. These senses work as a channel between the individual and its surrounding and create what we call perception (Pearrow 2007).

Perception is a word with origins in psychology and refers to the conscious and subconscious processes that convert sensory impressions to information (Bergström 2016). The eye, and what it intercepts, plays a central role in the context of visual perception, since it is from which the converting process begins (Jamieson 2007; Benyon 2014). The light falls between the eye and the object and the user becomes visually aware. The stimulus obtained is depending on the user bias, which will be filtered and transmitted into electrical impulses and develop a visual knowing (Jamieson 2007).
Visual knowing appears when a person senses something, when the brain is processing data and constructs a person’s perception of the world around her. When this mental image is generated, psychological and cultural factors will be determinants and influencers of what makes us focus in one thing rather than another by directing the attention (Jamieson 2007; Benyon 2014).

When perceptions are described, it is said that it can be interpreted either directly or indirectly. The direct perception refers to the stimulus that has been caught from one of the senses without any kind of human mediation. The indirect perception refers on the other hand to the stimuli from mediated communication (Jamieson, 2007). A person will perceive an ordinary object with same colour or shape, independently from the light or the angle. This is called perceptual constancy, (e.g. a coin has always the same colour and shape) (Benyon 2014).

In the context of web design, the individual is mainly interacting with the content through the vision and what they can see (Pearrow 2007). So, to establish good web design, we need to understand how the relationship between different visual element will affect the way people perceive them (Lupton & Phillips, 2008).

### 2.2.1 Aesthetics

Beaird and George (2014) states: “users are pleased by the design but drawn to the content”. Aesthetics is an area of study which concerns beauty and how things are sensed, felt and judged. Emotions towards design in general are very important to consider, since experience is all about the feeling. Experience is not to be designed; design is rather done to create an experience from the user (Benyon 2014).

The aesthetics of an object or an item is hard to define with a rule or point to one thing. A human has a complex sense of appeal, and each person has its own opinion about what appeal is for them (Lawrence & Tavakol 2007). When a user determines if the website is appealing or not, they look at the whole website and not on each element. Every representative element such as text, images, videos, sounds etc. can carry subjective or objective aesthetics but one element cannot make a whole site (Lawrence & Tavakol 2007). Lawrence & Tavakol (2007) emphasize that the user’s satisfaction is a result from their positive experience of the site and his or her emotional response of the aesthetics on a website.

### 2.2.2 First impression

Per Berström, Karlsson and Parmenvik (2009): A web page must be able to guide the users and attract them. Lawrence and Tavakol (2007) compared the main page with an entrance door at a store, which needs to invite the user to come in and browse. When a user sees a website for the first time, it can either create expectancy or kill all interest. To avoid the second scenario the creator of the website needs to consider who the user is, and what they want to do on the website (Bergström et. al 2009). The experience from the first impression has shown to have an impact in the ways a user interprets the information from the site. If he or she already has decided that the web site is not appealing, the information will be perceived as more negative than if their first impression was positive. A strong negative impression is as well discussed to be damaging for companies competing with others who are selling the same products or services online (Lindgaard & Dudek, 2002; Garrett, 2011).
Prior research by Lindgaard, Fernandes, Dudek and Brown (2008) has shown results that the user can evolve a reliable impression towards the visual appeal of a website within 50 ms. This research has also been a reference to other documentations within the subject of first impression and user experience (Tractinsky, Hassenzahl, 2006; Jardina, Phan, Nguyen & Chaparro 2012; Papachristos, Avouris, 2011). The length of time the visitor stays on the home page is assumed to be up to 20 seconds, of which time it is considered to take around 5 seconds to scan the page and gain a comprehension about it (Eccher, 2014; Michailidou, Harper & Bechhofer, 2008).

2.3 Interaction with a website

The interaction between the user and website is expressed to be divided into three stages - physically (by pressing a button), perceptually (things displayed on the screen or sounds) and last, conceptually (when understanding what the system does). The book written by Bergström (2016) states that of all the five human senses, the eyes catch about 83% of all the information perceived by the individual. But the common way of interacting with a website is through the eyes and what the individual sees (Benyon 2014).

2.3.1 Eye-tracking and eye-movements

Eye tracking is a method used to help the researcher to understand visual attention. Eye tracking can follow the user's eye movement and see where the users look, for how long and see if they are following a certain path. (Bergstrom & Schall 2014). To track and follow eye movements is described as a sensitive measure of the attention process and may also help to predict later memory performance (Chapman 2005).

The first documentation of the use of eye tracking is from the French ophthalmologist Emile Java who 1879 observed the eye movements from persons during text reading. (Lupu & Ungureanu 2013) Over the years the methods for eye tracking have developed together with the technical development (Lupu & Ungureanu 2013). In general, there are two types of eye tracking techniques, those who measure the position of the eye in relative to the head and those that measure the orientation of the eye in “point of regard” (Duchowski, A.T. 2003). The latter method is used when the concern is to identify elements on a visual scene, e.g. graphical attributes. The most common method to measure point of regard is the video based corneal reflection of light to the eye tracker (Duchowski, A.T. 2003). When researchers use video based eye tracking they have the choice to use visible spectrum or infrared spectrum (Lupe & Ungureanu 2013). When visible spectrum is used, the video tracker is a passive approach, which means that the light in the environment around the participant needs to reflect in the participant’s eyes. This means that the result will differ depending on the light from the environment (Lupe & Ungureanu 2013). When infrared spectrum is used the video-tracker is instead active, this means that the eye is illuminated constantly and uniformly but imperceptible for the user. (Lupe & Ungureanu 2013).

When the eye gets exposed to infrared light the eye movement can be detected and tracked with the reflective properties of the pupil (Hansen 2004). Methods based on active light which means that the eye gets exposed to infrared light, is the most predominated in both research and commercial studies. (Hansen 2004)
2.3.2 Glance-attracting objects and attention

According to Benyon (2014) attention is the “focusing of mental resources at or on a particular task or object”. From the article by Djamasbi, Siegl & Tullis (2010), results showed that search features, large pictures and faces, not least the ones of celebrities, caught user attention. Size of different graphics, moving objects as well as colours and things that are recognizable, have in general proved to have an impact on the attention paid from the user (Lee, Benbasat, 2002; Bergström, Karlsson & Parmenvik, 2009; Maughan, Gutinkov & Stevens, 2007; Eccher, 2014; Djamasbi, Siegl & Tullis, 2010).

By using these elements in certain ways, the designer can lead the eye wherever he or she intends (Eccher, 2014). This is defined as “visual hierarchy”, which inclines that the features you put in the top of the hierarchy, are the ones the user probably will pay attention to first. This will create a focus cue which may be followed in accordance with the priority order of the elements (Djamasbi, Siegl & Tullis, 2010).

Benyon (2014) states, that when a user perceives a website, things such as sound are grabbing a lot of attention from the user which can be used to communicate useful information. The user can also use their touch to interact with interface; this is called tangible interaction, and can be used through on-screen virtual tools (Benyon 2014).

2.3.3 Memory and recognition

The human memory is consisting of three major components, the working memory, the long-term memory and the iconic memory (Benyon 2014; Ware 2012). The iconic memory can be compared to short-time storage for pictures. It contains what the retina focuses until it is replaced by something new or a hundred of milliseconds pass (Ware 2012). The working memory is also called the short-term memory, can hold material in up to 30 seconds, and can only hold 3-4 “chunks” at the time. The content of the working memory can easily be overwritten and needs to be repeated or refreshed within 30 seconds to no be fading away or get lost (Benyon 2014; Ware 2012).

The long-term memory can never run out of storage. A memory can last from a few minutes to a lifetime (Benyon 2014). It has two important functions, the recall process and the recognition process. The recall process is the procedure when a person actively searches in his memory to retrieve a particular piece of information. The recognition process is instead the process where the person searches in his memory and then decides if the information matches what is stored in the memory. (Benyon 2014; Ware 2012)
3 METHODOLOGY

In this chapter the reader will be introduced to the choice of conducting a qualitative research by implementing an experiment combined with an open-ended questionnaire. Furthermore, the reader will gain an insight of how the research proceeded by a flow chart.

3.1 Research strategy

This is a qualitative thesis with quantitative elements, where much of the data collection will be done in a qualitative way, but is supplemented by quantitative features. The choice of a qualitative study was motivated by the research question which focused on the user’s perceptions and feelings. A qualitative study has its focus on the meaning and contexts and qualitative strategies have a typical focus on the development of interpretations of data (Robson 2011; Recker 2011). The quantitative research is on the other hand focusing on measurements and quantifications when the data is collected and analyzed (Robson 2011). Therefore, the researchers decided that a qualitative strategy will be the most suitable choice for this research.

The data in a qualitative study is usually collected through interviews and the researchers are using verbal analyzing methods (Patel & Davidson 2011). The advantage for the researchers to use a qualitative strategy is per Recker (2011) the ability to uncover complex and multifaceted phenomena and can therefore lead to a more multi-perspective view. As with every method, there are also disadvantages with the chosen strategy; a qualitative study is usually hard to generalize because of the interpretations of data (Recker 2011). In this study the data has been collected through a qualitative experiment and an open-ended questionnaire.

3.2 Research approach

To be able to perform a successful scientific research report, the researchers need to be aware of the current scientific approaches (Patel & Davisson 2011). Depending on the choice of strategy, methods or assumptions in the approach the research will differ. According to Patel & Davidson (2011) there are three different approaches in the way of viewing the relationship between research and theory; deductive, inductive and abductive approach. The deductive approach is when the research is based on existing theory and form that deducts a hypothesis, which then is tested empirically. The inductive approach is focused on the outcome of the research (Patel & Davidson 2011). The researcher is gathering data and based on the empirical collected data a theory is formulated. In an abductive approach the researcher combines both deductive and inductive approaches and utilizes features from both (Bryman & Bell 2015; Patel & Davidson 2011).

The approach to previous research in this study will be of abductive approach where the researchers will use a more deductive approach in the preparation work for the collection of data, and will base this on previous research and use a more inductive approach during the collection of data and during the analysis phase.
The philosophical paradigm that will be used in a study depends on how the researchers are planning to gaining and creating knowledge (Oates 2006). This study was conducted as a hermeneutic, where the interpretation of the answers has been an important part of the researchers work. The study focused on how the user of a website perceives a field that was hard to study without interpretation.

### 3.3 Research process

The study was initiated with a decision of an area of interest, which was decided to be “user’s first impression of websites”. The researchers then started to look at previous research to see what was studied in the field and if there were any areas where previous research was weak. Based on previous research the researchers saw a gap between two established theories for how to create a good website, where one side stressed the importance of usability and the other side stressed the importance of good design. When previous research was collected, the researchers chose a research strategy, research approach and research design, where the study was decided to be a qualitative study with a hermeneutic view and an abductive approach. The researchers then started to design their empirical data collection. The chosen design was quasi-experimental combined with an open-ended questionnaire. The quasi-experiment was decided to be executed through eye-tracking where two mock-ups of a web page main page would be shown to the participants. In the beginning of the test, the participants were required to answer three closed questions about the participant’s age, shopping habits and essential features on a website.

The mock-ups of the web pages were designed according to the two different design approaches where the first mock-up was focused on the graphic design, and the second mock-up was focused on usability. The complementary questionnaire was then designed to answer questions in four different areas, first impression, usability, memory and user preferences. The questions were open-ended and were designed to be able to catch the participant’s feelings and thoughts about the mock-up they were shown. The quasi-experiment was performed originally on a participant group of 30 subjects. To reach a more reliable study the researchers decided to complement with another 20 participants to create a total participant group of 50 participants. The participants were chosen based on quota sampling and had to fulfil the participant requirements set by the researchers, which were females in the ages between 18 and 35.

The findings through the empirical study was then analyzed, findings from the quasi-experiment was analyzed through heat-maps (illustrations which shows where a participant have had the most focus during the experiment) and gaze-plots (illustrations which show the order the participants has gazed over the picture during the experiment). The analysis will be an attempt to find patterns that are common for the participants. The findings from the questionnaire were analyzed through selective coding with an attempt to determine central phenomena in each question. The discussion will introduce the findings and leads to conclusions which will be presented together with areas of improvement and a discussion of chosen meth- od and suggestions for future research in the area.
3.4 Research design

The research design can be compared with a blueprint for your research (Recker 2011). When the design was created the researches decided to use a quasi-experiment to collect empirical data to answer the research question. A quasi-experiment, is a research design that is close to an experimental design but does not meet all the requirements of the experimental design (Bryman 2012). The experiment in this study does not meet the requirements for a control group or the manipulation of different control groups. The experiment will use one group of participants and give them the same tasks and then ask them to answer the same questions. This is similar to the one-group, pre-test, post-test, because of the instructions the participants will get during the experiment and the measurement the researchers will make before and after these instructions (Oates 2006).

The implementation of the experiment was decided to be eye-tracking, which is a technique to track a person’s eye movements. The device used in this experiment is provided by Tobii-pro-eye and is an eye tracker that is sending out infrared light to track the eye-movements. This equipment is fixed at a computer in the laboratory and it is therefore important that the participants do not move during the test. To get valid results, over 70% of the eye movement must be tracked, things that can disturb this are glasses, sunlight, if there is something in the way of the eyes or if the participant has very small eyes.

To use the Tobii-pro equipment the researchers took help from the SIIR coordinator that helped the researchers create a test from the mock-ups the researchers had created. The experiment will compare two mock-ups where the researchers measure how the participants gaze over the screen when each mock-up appears. To get a more solid result the experiment was followed up by a questionnaire where the participants was asked to answer 11 open-ended questions.
3.4.1 Design of mock-ups

To be able to perform the quasi-experiment through eye-tracking the researchers had to decide what they want to measure and what they want to show to the participants. Because of the focus on first impression the researchers decided to use the main page of a webpage, and to create a genuine first impression the researchers decided to create two pictures represented the main page of a website.

To create these pictures, the researchers started to conduct information about how websites today are built, to be able to deduct what is considered “a good website” the researchers searched for sites that have been elected as the best e-commerce website or websites that have a high volume of transactions. The researchers then saw a pattern of attributes that the most successful web pages (internet world 2016) choose to use on their sites.

The researchers also started to read previous research and saw that there was a distinction between the theories of usability and the theories of design aspects. Much of previous research stresses that the aspects need to be combined, but there is a disagreement between in to what extension the combination should be. Previous research in the area also suggested that younger generations prefer large pictures instead of long texts containing a massive amount of information. The reason for this according to the research (Djamasbi et.al 2011) was that this generation has been growing up with the technology and did not find the need for instructions or text and preferred pictures and fast navigation.

Previous research was used as a foundation to create the mock-ups (a model of the design of a webpage’s start page). To create mock-ups that would be realistic the researchers also studied top ranked e-commerce websites for clothes in Sweden. The researchers then could conclude that best practice was used to a large extent at the websites since they shared many similarities regarding navigation tools, design and layout.

When the mock-ups were created every attribute such as colours, text fonts, images were chosen with foundation from previous research. The mock-ups were created in the picture developing program InDesign in jpg format, represented as the main page of the websites.

When creating the mock-ups, the researchers wanted to get a result which was not affected by a company or recognition of a site or a logotype. The researchers therefore decided to construct their own logo based on the first letters in their first names. The colour scheme chosen at the mock-ups is blue, a colour previous research has identified as calming as well as it is a colour with similar meaning in different cultures and countries.

The researchers decide to use pictures not contain faces or full body pictures of humans; the reason for this is that previous research (Djamasbi et.al 2011) has shown that users prefer to look at pictures of faces and that the attention of the eyes is drawn to them. To avoid a that the result would be influenced by what the user thought about the person on the picture or recognized the person for different reasons the researchers used a picture of a woman where the researchers cut out a part of her head so that the user will only saw a part of the head and the neck - but not the face.
The placement of navigation tools is based on “best practice” where previous research has showed that users prefer if navigation tools are similarly placed on different websites. The difference between the two mock-ups the researchers created was that what will be addressed as mock-up 1 was designed with the visual appeal in focus; this means that the researchers have used previous research with focus on visual appeal in the development of the picture. The mock-up therefore contains a very small amount of text and the navigation tools are represented by symbols. Mock-up 1 is also containing only four large pictures below a main picture to create a more visual appeal. The mock-up that will be addressed as mock-up 2 has the focus on usability instead. Mock-up 2 has navigation tools represented by text, smaller pictures and more focus on a clear menu and where to click to use different tools for navigation. The researchers also added two large buttons below the main picture (that now is smaller than on picture 1) which show the user where to click to shop for her or for him. There are also links added underneath the product pictures which is telling the users to click here to shop this item. The similarities are that the font is the same in the mock-ups, and both mock-ups have the same images and the same colours.

3.4.2 Design of questionnaire

The questionnaire is an open-ended questionnaire containing eleven questions where five questions are asked concerning mock-up 1; these five questions are then repeated but now concerning the mock-up 2 and the last question is a comparing question. The questions cover areas of first impression, usability, and memory. The area of first impression is chosen as an attempt to catch what the participants think about the first sight of the mock-ups presented for them during the experiment.

“Describe your first impression of the web page? Is it good or bad? Please motivate your answer.” This is the first question and is repeated for the second web page and has then number six in the questionnaire. The goal with this question is that the researchers want to see what the participant think about the page, just in general, was it good or bad and why? The researchers compare the answers of this question with the first seconds the participants look at the screen to try to see a pattern between the answers and the path the eyes have moved over the screen.

“Did you understand what the web page was selling?” This is the fifth and the tenth question in the questionnaire. This question is a control question to make sure that the websites mediate the message the researchers has in mind when the mock-ups were created. The usability area is measured through the participant’s perceptions. This means that we do not measure usability in the traditional way where researchers measure the time it takes for users to perform a certain task. Focus is instead on the perception of usability and if this affect the first impression the users get form the picture.

“What navigation tools did you find on the web page?” This is the third and the eighth question in the questionnaire. This question has two purposes; the first is to see if the participants remember what they have seen during the experiment, but also to see if there are some navigation tools that are more likely to find than others. On the first web page the navigation tools are just symbols and they are not very clear meanwhile the navigation tools on the second web page are large and very clear. The researcher’s goal is to see if there are some navigation tools that are more important than others and if there is a connection between the navigation
tools that are considered most important in previous research and which navigation tools the participants are more likely to remember.

“Did you experience that the web page would be easy to use”. This is the fourth and the ninth question in the questionnaire. The objective with this question is if see of the web page is perceived as user friendly even if the participants don’t click around on the web pages. The researchers would like to see if there is a connection between what is perceived as usable and what first impression this gives the user. There is also an interest from the researcher’s side if a less usable site can be overlooked if the graphical design aspects are visually appealing. To be able to confirm that the participants have registered what they have seen on the screen the researchers decided to add a question to the questionnaire to see what the participants remembered.

“Mention two things you remembered from the web page” This is the second and the seventh question in the questionnaire. To be able to be sure that the participants have registered what they have seen on the screen there is a need for a control question. But this question also has the purpose to see what the participants focused enough on to remember, and the researchers tried to see if there are areas that the participants remembered most of and therefore highlight areas that will be more important for the first impression than others.

3.5 Implementation of empirical research

The collection of data was decided to be determined through an experiment with a supplementary questionnaire. To conduct that experiment and that it would give a desired result the researchers decided to use a pilot experiment. The test will contain 1 person that will perform the experiment, the researchers observed the participants when they performed the test and afterwards asked them to make an oral evaluation about what they thought about the test, if they understood everything and if the questionnaire afterwards was understandable.

3.5.1 Pilot experiment

The researcher starts the system and goes through the equipment with the mentor for the lab. The mentor gives the researcher some guidelines of what to think about when performing an eye tracking experiment: for example, how to instruct the participants how to sit when the calibration start, how others have done when they perform their experiment and so on. The test person arrives to the experimental lab and the researcher gives the participant instructions regarding the experiment the participant will perform. The researcher begins with calibrating the participant´s eyes to make sure that the eye tracker can record the participant´s eye movement. The calibration is performed by the researcher placing the participant in front of a computer screen, and then the researcher needs to make sure that the participant sits at the right distance from the screen. The distance between the participants and the screen should be between 60 and 70 cm, to help the researcher there is a scale on the screen that are shifting from red to green depending on if the participant´s distance is okay or not.

When the distance is satisfying, the researcher needs to be sure that the eye-tracker can catch the participant´s eye movement. The participant gets the instruction that a red dot will appear
on a white screen and the participant is asked to follow this dot with her eyes. It is important to instruct the participant that she only should move her eyes and not her head. When the eye movement calibration is finished, the researcher will see 5 grey dots on a document, every dot should contain a green area to be valid, and if the area does not contain a grey area the calibration should be redone.

When the calibration is ready the researcher gives the participant instructions that the test will begin; the test starts with 3 start-up questions about age, shopping habits and what they think is important on a site. When the questions are answered, an instruction will appear on the screen: Look at picture 1 in 20 seconds. When 20 seconds have passed, the participant gets a new instruction of look at a second picture but this time look for the menu and navigation tools. The time is still 20 seconds or when the participant is ready. During the test the researchers ask the participant to talk out loud about what she sees and what she thinks about it. When the eye tracking test is finished, the participant goes to a new computer where she gets a questionnaire, with nine closed questions for each picture (the questions are identical for both pictures) When she is finished and submitted, the test is finished.

3.5.2 Learning points from pilot experiment

- The researcher needs to instruct the participant not to move during the test; if the participant moves forward or backwards the eye tracker cannot track the movement and there will be no result from this time, (if this time is too long the whole test will be invalid)

- 20 seconds is a very long time so the researchers decided to shorten this to 10 seconds (which is still plenty of time to look around)

- The researchers realized that they cannot ask the participants to talk out loud, because the participant needs longer time to form what he or she sees on the screen than the actual viewing time. Therefore, the participant will get distracted and the result will not be as clear as if they are given the instructions to just look at the screen.

- When answering the questionnaire, the participant had trouble remembering the first picture she saw. The researcher decided to change in the questionnaire and divide the questions in 2 separate parts. Each part starts with the picture the researcher wants the participant to answer regarding, to make sure that the participant answers concerns the right picture. The researcher also hoped that this will minimize the mix-up between the pictures and to make sure that the answers the researchers collect will belong to the right picture.

- The researchers decided that the test was too controlled and decided to add two pictures, the test now starts with some instructions (the participants are informed that they will see a website for 10 seconds) the participants now look at the first website layout for 10 seconds, then the participants get a new instruction to look at the same website, but are new informed to search for the navigation tools on the site. After that the participants get new instruction that they will see a new website for 10 seconds and are asked to just look at it. After 10 seconds, new instructions appear and once again the participants are asked to search for the navigation tools on the site
• The researchers saw that they would not get enough data from a questionnaire with closed questions and decided to change the questionnaire to 11 open questions where the researchers can collect the participant’s thoughts about the websites, and because the researchers are interested in the participant’s opinions the researchers decided that they will not be able to create closed questions that will cover all possible answers.

3.5.3 Implementation of experiment

When participants enter the laboratory, the researchers start with a brief introduction about what the experiment is about. The researchers then instruct the subject to sit down at the eye tracker device, ask for their first name and the first letter in their second name, the names will not be published in the study but are a help for the researchers in the analysis part where the eye tracking and the questionnaire answers will be linked.

The first thing the researcher will do is to calibrate the subject’s eyes. Calibration means that the eye tracker make a calibration to make sure that it can track the eye movement without any distractions. The participant get instructions to sit straight up in a way that feels comfortable and that a red dot will appear on a white background, the researcher now ask the participant to follow this red dot with their eyes without moving the head. If the calibration is acceptable the researcher informs that the test will begin. If the calibration is not acceptable the researcher recalibrates the non-acceptable parts. The test starts with three closed answer questions about age, shopping habits and what the participant think is most important on a website. Due the fact that the start questions can be used to divide the participants in different group to see if the result is different depending on their age or shopping habits these three questions are asked in the beginning to be able to connect with the Tobii-eye tracker software.

When the participant has answered the questions, following instructions will appear on the screen “You will now see a web page, use the time to look around on the page”. The participant will then press the “space” button on the keyboard to start; the participant will then have 10 seconds to look around at the web page. When the time is up new instructions will appear “You will now look at the same web page again, but we now ask you to locate the navigation tools at the page”. Once again the participant is asked just to look around at the screen and when the participant presses “space” the time starts, the time is now 5 seconds. New instructions appear “You will now look at a second web page, use the time to look around on the page”, when “space” is pressed the time start for the second web page, the participant once again has 10 seconds to look around at the screen. When the time is up, the last instructions appear on the screen “You will now look at the same web page again, but we now ask you to locate the navigation tools” the participant will have 5 seconds to look around at the screen and then the eye tracking test is finished.

The participant is now asked to sit down at a different computer where she will get the questionnaire. After the participant, has finished answering the questions the researcher offers coffee as thanks for her participation.

3.6 Ethical issues

An ethical consideration needs to be made with concerns towards both participants and researchers. This to make sure that the participant can feel safe and comfortable when participating in a study and to avoid any kind of bias or unethical behaviour from the researcher.
Good ethical practice has also been referred to by the Social Research Association (SRA, http://the-sra.org.uk/) as vital to protect the research subjects as well as ensuring a high research quality. When studying literature discussing ethics (Bryman & Bell, 2011; Kumar, 2014), certain principles have occurred frequently. Such as harm to participants, informed consent, invasion of privacy and legal concerns. For this study, each of these principles has been considered closely in ways that will be presented in the following headlines.

### 3.6.1 Harm to participants

In the book by Kumar (2014) the author states that researchers need to examine whether the participation in a study is likely to harm those involved in any way. If that is the case, the researcher needs to ensure that the risk the participant is exposed to be minimized, meaning that the extent of harm is no greater than what it would be if ordinarily encountered in daily life (Kumar, 2014). The same attitudes are expressed in the book by Bryman and Bell (2011) when presenting the codes of conduct from the Academy of Management (AoM) and Market Research Society (MRS).

Another issue mentioned by Bryman and Bell (2011) is confidentiality and anonymity which involves both legal as well as ethical considerations. Maintaining confidentiality of the individual, means that participants should not be identified, unless there is a permission given for this (Bryman & Bell, 2011; Kumar, 2014).

The personal data gathered from this study consisted of the individuals first name combined with the initial letter of the last name. This to being able of linking results from the experiment to the answers of the questionnaire and to distinguish between people having the same first names. Apart from this, considerations about age were made. By not forcing the individuals into specifying their age and instead allowing them to choose between four age intervals, each consisting of a five-year span, you avoid to harming the participant psychologically by preventing possible age-anxiety.

### 3.6.2 Informed consent

Since several ways of causing harmful situations for an individual participating in a study are described and yet it is difficult to identify all circumstances which are likely to occur, informed consent is expressed as a must. Not the least when the risk in participating is greater than risks of everyday life (Bryman & Bell, 2011). To obtain the informed consent from the participant is also explained as important to obtain prior to attempting asking personal questions, which implies that all participants should be aware of the information required from them (Kumar, 2014). Informed consent should always be voluntary and prevail under circumstances without the presence of pressure (Kumar, 2014).

When recruiting attendees for this study, a self-completed attending schedule was sent out via different media channels, first showing an initial presentation of the purpose of the study then giving individuals the opportunity to choose for themselves to participating or not.
3.7 Collection of theory

The collection of theory began when the researchers found their area of interest in web layout and first impressions of the main page of a website. When the area of interest was found, the researchers started to look for research and theories in the areas of usability, web design, visual appeal and first impression.

Through the first literature review the researchers could develop a research question and decide on which method to be used in the study based on previous studies and what they had measured. When the method was chosen, the researchers started to look deeper into the design of a website and how previous research in the area had been performed. After findings of two main views in the area were accepted the researchers started to develop a hypothesis for their study. The collection of theory is important for the researchers to be able to answer the re- search question and it is important for the researcher to do this in a relevant and good way.

To be able to perform the empirical data collection the researchers use previous studies to collect known theories in the area and see if there are areas where the researchers can contribute with further research. The researchers also decided to perform an experiment and use secondary data to be able to create mock-ups and frames for the experiment. Secondary data is data collected by other researchers and writers (Bryman 2012). The development of empirical framework was depending on the theoretical framework and the understanding the re- searchers gained through the research. The focus on the theory was narrowed down during the process when the researchers gained more and more knowledge in the area and therefore understood what they were missing in their theoretical framework to be able to answer the research question.

When the theory was collected, the researchers have used the library of the University of Borås to find books in areas of web design and usability. The search tools Google scholar and Summon have been used to find books and scientific articles online. To find relevant theory the researchers have been using search words as: “usability”, “visual appeal”, “eye-tracking”, “structure of a website”, “Human Computer Interaction (HCI)” both as individual searchers and in large quantity of varieties.

3.8 Data analyzing

Thus, from the experiment the researchers will receive data from two different parts. The first part is the eye tracking, which will provide the researchers with gaze plots and heat maps. A gaze plot is a network of points where the eyes have glanced over the screen and in which order. A heat map is a map where the researchers can see where the participants has viewed the screen the longest, a heat map can be made based on how long time the eye stopped at the point or for how many times the eye come back to the point. Eye tracking is used to see patterns in how users view images and designs on a screen. The visual presentations the eye tracker presents help the researchers to see patterns.

The questionnaire will be open-ended which means that the result from the questionnaire needs to be coded. Per Bryman & Bell (2011) coding is the most common method for analyzing qualitative data. The answers from the questionnaire will be coded in this research. The researchers started with open coding and tried to deduce certain words and phrases the participant uses in their answers on the questionnaire. When salient categories were divided,
the researchers start the axial coding to see if there are any relationships between different answers. The researchers also use selective coding to try to deduce if there is a central phenomenon in the answers of each question.

### 3.9 Sampling method

The sampling process is fundamental for the result of a study. The researchers need to decide on how the sampling will be performed, how big the sampling size should be and where the sampling should take place. This in relation to how much time and money the researcher has access to.

Depending on the research method applied to the study, the researcher decides if the sampling should be a probability sampling or a non-probability sampling. The probability sampling is essentially collection methods that is generalizable and reduce the bias of the research. The non-probability sampling is a term for every other method that does not follow the guidelines that the probability sampling provides (Bryman and Bell 2015). In this study the non-probability sampling has been used, this method is often used when the researchers do not know the frames of the research such as how many participants they need or when time and cost are limited (Oates 2006; Robson 2011). In this study the researchers has been performing an experiment where the result can vary depending on how much of the eye-movement the eye tracker detects. If the eye tracker detects less than 70% of the eye movements, the test is invalid and cannot be used in the research. Because of this fact the researchers could not determine how many participants would be needed for the research.

The researchers have also been using a mix of convenience sampling and quota sampling. The convenience sampling is a sampling method where the researchers chose respondents that are near and convenient. The collecting process continues until the determined sample size is reached (Robson 2011). The researcher’s decision of using convenience sampling is mainly because the experiment is performed in a laboratory where the equipment that is used is fixed and the researchers are not in position to move it. This means that the participants of the experiment need to be in the University of Borås and the researchers therefore decided that to be able to perform the research at all the convenience sampling was required.

Quota sampling is a method where the researchers chose the respondents deliberately to meet the purpose of the study and to be able to answer the research question. This sampling type is also used for sample portions. Sample portions is when the researcher desire certain characteristics in the respondents such as specific gender, age, ethnicity, socio-economical and many more (Bryman and Bell 2015).

The researcher decided to use a type of quota sampling where the researcher decided that they wanted to have participants that where women in the ages between 18 and 35 years old. The gender and age specifics was chosen when the researchers found statistics where 25% of all online shopping was for women clothing and that over 50% of all women in the ages between 18 and 30 was shopping online once a month or more ([http://www.hui.se](http://www.hui.se)).

Through previous research the researchers also wanted to base the study on people that was a part of what is known as generation Y, which is a generation that has grown up with the technology growth of smartphones and internet (Djamasbi 2010). Problems with the convenience sampling is that it cannot state that the findings are representative of a population and it is likely that the participants can be influenced and of a bias (Robson, 2011). It is also hard to generalize the findings because it will be an unawareness of which kind of population the sample would be representative to (Bryman & Bell, 2015). The researchers are aware of this problem and have tried to find participants...
from different areas but due to the limitation of resources and the restrained access to the equipment, the participants were selected from Borås with surroundings. But the researchers believe that the result would be similar if would have been performed at different location with women the same age and the same internet shopping habits.

The problem with quota sampling is that when the researchers have chosen the participants the sample cannot be representative (Bryman and Bell 2015). The researchers are aware of this problem and have therefore only chosen the characteristics of the participants and not every participant. To find suitable participants the researchers has created a doodle document where participants could express their interests, there was also posters posted on the University, and email contact with teachers of both high schools and a profession university to find participants with different ages and backgrounds.

The test person arrives to the experimental lab and the researcher gives the participants instructions about the experiment the participant will perform. The researcher start with calibrate the participants eyes to make sure that the eye tracker can record the participants eye movement. The calibration is performed that the researcher puts the participants in front of a computer screen, first the researcher needs to make sure that the participant sit at the right distance from the screen. The distance between the participants and the screen should be between 60 and 70 cm, to help the researcher there is a scale on the screen that are shifting from red to green depending on if the participants distance is okay or not.

When the distance is satisfying, the researcher need to be sure that the eye-tracker can catch the participants eye movement. The participant gets the instruction that there will appear a red dot on a white screen and the participant is asked to follow this dot with her eyes. It is important to instruct that the participant only should use their eyes and not move their head. When the eye movement calibration is finished, the researcher will see 5 gray dots on a document, every dot should contain a green area to be valid, and if the area does not contain a gray area the calibration should be redone.

When the calibration is ready the researcher give the participant instructions that the test will begin, the test starts with 3 startup questions about age, shopping habits and what they think is important on a site. When the questions are answered, instructions will appear on the screen, look at picture 1 in 20 seconds. When 20 seconds has passed, the participant get new instructions of looking at a second picture but this time look for the menu and navigation tools. The time is still 20 seconds or when the participant is ready. During the test the researchers ask the participant to talk out loud about what she sees and what she thinks about it.

When the eye tracking test is finished, the participant is redirected to a new computer where she gets a questionnaire of nine closed questions, one for each picture (the questions is identical for both). When she is done, and has submitted the test, the experiment is officially finished.
4 EMPIRICAL FINDINGS

The results reclaimed from the performed experiment will in this chapter be presented through two separate parts. Firstly, the results from the eye-tracking will be introduced followed by an analysis. Secondly, the researchers will present the coding of the answers from the questionnaire.

4.1 Eye-tracking results

The results from the eye tracking will be presented though heat maps and gaze plots (this will be further explained in in the text). The presentation of the eye-tracking results is both graphical to make it easier for the reader to understand the patterns the researchers has found.

A heat map is a map over the image used in the eye tracking test and shows which points the participants fixated on the longest. The colours on the heat map indicate the fixation time the participants have glanced at the mock-ups. The heat maps therefor present so called heated areas where the eyes have had the longest fixation time during the test.

![Heat gradient](image)

Figure 2 Heat gradient
Figure 3. Heat map after 50 milliseconds after first instructions. Mock-up 1 to the left and Mock-up 2 to the right.

The images above in Figure 3 shows heat maps for the first 50 milliseconds when the participants had the instruction to only gaze over the web page. The heat maps allow the researchers to see where the participants start to gaze on the web page and where the participants have the most focus towards which is indicated by a red colour.

As the image shows the participants tends to start in the middle of the page on or near the main picture on the web page. The images also show that the spread during the first milliseconds are larger at the second webpage than on the first webpage where the participant’s eye movements are slightly more fixed. The researchers can also see that the first webpages heated areas are more concentrated and are represented by three red markings in comparison with the second webpage that has two heated areas and more green areas then red and yellow.
The images above show the heat maps after 10 seconds and the end of the first part of the experiment. The participants have now only received the instructions to look at the web page. The researchers can through this heat maps see where the participants have focused the most during the test time.

As the images shows, the first webpage which has larger focal points on the graphics, the clothes get more focus than on the second website that has more focus on the text and the navigation tools on the site. The researchers also see a larger focus on the woman at the first webpage and on the logo which can be explained through the lack of other text and navigation tools. Both webpages show that the participants have a large fixation of both corners both right and left. It is also clear that the second webpage contains more information and the focus of the page is also more divide over the page.
The heat maps above shows the participants focus after the second instruction. The researchers have now asked the participants to search for the navigation tools of the page. The result of the eye tracking is now showing a quite different result and that the participants focus of the page is shifted. After the instructions, the focus on the clothes has diapered from both web-sites and the focuses are mainly on the upper part of the webpages. The participants are starting to look at webpages in similar ways as when they received the first instruction but are quickly going to the top of the page to find the navigation tools.

The heat maps will now be presented by gaze plots that show the same mock-ups at the same time but are presenting the results in a different way. A gaze plot is a map that shows the participants fixation order on the mock-ups. From the first fixation point referred to as the “start point” until the last fixation point. The gaze plot help the researcher understand in which or- der the participants has looked at the webpage and if there is some point that the participant has returned to with the eyes several times. The gaze paths represented by lines also help the researchers deduce gaze patterns shared between a group of participants.
Figure 6 Gaze plot after 50 milliseconds after first instructions. Mock-up 1 to the left and Mock-up 2 to the right.

This gaze plots shows the first fixation points for the participants after 50 milliseconds. Through this image the researchers can see where the first fixation started and where on the image the first focus is. Each participant is represented with a colour. Figure 6 shows the distribution of first fixation points and gives the researchers a “start area” where most of the participants start their gaze paths. The pattern the researchers see is that the start points are located on main picture in the middle with a few exemptions. But the researchers also see that some of the participants not only have their first fixation point represented but also their second in Figure 6.

Figure 7 Gaze plot after 10 seconds after first instructions. Mock-up 1 to the left and Mock-up 2 to the right.

The gaze plot in figure 7 is showing the gaze order of the participants after 10 second. The participants have got the instructions to just look around at the webpage. Each participant is represented by a colour. Even though the images above may seem quite unclear, a pattern could be deduced through video recordings which showed that the starting point of both images had a tendency of appearing in the center of the page. The following paths then showed a slight difference between the both by heading towards different directions.

What you can see from the images presented in fig8. that the eye movements of the participating individuals followed a more structured gazing pattern in webpage 1 than webpage 2.
The gaze plot from figure 8 is showing the participants gazing order after the second instructions. The participants have now received instructions to find the navigation tools at the web-site. The researchers here see a clear change in gazing pattern where the participants instead are drawn more to the upper corners and are searching for navigation tools in the upper areas. Even if there are gaze points over the clothes the researchers see that the focus is lower than previous.

### 4.2 Questionnaire results

To be able to deduct a result from the questionnaire the researchers coded the answers from the open-ended questions in the questionnaire. The researchers decided to code one question at the time through analyzing the content and formulate themes based on patterns found from recurring wordings in the answers.

The participants answered three closed questions where the frequency of the answers is represented below. The first questions answers are represented in diagram 1, the second questions answers are represented in diagram 2. The last questions answers will not be represented in the results, because the researchers have decided not to use this information in their re-search. The reason for this is that the answers on the third question did not contribute with any useful data for this study.

![Participants age spread](image)

**Figure 9** Presents the age spread in the experiment
The tables below will show common themes generated from the questionnaire answers and the frequency each answer had among the participants.

**Table 1 Headline explanation**

<table>
<thead>
<tr>
<th>Question</th>
<th>Represents the questions from the questionnaire.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category</td>
<td>These are presented in the empirical framework as: Usability, first impression, memory and selection (part 4.4).</td>
</tr>
<tr>
<td>Theme</td>
<td>Extracted from patterns based on recurring words in the answers.</td>
</tr>
<tr>
<td>Motivation</td>
<td>Will give a detailed review of why the authors have decided to use the defined theme.</td>
</tr>
<tr>
<td>Frequency</td>
<td>The amount of time the theme has occurred.</td>
</tr>
</tbody>
</table>

Questions presented below will show the coding of answers claimed from the questionnaire post-performing the experiment.

**Question 1:** Describe your first impression of the webpage. Was it good or bad? Please motivate your answer. (This question is regarding the first web page)

**Category:** First impression

**Table 2 Describe your first impression of the webpage. Was it good or bad? Please motivate your answer**

<table>
<thead>
<tr>
<th>Themes</th>
<th>Motivation</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good first impression</td>
<td>Participants who are answering in the questionnaire that their first impression of this website was good. With motivations that the design is nice and are pleasing to the eyes.</td>
<td>28</td>
</tr>
<tr>
<td>Bad first impression</td>
<td>the respondents that answered that this webpage was bad, boring and unclear and stated that their first impression of the webpage was bad.</td>
<td>14</td>
</tr>
<tr>
<td>Other</td>
<td>This theme represent the participants who have answered in a way that the researchers not can be sure what they think about the webpage</td>
<td>8</td>
</tr>
</tbody>
</table>
Table 2 shows the coding for question 1 and states that 56% of the participants was answering that their first impression of the mock-up was good. The Table also show that 28% announce that their first impression was bad and 16% of the participants did not know if the first impression was good or bad.

**Question 2:** Can you write down two things you remembered from the webpage?

**Category:** Memory

*The frequency for this purpose will not be in accordance with the amount of attendees of the study because of the question instructions.*

**Table 3 Can you write down two things you remembered from the webpage?**

<table>
<thead>
<tr>
<th>Themes</th>
<th>Motivation</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clothes</td>
<td>The participants have mentioned clothes or the association with clothes in any way in their answers</td>
<td>17</td>
</tr>
<tr>
<td>Lady/main image</td>
<td>The answers contain a description of the main image or the so called lady in the image.</td>
<td>12</td>
</tr>
<tr>
<td>Colour</td>
<td>The answers in this theme have answered that they have remembered colours on the webpage.</td>
<td>10</td>
</tr>
<tr>
<td>Functions</td>
<td>This theme represents the navigation tools or other functions the participants has answered that they have remembered on the webpage.</td>
<td>6</td>
</tr>
<tr>
<td>Design</td>
<td>All describing of design elements such as logo, text and the word design itself will be merged into this theme</td>
<td>2</td>
</tr>
<tr>
<td>Other</td>
<td>Answers that does not associate with previous major themes representing small frequencies which together contributes with</td>
<td>3</td>
</tr>
</tbody>
</table>

Table 3 shows what the participants remembered from each mock-up. The most frequent answers from participants was “Clothes”, “Lady / big picture” and “the colour”. The first mock-up show a clear pattern that the participants has a tendency to remember the pictures on the site and tend to lay more focus on the images.
**Question 3:** What navigation tools did you find on the webpage?
**Category:** Usability

**Table 4** What navigation tools did you find on the webpage?

<table>
<thead>
<tr>
<th>Themes</th>
<th>Motivation</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-1 (low usability)</td>
<td>Evaluating the ability of the user orienting herself around a web page worked as a measure for the actual usability in this context. Which were considered low if the participant had found none or only one of the navigation tools.</td>
<td>19</td>
</tr>
<tr>
<td>2 (medium usability)</td>
<td>The purpose of this concept was to have a central measure if the participant did not find the actual tools which would be enough to almost complete a purchase. Since the frequency of finding the combination of</td>
<td>16</td>
</tr>
<tr>
<td>≤3 (high usability)</td>
<td>In order to complete an entire purchase, decisions were made that at least three findings of navigation tools would be necessary to finalize a purchasing process. This for this purpose would function as a measure for usability (i.e, finding the selected product, by search tool and menu, and the shopping cart).</td>
<td>15</td>
</tr>
</tbody>
</table>

To measure the perceived usability, the researchers asked the participants to list the navigation tools they found at the website. As table 4 is showing the first mock-up has a low usability based on the participants’ answers, where only 30% found three navigation tools or more. And the participants had difficulties to find the navigation tools, which was represented by icons. The different categories are chosen based on how many navigation tools the participants would need to complete a purchase.

**Question 4:** Did you experience the web page to be easy to use?
**Category:** Usability

**Table 5** Did you experience the web page to be easy to use?

<table>
<thead>
<tr>
<th>Theme</th>
<th>Motivation</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>High perceived usability</td>
<td>This is a category because the respondents in this category answers that the perceived usability was high and that they thought that the webpage would be easy to use.</td>
<td>27</td>
</tr>
<tr>
<td>Low perceived usability</td>
<td>This category captures the answers from participants who did not experience perceived usability for the first webpage.</td>
<td>14</td>
</tr>
<tr>
<td>Neither</td>
<td>This theme represents the participants who have answered that they do not know if they thought the website would be easy to use or not.</td>
<td>9</td>
</tr>
</tbody>
</table>

Even though 70% of the participants remembered two navigation tools or less, Table 5 is showing that 54% answered that they believed that the mock-up would be easy to use. This shows that the perceived usability is relatively high even if there is a lack of navigation tools.
**Question 5: Did you understand what the webpage was selling?**

**Category:** First impression

Table 6 Did you understand what the webpage was selling?

<table>
<thead>
<tr>
<th>Theme</th>
<th>Motivation</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clothes</td>
<td>The aim of this question was to determine whether or not the message of being an e-commerce website selling clothes actually were perceived by the audience.</td>
<td>46</td>
</tr>
<tr>
<td>Other</td>
<td>This represent participants who answers that they are unsure on what the webpage sell</td>
<td>4</td>
</tr>
</tbody>
</table>

Table 6 is presenting the participants answers for question 5. The question was a control question where the researchers wanted to make sure that the message the mock-up was supposed to transmit were expressed in a clear way. As Table 6 states 92 % of the participants answered that the mock-up was selling clothes which also were the message the mock-up should mediate.

Following tables are showing the categorizing for questions regarding the second webpage.

**Question 6: Describe your first impression of the webpage. Was it good or bad? Please motivate your answer**

**Category:** First impression

Table 7 Describe your first impression of the webpage. Was it good or bad? Please motivate your answer

<table>
<thead>
<tr>
<th>Themes</th>
<th>Motivation</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good first impression</td>
<td>Participants who have answered that their first impression was good of this website. And is therefore a measurement for the researchers what the participants though about the webpage.</td>
<td>37</td>
</tr>
<tr>
<td>Bad first impression</td>
<td>The participants who have answered that their first impression of the website was bad. Or answered in a way where the</td>
<td>7</td>
</tr>
<tr>
<td>Other</td>
<td>This theme represents the participants with answers that do not describe what they think about the webpage.</td>
<td>6</td>
</tr>
</tbody>
</table>

Table 7 presents the participants first impression for the second mock-up. The researchers could see more positive answers for the website and 74% of the participants were answering that their first impression of mock-up 2 were good. While 56% gave positive answers directed to mock-up one. The pattern the researchers can see in the answers where the participants motivate their answer is that the second mock-up gets compared with the first on, and many participants who missed navigation tools in the first mock-up was answering that they found the first impression for the second mock-up better because of this.
**Question 7:** Can you write down two things you remembered from the web page?

**Category:** Memory

Table 8 Can you write down two things you remembered from the web page?

<table>
<thead>
<tr>
<th>Themes</th>
<th>Motivation</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Functions</td>
<td>The following themes have been gathered from the questionnaire answers and has been specifically distinguished. Therefore these have been chosen as it indicates some kind of memorized impression. The reason to why all sharing the same motivation is due to the instructions of each participants listing two characteristics.</td>
<td>32</td>
</tr>
<tr>
<td>Clothes</td>
<td>As the text on the mock-up two also will serve as navigation functions, stated wordings using both navigation and text will be merged together.</td>
<td>6</td>
</tr>
<tr>
<td>Design</td>
<td>Also in the context of the second mock-up clothes has been proved to show some frequency. Therefore, it was considered appropriate to apply as a theme.</td>
<td>9</td>
</tr>
<tr>
<td>Images</td>
<td>Since the specification of the word images have referred to both the images presented of the clothes as well as the main picture.</td>
<td>3</td>
</tr>
</tbody>
</table>

The answers in Table 8 are presenting the four most remembered answers from the second mock-up. Where function on the site is most remembered which 64% of the participants’ answers that they remembered. The category function stands for all answers where the navigation tools, buttons or links are mention.

The researchers saw a clear distinction between what the participants remembered from the different mock-ups. After the first mock-up, the participants remembered mainly the main picture on the mock-up and the colours. On the second mock-up, the focus has shifted towards functions of the website and few are answering that they remembered pictures of the products or the colours of the website.
**Question 8:** *What navigation tools did you find on the webpage?*

**Category:** Usability

Numbers below (theme column) will represent the amount of tools the respondents have found

<table>
<thead>
<tr>
<th>Table 9 What navigation tools did you find on the webpage?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Theme</strong></td>
</tr>
<tr>
<td>------------</td>
</tr>
<tr>
<td>0-1 (low usability)</td>
</tr>
<tr>
<td>2 (medium usability)</td>
</tr>
<tr>
<td>≤3 (high usability)</td>
</tr>
</tbody>
</table>

To measure the perceived usability on the website the researchers asked the participants to list the navigation tools they remembered from the mock-up. Table 9 clearly show that 70% of the participants remembered three navigation tools or more. This could be compared the first mock-up where only 30% remembered three navigation tools or more. The second mock-up could be based on the answers where the users expressed a high perceived usability.

**Question 9:** *Did you experience the web page to be easy to use?*

**Category:** Usability

<table>
<thead>
<tr>
<th>Table 10 Did you experience the web page to be easy to use?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Themes</strong></td>
</tr>
<tr>
<td>------------</td>
</tr>
<tr>
<td>High perceived usability</td>
</tr>
<tr>
<td>Low perceived usability</td>
</tr>
<tr>
<td>Neither</td>
</tr>
</tbody>
</table>

Table 10 present the participants answer that the second mock-up is considered to have a high perceived usability where 88% had answered that they thought that the mock-up would be easy to use. This is in line with Table 9 which stated that the perceived usability based on found navigation tools was considered high.

When the researchers compared the result in Table 10 with the results in Table 4 the difference are distinct. Where 54% of the participants answered that the first mock-up would be easy to use, 88% answered that the second mock-up would be easy to use. The researchers
therefor see a pattern that the perceived usability had influence on the participants first impression.

**Question 10: Did you understand what the webpage was selling?**
*Category: First impression*

**Table 11 Did you understand what the webpage was selling?**

<table>
<thead>
<tr>
<th>Themes</th>
<th>Motivation</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clothes</td>
<td>Participants who answered that the webpage where selling clothes or clothes for women</td>
<td>32</td>
</tr>
<tr>
<td>Clothes for men and women</td>
<td>Participants who have answered that the webpage are selling clothes for both women and men</td>
<td>13</td>
</tr>
<tr>
<td>Other</td>
<td>Participants who have answered that they do not understood what the webpage was selling</td>
<td>5</td>
</tr>
</tbody>
</table>

This was a control question used to make sure that the message of the mock-up was perceived the same way as it were intended. For the second mock-up, the researchers had added two buttons on the middle of the page, an addition which gave question 10 a slightly different answer than question 5. As presented in Table 11 the participants are more specified with their answers and are no longer just answering that the site is selling clothes or clothes for women, 26% are now answering that the mock-up is selling clothes for men and women.

**Question 11: Which web page did you prefer the first one or the second one? Please motivate your answer.**
*Category: User preferences*

**Table 12 Which web page did you prefer the first one or the second one? Please motivate your answer.**

<table>
<thead>
<tr>
<th>Themes</th>
<th>Motivation</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Webpage one</td>
<td>The participants who answered that they preferred the first webpage</td>
<td>17</td>
</tr>
<tr>
<td>Webpage two</td>
<td>Participants who answered that they preferred the second webpage</td>
<td>33</td>
</tr>
</tbody>
</table>

The final question in the questionnaire was a comparative question where the researchers asked the participants to answer which mock-up they would prefer if they were forced to choose one. The result presented in Table 12 shows that 2 out of 3 preferred the second mock-up. The most common motivation for the choice was that the second mock-up would be easier to use and that the second mock-up showed a clearer structure.
5 DISCUSSION

In the discussion, findings reclaimed from the performed experiment will be compared to findings from prior research mainly directed to the subjects of usability and first impression.

Throughout this study we have been striving towards finding the answer to what considerations of the main page of an e-commerce website that needs to be made when shaping a user’s first impression. By conducting an experiment along with a complementary questionnaire, we got a comprehensive view of both what were appreciated to consider from a user perspective as well as an understanding for their eyes tend to move while creating their first impression.

5.1 Gazing patterns

The researchers saw that the gazing patterns were quite different between the two mock-ups. The first mock-up showed a distinct pattern where the participants shared the same gazing pattern with each other. The pattern showed that the participants tend to start in the middle of the picture (see Figure 6) and follow the path of left corner, following the upper part of the mock-up to the right corner, go back to the middle of the page and then gaze on the four smaller pictures on the bottom of the mock-up. As Figure 10 presented in the empirical findings are showing the first mock-ups pattern look like an anchor combined with two dots in the upper corners.

The second mock-up did not present any distinct pattern at all (see Figure 10) more than the start point which was shared with the first mock-up (see Figure 6). The participants started in different ways and were not drawn to the same content in the same extent as on the first mock-up. The researches assume that the first mock-up presented a pattern because of the structure, and the more visual design. The first mock-up had less attribute to gaze over and less attribute to steal the eyes attention. The second mock-up had instead a great number of attributes and presented both text and images for the participants. The researchers therefor assume that if a website contain both images and text the gazing pattern will be harder to predict. Previous studies by Eccer (2014) states that people processes the information of pictures faster than information form text. The researchers believe that this has an impact on the results where the pattern for mock-up 1 is distinct and can be because of the fast process of pictures. On mock-up 2 there is a combination of text and pictures and the researchers therefor believe that the lack of pattern in because of the amount of information and the fact that the participants are processing the text with different speed.

When we asked the participants to search for the navigation tools on each mock-up we saw a pattern between how the participants choose to look at both sites (see Figure 8). The pattern was that they started in the left corner and gazed on the upper part of the mock-ups. We conclude that this is a behaviour the participants share due to the use of best practice in the web development community. As Eccer (2014) states that the placement of navigation is crucial and should be placed on the upper parts of the page or descending on the left side of the page. Eccers (2014) explain that the users are habitual and therefor start to look for
the navigation in the left upper part of the webpage which is consistent with our finding in the study.

5.2 Areas of interest

Through analysis of the heat maps the researchers can see that there is a difference between the mock-ups. The first mock-up shows that the most heated areas are on the main picture and on the pictures of the clothes on the bottom of the page (see Figure 5). And the heated areas for the second mock-up are instead on text and navigation tools. The pattern in Figure 5 is reflected in the answers presented in Table 3 and Table 8. The answers for what the participant remembers from the first mock-up shows that there are a larger number of answers that are focused on the design and the images on the mock-up. This can be put in relation to the answers for the second mock-up which instead shows a pattern where the participants remembered the functions. In other words, the participants remember what they focused on during the eye-tracking.

Regarding the first impression the researchers make a connection between the answers presented in Table 2, Table 5, Table 7 and Table 10, where the participants have answered the questions “Describe your first impression of the webpage?” and “Did you experience the webpage easy to use?”. The researchers see a connection between if the participants think that the webpage would be easy to use and the first impression. Where previous research by Bergström, Karlsson and Parmevik (2009) are stating that the main page works like an entrance door and it need to invite the user to come inside, we see through the answers that it is important for the users that they understand the “invite” and how they are expected to walk through that door. Benyon (2014) also states that there are three levels of interaction with a webpage, physically, perceptually and conceptually. In this study, we see a link between the perceptual and conceptual and that they need to be connected for the user to create a good first impression. The answers regarding the first mock-up states that 28 participants’ answers that their first impression was good and 27 of the participants answered that they believed that the mock-up would be easy to use. For the second mock-up 37 participants answered that they got a good first impression and 44 participants answered that they believed that the mock-up would be easy to use. This finding is in conformity with the research by Beaird and George (2014) which states that the users are pleased by the design but drawn to the content. When only design is presented as in mock-up 1 the good first impression is 54% and the 46% who answered that their first impression was bad or neither was often expressing the lack of content on the mock-up. On mock-up 2, 74% answered that their first impression was good, the 26% who answered that their first impression was bad or neither good or bad usually motivated their answer by stating that mock-up 2 was ugly and was messy. And the researchers therefore assume that it’s important to find a balance between content and design on a website.

5.3 User preferences

To find an instruction or created guidelines for what users prefer on a webpage is almost impossible because of differences in taste, what a person think is beautiful and what a person think is usable. But during our study we have found some similarities the 50 participants of the study think is important.

By connecting the answers on the question on what webpage did you prefer and the closed question how often do you shop online, the researches saw a pattern that the participants who were frequent or occasionally web shoppers were preferring mock-up 2. The motivation they
specify in their answers are simply that mock-up 2 contained the information they would need to perform a purchase and that the first mock-up had a lack of information. The researchers believe that the reason for this is that the participants which were more use to shop online and therefor knew what they wanted from a site unlike the participants who never shopped online and therefor did not had the knowledge about what information they would need to use the mock-up.

The researchers can also see a connection between memory and the design approach on each mock-up. Previous research by Eccer (2014) mentioned above says that a user process pictures faster than text. And the researchers believe that this is a reason for that the participants remembered different attributes from the two mock-ups. From the first mock-up, the participants remembered the main picture of the lady, pictures of clothes and the colour choices. From the second mock-up, the participants instead remembered functions and navigation tools. The researchers believe that this difference is because of the time needed to process things, if the brain as Eccer (2014) says needs more time to process text then it is natural that the brain will remember text easier, simple because it has put more effort in understanding it. There is also the connection between what people remember and what they have focused on during the eye-tracking. The heat maps (see Figure 4) is showing that the heated areas on the first mock-up is on the pictures of the main page and the clothes and the heated areas on the second mock-up is on the navigation tools and on the text presented on it.

The researchers also see a pattern between what the participants remember and where they start to gaze on the webpage. On the first mock-up, the start point is on the main picture presenting a woman and this is also common among the participants to remember in question 2. On the second mock-up, the start point is on a button and on the text “Season Favorites” and this is also common to remember and given answers like, text or functions in question 7.
6 CONCLUSION

In this final chapter the researchers will present the answers of the research question and present their contribution to the field of informatics and Human Computer Interaction.

6.1 Will usability be highly valued in a pre-usage state when the user is shaping her first impression?

After analyzing the answers from the questionnaire, a clear connection between the perceived usability and the first impression of the mock-ups could be seen. The answers provided by the participants showed that the second mock-up, with the usable design, both scored higher in first impression and in perceived usability. Not least, the second mock-up was chosen over the first one by the majority of the participants, a choice motivated by the impression of being easier to use. We therefore draw the conclusion that perceived usability has a great influence on generating a positive first impression.

The user needs to understand the website and if they could manage to use it in order to decide whether or not the website is worth their time. It is simply not enough for a website to look good, it needs to give the impression of usability from the moment the user is entering the home page or else, it may affect their attitudes negatively.

We can also see a minor correlation between how often a person shop online and their demands in navigation tools on the website. The participants who either answered that they occasionally or frequently were shopping online were more critical towards the first mock-up where the navigation tools were symbols instead of text and thus more difficult to find and interpret in comparison to the second mock-up. The conclusion drawn from this is that users who has experience from shopping online and are familiar with the purchasing process will have a clear view of what they expect of a website and consider as usable.

We believe that the more skilled the web user, the more aware they are of what they require from a website in order to act as they wish and therefore they become more picky as they base their first impression on their expectations.

6.2 Will young users prefer a web design with a more graphical design?

This study was delimited to young women in the ages between 18 and 35, and the result from the experiment showed that those who participated did not prefer the mock-up with the graphical design to the same extent as the second. Per the answers of the final question in the questionnaire, 33 persons out of 50 would have chosen the second mock-up rather than the first.

Previous research debated that younger user’s preferred big picture and small amounts of text rather than the opposite, which our experiment partly dismisses. The participants of this study
seems to share similar opinions about usability and their answers to the questionnaire can be derived to that usability of a website should not be overlooked if they want to attract the investigated segment of women.

The conclusion drawn from this is that even though the younger generation is expected to dislike reading texts, they still seem to require describing texts on the navigation tools as they expect to quickly interpret where and how to navigate further. Therefore, the answer to the question “will young users prefer a web design with a more graphical design” will not necessarily be yes, as they seem to usability considerations into account when they shape their final opinion.

6.3 What considerations need to be made when shaping the young user’s first impression of the main page of an e-commerce website?

The findings from the conducted thesis proved that the user’s impression of usability at first sight plays a major role when molding the attitude towards a site. Though, this may not be the definite explanation to why a user likes or dislikes an e-commerce website due to individual’s fluctuation in taste and, perhaps, education and skills. From the compilation of questionnaires and test results an implicit effect on the choice of preferred website based on the user’s previous experience in online shopping could be deduced. This makes it rather important to understand the targeted user, whom he or she may be, and carefully select a suitable solution that does not require the user to have previous experience from shopping online.

Another important aspect to bear in mind when planning to develop an e-commerce website is to clearly determine what you want to mediate to the user and what you would like them to recall from the interaction. In the theory chapter, we cited Poulin (2011) where he presented graphical design as a language and visual communication as the way we speak, which we believe to have seen in the way the participants interpreted our mock-ups. When we designed our mock-ups we decided to create them either with a usable or a graphical approach by using certain elements (i.e pictures/symbols or text) in different ways (e.g structured over the image or in a non-thought through way). These elements proved to have helped us speak the language of graphical design, as they were interpreted by the participants in accordance with the intention of using them in the mock-up. This makes us draw the conclusion that the chosen design approach and choice of attributes, as well as the placement of them somehow appeared to influence the user’s impression of the website in general. Meaning, the designers thought out approach will be reflected in the user’s perception.

We also believe in the importance of encouraging the user’s gazing pattern in the design process. The findings of this study indicate several hotspots, which we can deduct from the participant’s eye movements and from where they tended to fixate their vision for a longer time. In the performed eye-tracking experiment we could see that these hotspots tend to differ depending on the web page appearance. In mock-up 2 there were a wider range of elements, with more text and objects, and the participant’s eyes roamed a lot more over the screen and showed less tendencies of fixation. The opposite could instead be deduced from the gaze plot from mock-up 1 where a more consistent pattern could be seen as well as more intense fixation spots. What we are trying to point out here is yet again the value of starting off with a well thought through plan for exactly what you want to mediate and promote with your website content as well as what you want your audience to intercept.
The questionnaire proved that pictures of clothes and design was remembered from mock-up 1 and from mock-up 2 (with the usable approach), people recalled to have seen navigation tools and text. On the contrary we have seen that the participants of this study as well has been influenced of what they expected to see - such as unconsciously believing that they had seen pictures of shoes even though there was none on the image in front of them. Of course this requires a deeper investigation of the cognitive processes and phenomena of the human mind, as it appears to convince the human that she has seen things she has not.

This leads us to the conclusion that; if you want to promote clothes, which we assume you do if you are establishing a clothing business, suggestions are to use large pictures of the clothes you want to promote and place objects with important information central on the screen or in the upper areas. The key is to find a balance and avoid putting too much content which can disturb the attention paid to what is actually intended to be mediated.

6.4 Summary of conclusions

Evidently, you need to consider both graphical and usable parts when developing the main page of an e-commerce website, but you also need to pay attention to what you want the user to remember afterwards their interaction with the site. From this study we could deduce that the understanding of navigation tools played a big part in the perceived usability of the website as it affected whether or not the user found the mock-up appealing. On the other hand, if you put too much effort into making the website all about usability, it might be the only thing the user will recall from the interaction, which may not be the optimal situation when the purpose is to sell clothes as well?

Anyhow, the following conclusions have been drawn from the conducted thesis:

- The perceived usability is a major variable when a user shapes their first impression as it has shown to be a determining factor to the participant’s final choices.
- Users have similar patterns when they look at the site which create so called areas of interests (areas that need to be designed in a good way) is left upper corner, main page and the upper header.

- User experience from shopping online will have an impact on how they value perceived usability on a website.

- The users experience with online shopping might influence their opinion of the web-sites design attributes.

- When text occurred on the webpage it has shown that it tended to distract the users from focusing on the products/clothes being presented

- The design approach will affect what the user will remember from the site.
6.5 Contribution to the field of informatics

The area of web design has been researched for as long as there has been websites. The question remaining is then - what did we contribute with by the research we performed? Our opinion is that we have contributed with new approach of attacking the research question, by using a method combining what the participants thought about the website with an eye-tracking test where we could see patterns of eye-movements the participants aren't aware of doing.

We also believe that we contribute with a study which established that previous research may not be accurate for all purposes as we have received results that disapproved that young users would overlook bad usability if the website were graphically appealing.

Finally we believe to have raised the question about first impression and the effect of perceived usability on the user’s overall impression of the website. Traditionally usability is evaluated through time tests where the participants are asked to perform a certain task. In our study, we investigate the participant’s viewing patterns in a non-interactive way for only a short time to establish what you accomplish to see at the first sight. Along with a complementary questionnaire we obtained the knowledge of the importance of perceived usability in a way we have not seen earlier. We believe this knowledge will be valued by organizations creating e-commerce websites due to the increased amount of websites battling about users on the World Wide Web today.

6.6 Evaluation of method

We believe to have chosen the right method for this research. An alternative way of performing this study would have been to perform in depth interviews, but we still believe that we would not have received the same results. By conducting a study containing both an eye-tracking test and a questionnaire performed by the respondent herself only, we did not intrude any thought and allowed her to put everything on paper while she still had the experience freshly in mind, which we might had done if we were to ask her oral questions.

By performing a pilot-experiment, we learned that our first idea of having a conversation with the participant during the test was not an option when we realized it disturbed the participants. From this we believe that important data, which could have been helpful during the process of analyzing the data from the questionnaire, were lost. Perhaps it could have assisted with a better understanding for the respondents’ individual attitudes. Also, a larger quantity of participants might have contributed with a more improved and reliable result. Unfortunately it was not accomplishable for this study as the accessibility to the eye-tracker was restrained.

6.7 Future research

In future studies, we deem that researchers should continue to examine the perceived usability further as there is an enormous number of websites presenting similar content and features for online shoppers today. We believe that there lies importance in the understanding of how to persuade the users to stay on the website if you want to achieve a competitive advantage.
As we especially consider the perceived usability as a crucial factor in this aspect we believe that this is a subject that could use further research. For further studies we therefore suggest a larger number of participants combined with a bigger selection of presented websites in order to establish statistical data of how to composite a website to make it look usable in a pre-usage state.

Through this study we have been able to detect a connection between the perceived usability and the user’s first impression, a connection we believe should be continuous studied. Not only due to the lack of research existing today, but because of the fact the next generations of users will be more versed in the technical advancement than the ones before them which we believe to contribute to their demands in websites in the future.


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University of Borås is a modern university in the city center. We give education programs and courses in business administration and informatics, library and information science, fashion and textiles, behavioral sciences and teacher education, engineering and health sciences.

At the Department of Information Technology, we have focused on the students’ future needs. Therefore, we have created programs in which employability is a key word. Subject integration, wholeness and contextualization are other important concepts. The department has a closeness, both between students and teachers as well as between industry and education.

Our courses and programs with a major in informatics are centered around basic concepts as system development and business development. In our wide range of specializations there is everything from programming advanced systems, analyze the needs and requirements of businesses, to conduct integrated IT and business development, with the common purpose of promoting good use of IT in enterprises and organizations.

The department is carrying out IT-related research within the university’s research area called Business and IT. In terms of field, the research activities are mainly within computer and systems science. Particular areas of focus are data science and information systems science. Both scientifically and professionally-oriented research are performed, which among other things is manifested through that research is often conducted based on domain specific needs of business and government organizations at local, national and international arena. The professionally-oriented research is also often manifested through our participation in the Swedish Institute for Innovative Retailing (SIIR), which is a research center at the University with the aim of contributing to commerce and society with the development of innovative and sustainable trade.