Developing a framework of design principles for single page websites and their application

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Declaration

I hereby declare and confirm that this thesis is entirely the result of my own original work. Where other sources of information have been used, they have been indicated as such and properly acknowledged. I further declare that this or similar work has not been submitted for credit elsewhere.

Aalborg University, June 1, 2015

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Contents

Abstract

The aim of this thesis has been to investigate the notion of single page websites through quantitative and qualitative research, in order to establish a framework of design principles. Through the phenomenological approach, the process has involved continuously acquiring new knowledge about the phenomenon, and plan the process accordingly. In order to investigate the phenomenon, we have looked into its context and how technology has influenced the dissemination of other website genres, which involved investigating the history and evolution of the World Wide Web. Furthermore, in order to establish what constitutes a single page website, we looked into the structure and features used in the anatomy of single pages. Additionally, we conducted a quantitative investigation by categorising 100 single page websites aimed at getting insights into the current context and how the information architecture structures are designed and utilised. This led us to suggest a genre division, which involves the two sub-genres Avantgarde and Conventional. On the basis of this preliminary research, we conducted a usability study of a qualitative and quantitative nature, involving 17 participants. This study focusing on the usability and user experience of single pages involved examining a website from each sub-genre, hereby building on the preliminary research. The data from this usability study was transcribed and analysed, thus creating the foundation for establishing a framework of design principles taking into account how users perceive and interact with single page websites.

1 | Introduction

The objective of this thesis is to investigate the phenomenon single page websites with the aim of developing a framework of design principles. Therefore, with a phenomenological and hermeneutic approach, the dissemination, anatomy, and use of the website genre will be studied and examined with the intention of developing a framework of design principles taking into account how users navigate and experience the single page genre.

1.1 Motivation

Single page websites, or *one page websites* as some refer to them, have recently become a trend on the internet. They are commonly known to showcase the content in one single page, rather than many sub-pages. A single page website is fully loaded when the user enters, or else it often uses the AJAX functionality, which entails loading content from a server into a container instead of having to navigate to an entirely new page (One Page Love, 2014). Even though many web designers have adopted and adapted the single page trend, there is still much confusion about what exactly constitutes a single page website. One thing that everyone seems to agree on, is the aim of single page websites, which is summarised in the following two statements:

> "*Single page websites are intended to showcase one main idea.*" (Awwwards, 2015)

> "*A One Page website aims to provide the perfect (could read minimum) amount of information for a user to make a decision and act upon it.*" (One Page Love, 2014)

In other words, single page websites display a suitable amount of information aimed at showcasing the core idea of the website. The continuous and fluid experience of navigating single page websites can save time for visitors, and in turn allow the sender to "tunnel"[1] the visitor through the content in a specific order. This brings us to why and how were we in fact motivated to investigate this phenomenon. During our internship on the 8th semester, we got the chance to redesign the main website for a kindergarten located in a small town in Northern Jutland. After finishing our main investigations of getting insights into the organisational context, we made a decision in regards to the missing transparency on the website: We needed to enhance

[1] *Tunnelling* is mostly known from Persuasive Technology and involves leading users through "*a predetermined sequence of actions or events, step by step*". (Fogg, 2003, p. 34)

the core values in order for them to stand out from the competing kindergartens in the small town. The need for incorporating the core values led us to browse the internet, looking for design ideas for displaying core values on a website. This investigation involved looking at many different kinds of sites, and here we discovered the new trend; single pages. These websites differed from the traditional website structure by not having sub-pages. As information architects we started to wonder how this new way of naviga-ting and organising affects the user, and therefore we asked ourselves: Is this actually lowering the degree of complexity? How does it affect the user's behaviour? Efficiency? Understanding? Learning? User experience?

1.2 Defining the scope

In order to outline the anatomy, characteristics, and structure of single page websites, we will apply conceptual frameworks within the fields of information architecture (IA) and Gestalt psychology (Gestalt design principles). These can be used to explore how the websites are designed, structured, and perceived by users, and help us understand the structural interface. Additionally, to understand the user interaction, we are interested in investigating the user experience and usability of websites from the genre, and study whether or not single pages are perceived as simple or complex. With these goals and considerations in mind, the aim of this project can be summarised into the following problem statement and supplementary questions:

1.2.1 Problem statement

Through an examination of the notion of single page websites we aim to develop a framework of design principles.

1. What is a single page website?
2. How is the information architecture on single page websites designed, and how is it utilised by designers and users?
3. How can the usability and user experience, in the context of single page websites, be characterised?

Alongside the phenomenological approach, we intend to work within the limits of the hermeneutic circle. Thereby we will continuously obtain knowledge and experience within this particular field, and iteratively add to our existing knowledge. Within the scope of phenomenology, we will attempt to take on an unbiased approach to the investigation and let our newly acquired knowledge lead the way, continuously adding to our holistic understanding of the phenomenon. In chapter 2 we will present our methodological foundation as well as elaborate on our philosophical viewpoints in the context of theory of science.

2 | Method

In this chapter, we will present our choices and reflections on our own methodology and the theories of science that form the foundation for our scientific work. In section 2.2, the foundation for our empirical work is presented and connected to the problem statement. Furthermore, we will present our entire process in table 2.1, as well as our ongoing reflections in section 2.3 on how to investigate the notion of single page websites.

2.1 Theory of science

In order to process and investigate our problem area, we have taken on two fundamental theories of science: The phenomenological and the hermeneutic approach. In this section, the two perspectives will be presented as theoretical, philosophical, and methodological perspectives, and later on in section 2.2 we will present how the practises involved have influenced our process and empirical work.

2.1.1 Phenomenological approach

The term phenomenology is commonly understood in the context of the human being's perception on phenomena in this world. It is therefore commonly viewed as people's understanding of *things*, and hereby also experience and cognition. (Husserl, 2001) Modern phenomenology was originally a philosophical idea by Edmund Husserl, first presented in the early 1900s. Husserl expresses that all consciousness in reality is *consciousness of something*, therefore a connection exists between the conscious subject and the surrounding world. (Husserl, 2001)

Human beings live in their own Lifeworld (German: Lebenswelt) consisting of experience and epistemological foundations. Therefore the primary concern of phenomenologists is to interpret the world and gain understanding, experiences and knowledge through (inter)action with the world. (Norlyk & Martinesen, 2008, pp. 70-73) It is important to differentiate between phenomenology as a philosophy and scientific method, since the philosophy merely functions as a guiding perspective in the different phases of scientific work. One of the central ideas in the phenomenological approach is the concept of intentionality. Human beings experience the world and act based on intentions and perspective, which means that the individual will always experience the world and phenomena in a specific subjective way. In other words, the subject's understanding of objects is in the context of experience and knowledge, and objects present themselves in our own individual frame

of understanding. In this context, phenomenological reduction is aimed at investigating phenomena in an unbiased way, which should lead to looking at the phenomenon without the bias of prior understanding. Based on Husserl's idea of intentionality and the premises of phenomenological analysis, the scientific method should lead to the *essence* of a phenomenon. (Norlyk & Martinesen, 2008, pp. 70-73)

2.1.2 Hermeneutic approach

A central element in the notion of hermeneutics is the hermeneutic circle. It defines the relationship between the whole and its parts: The parts must be seen and understood based on the whole, and the whole must be understood on the basis of the parts. The different directions within hermeneutics use the circle in varying ways, but they share the fundamental notion of the circle. (Christensen, 1994, p. 26) We will only mention the philosophical approach to hermeneutics, since it is fundamental to the approach we have had in the process of writing this thesis.

In the 20^{th} century, the ontological theories of Martin Heidegger, the assistant of Edmund Husserl, influenced the direction of hermeneutics. This direction focuses on understanding rather than interpretation (as in the classic hermeneutic) of the *being-in-the-world* (German: Da-sein). Everything derives its meaning from the context surrounding it, and we understand in the context of use. Hereby we have a pre-understanding of the object, and it is the requisite of all understanding. Heidegger states that we use objects to *do* something. In relation to the circle, the parts are actions decided on the basis of the goal. Simultaneously, it is our understanding of the goal, the situation, and our task, that controls our actions towards achieving the goal. (Christensen, 1994)

During the process of writing this thesis we have worked iteratively, continuously getting new experience with the subject, adding to our understanding of single pages. This can be seen in connection to the hermeneutic circle, since we have worked with the main goal in mind, which in turn has driven us to make decisions and acquire knowledge in iterations, all adding to our collective understanding of the subject. During this process we took an unbiased approach to the investigation of the phenomenon single page websites, and attempted to let our newly acquired knowledge form the path. Therefore we ceaselessly gained new pre-understandings in the process, continuously building on our holistic understanding of the phenomenon single page websites.

2.2 Empirical work and foundation

Seen in the context of the scientific study in this thesis, we wish to investigate the phenomenon that is single page websites. In order to do this in an

unbiased way, we attempted refrain from taking on a theoretical approach to the investigation, but rather try to investigate the context of single pages, and, based on this context, form a research design. The first step of the process involved investigating the history of the web in order to gain insights into the context, within which single page websites have emerged. The second step in the process was to determine what a single page website consists of. This was done by accessing the web and looking at some of the websites within this category (single page). This led us to understand the look, anatomy, and features of single page websites, which then equipped us to make a description of the genre by looking at two examples that we found to be representative to the genre without being domain-specific. The third step was to get an understanding of the context of single page websites: Who is behind them, and for what purpose? We picked out 100 random single pages from Awwwards (which will be presented later on) and attempted to divide them into categories. During this step we inspected a vast amount of single page websites and began to see an anatomical pattern, which led us to suggest two sub-genres. By looking at the parts and at the whole, we have used the hermeneutic approach to gain an understanding of the phenomenon that is single page websites, as well as the context. With this foundation we set up an observational study with 17 participants aimed at gaining insights into the usability of websites within both sub-genres, as well as the participants' user experience. The participants are represented from different age groups, genders, and cultural environments in Denmark. Since the aim of the examination is to develop a framework of design principles, we will focus on the perceptions and experiences of the individual participants, but also try to note and examine common issues and statements by using meaning categorisation. Consequently the preliminary investigations into the anatomy and design of single page websites provide us with knowledge about characteristics. Additionally, the usability study provides us with knowledge about the users' interaction and perception on what constitutes usable and satisfactory structures. This newly acquired knowledge can then be combined with knowledge from the preliminary investigations, thus forming a framework of design principles for single page websites.

In order to form an overview of the usability and user experience (UX) we will include UX metrics with the aim of processing the data with a quantifiable outcome. By using quantitative data we are able to get a better overview of the qualitative results. We are aware that the UX metrics lean more towards a positivist approach, but we believe that they can provide us with a clear overview of the user experience and usability. Combined with the qualitative statements from the usability session we will be able to process the data and develop a framework of design principles. In the next section we will dive further into the process of investigating our problem area, and how we take on the challenge of answering the sub-questions in our problem statement.

2.2.1 Investigating the problem statement

In order to investigate our overall problem statement, *through an examination of the notion of single page websites we aim to develop a framework of design principles*, we have divided the overall problem area into sub-questions. The investigations aimed at answering the first question, *what is a single page website?*, started early in the process by investigating the history of web design. Many (Jakob Nielsen (2000), among others) have described the World Wide Web as an *intertwingled* clutter of information where change is the only constant. This fundamental understanding conveyed us to investigate the evolution of the web in order to get an idea of how and why web design has evolved the way it has, and how technology has influenced the process.

The next step in the process involved searching for definitions and descriptions of the single page website genre in order to start building on our fundamental understanding the phenomenon. This lead us to two websites; *Awwwards* and *One Page Love*. Both are website collections focusing on web design phenomena. Awwwards contains several types of websites, while One Page Love collects single page websites, also known as one page websites. Each have their own definition of single page websites, one more extensive than the other, but overall they seemed to overlap. With this knowledge in mind, we proceeded onto collecting 100 websites with the tag "Single page websites" on Awwwards, in order to get an idea of the context within which single pages are used. This led us to look at characteristics of single pages, which then led to us making a categorisation. This categorisation was open, meaning that it involved continuously dividing the websites into categories and adding new ones if they did not fit within the limits of the existing categorisation. This quantitative research gave us insights into the context of single page websites, and what they are used for. It also provided us with the knowledge that single page websites are very different, and we then decided to look at the small differences in the anatomy. This built the foundation to start investigating the second sub-question: *How is the information architecture on single page websites designed, and how is it utilised by designers and users?* By looking at the different structures we proceeded on to suggesting that two sub-genres of single pages exist, and we named these two sub-genres *Conventional* and *Avantgarde*. In order to further explain these two sub-genres we used concepts of information architecture (IA), Gestalt principles derived from Gestalt psychology, convergent (goal-directed), and divergent (exploratory) information behaviour. We found the Gestalt principles to be fitting, since they can help conceptualise how users perceive connections and structures of objects in an interface. Information architecture also deals with structures, components, and usability, enabling us to look at and understand specific parts of websites, based on which we can form our design principles. During our investigations we found that single

pages often are aimed at serving a suitable amount of information to the user in a simple and clear way, and this laid the foundation for including the aspect of information behaviour (Björneborn, 2008). Therefore we decided on including the aspect involving the two information behaviours, Divergent and Convergent, which will be explained in section 8.1.1. These involve looking at a user's objective from entering a website, and whether or not it is aimed at recovery or discovery. Therefore these conceptual models have enabled us to describe the anatomy, differences, and characteristics of the single page phenomenon and the two sub-genres. We will present our findings and the sub-genres later in this thesis (section 8.3).

The third sub-question in our problem statement, *how can the usability and user experience, in the context of single page websites, be characterised?*, was inspired by our aim to get insights into how the end-users navigate single pages, as well as how they experience it. Since we had now identified two sub-genres, we were interested in investigating both as separate entities within the same phenomenon. In order to investigate this, we created a research design aimed at examining the user experience and getting insights into the use. This research design involved an observational study in a usability lab, where 17 participants were asked to complete a series of tasks by locating information on single page websites. About half of the participants examined a Conventional single page website, while the other half examined an Avantgarde single page website. Through self-reported metrics on the semantic differential scale the usability sessions were aimed at assessing in what way the participants understand and perceive the websites' usability and user experience. This also involved a post-task Q&A (questions and answers) where the participants were asked a series of questions about their user experience and their thoughts on the usability. In addition, the usability examinations were aimed at getting an understanding of whether or not single page websites are perceived as simple or complex by users (Norman, 2010). This aspect was interesting to us, as we discovered that many sources refer to single pages as simple. This partly breaks with our understanding, and since information architecture underlines the importance of thorough menu structures we found it relevant to look at whether or not the missing depth in the structure made it complex. We believe that this concept of simplicity/complexity is relevant in connection with single pages, since the structural division of content normally seen in sub-pages is not present on single pages. Whether or not this, in the mind of the user, eases or complicates the path through the site is what we wish to investigate. Notions taken from this conceptual model were included in the usability session, and statements involving either complexity, simplicity, or perceived affordance, were audio-recorded. The post-task self-reported metrics on the semantic differential scale also involved a question where the participants were asked to assess the degree of complexity or simplicity of the overall structure of the website.

2.3 Qualitative research process

In order to describe our process, we have looked at Alan Bryman's *The main steps in qualitative research*, from the book *Social Research Methods* (2008). This section is dedicated to explain how our process has differed or fit the various steps, which are as follows (Bryman, 2008, p. 370):

1. General research questions
2. Selection of relevant site(s) and subjects
3. Collection of relevant data
4. Interpretation of data
5. Conceptual and theoretical work
   (a) Collection of further data
   (b) Tighter specification of the research questions(s)
6. Writing up findings/conclusions

General research questions

Even though we were already familiar with our overall problem statement, it was necessary to specify what we wanted to investigate with the usability examination. Through usability we aim at collecting formative results about the interface design, but conducted in a summative way, since the websites subjected to the usability examination are finished, and not prototypes (Tullis, 2013, ch. 3). From this, we seek to gain insights in order to lay out a framework of design principles. Since we had already gained fundamental knowledge about the phenomenon single pages, we needed to convert it into a research design. In order to do this, we used the DECIDE-model, a framework for evaluation developed by Rogers, Sharp & Preece (2002). By assessing each step with our newly acquired knowledge, we were able to outline the research process in clear steps. The model is comprised of six steps:

- **D**etermine the goals
- **E**xplore the questions
- **C**hoose the evaluation approach
- **I**dentify the practical issues
- **D**ecide on ethical issues
- **E**valuate, analyse, interpret, and present

Determine the goals

The first step of the DECIDE-model is to determine the goals that function as the overall research foundation. Our goal for the usability examination was to investigate the phenomenon single pages in order to gain insights

into how the user perceives them. Alan Bryman (2008) states, that *"Research questions in qualitative research are stated with varying degrees of explicitness"* (Bryman, 2008, p. 371), meaning that the research question sometimes is embedded in a general statement. Our overall goal is more a statement of what we want to investigate rather than a research question, but it is accompanied by sub-questions of areas we specifically want to research:

- How do users navigate and interact with single pages, and which parts of the interface are used for what purposes?
- Do users perceive the navigation as simple or complex?
- Is the website interface aesthetically pleasing to the user?
- Does the sender of the website come through to the user clearly? Or does the sender-receiver situation *get lost* in the design?

These questions all contribute to gaining an understanding of single pages in order to investigate the phenomenon. We find it relevant to investigate the aesthetic perspective as well, since we believe that it can function as an instrument to enhance the usability and simplicity of a website. Therefore, through aesthetically pleasing design, a website can be perceived as more accessible and simple to users. Furthermore, by researching the communicative situation (sender-product-receiver), we aim at investigating the overall transparency of single page websites as it is perceived by the user.

Explore the questions

On the basis of the general research questions from the first step and our knowledge about single pages acquired during previous investigations, we created a series of supplemental questions. In the process of visiting 100 single page websites we experienced issues with deciphering the communicative situation on some of the websites. We also experienced that some of the websites lagged, which was caused by high latency, and sometimes maybe due to insufficient processing power to run the website. This guided us towards formulating a series of questions taking into account both conceptual models (IA, UX, usability, complexity) and our newly acquired knowledge about the phenomenon. These questions can be seen in the usability manuscript found in Appendix A.

Choose the evaluation approach

In this step, the evaluation techniques are chosen. In our case, we wanted to conduct a usability examination with different participants. By having participants with different backgrounds we were able to get a broader picture of how single pages are perceived, and not just the thoughts of a specific user group. Based on our overall goal with the research, we wanted to get

familiar with our participants' backgrounds. In order to do so, we collected various kinds of data from the participants through a pre-examination questionnaire (which can be found in Appendix B). The information we collected was about the participant's profile, educational background, and area of profession. We decided to conduct the examination in a controlled environment and got access to a usability testing lab. Our decision was based on the ability to focus on the task of navigating a website without being disturbed by the surroundings. Rogers, Sharp & Preece (2002) mention the difference between examining in a lab and in the field: *"In the laboratory the emphasis is on the details of what individuals do, while in the field the context is important and the focus is on how people interact with each other, the technology, and their environment."* (Rogers, Sharp & Preece, 2002, p. 364) By conducting the examination in a lab, we examine the actual phenomenon that is single pages and how users interact with them within the same context. By using a controlled setting we are certain that users focus on single pages, and not their surroundings. Additionally we are able to ensure that all participants do the examination within the same setting, since it is under our control and is not located in an open space. If we were to have included the context of use, we could for example have used the cultural probes method. Through cultural probes a designer is able to investigate a subject through artifacts and devices, and reach an intimate sphere of participants' lives. This can for example be done through making a camera and other forms of documentation available to the participants while asking them to document how they use certain objects or technologies in their daily lives. (Kjeldskov et al., 2004)

Identify the practical issues

The practical tasks of conducting our usability examination included the search for relevant participants and a location. We were able to use the usability lab at the Department of Computer Science (AAU), and we used our own computers to run and record screen and voice during the examinations.

When it came to choosing participants, we found it relevant to have a wide range of different users. We aimed at examining an equal amount of men and women in all ages with different backgrounds in education and job in order to be as versatile as possible.

Decide on ethical issues

We identified our only ethical issue as our participants' anonymity. It is only relevant for our research to know their profile (educational background, age, gender) and their way of navigating the websites. To be sure that the participants fully accepted their anonymity, as well as being audio-recorded, we drew up a contract, or consent letter, for the participants to sign. The

full contract can be viewed in Appendix C. To keep our subjects anonymous, we have used aliases when analysing our results.

Evaluate, analyse, interpret, and present

Since a lot of our data is audio-recordings of our participants, we decided to transcribe the sections we will be using, and sort the statements into categories, also known as meaning categorisation. For practical reasons, we chose to only transcribe statements relevant to our meaning categorisation, and not the entirety of the audio-recordings. This may result in difficulties in understanding the context of the statements, but we have provided a time stamp at each quote, making it possible to find the sequence in the audio-files in Appendix H. The meaning categorisation followed the guidelines laid out by Kvale (2007). From these categories we wanted to analyse and present different statements relevant to our research design and questions.

Selection of relevant site(s) and subjects

We conducted the examination in a usability lab to create a controlled setting. In our case, "site(s)" also mean websites, and we decided on two websites that we found representative for each of the two sub-genres; Conventional and Avantgarde. We picked the website Factory Forty (factoryforty.be/en) to represent the Conventional website sub-genre, and The Survival Kit (agencysurvivalkit.com) to represent the Avantgarde sub-genre. The pages are presented in section 8.3.

Since we wanted participants with different backgrounds (across age, gender, and profession) we were inclined to ask on Facebook for people willing to participate. Even though our Facebook-post was shared by others, all participants taking part of the examination were known by at least one of us. We believe that this could have influenced the results in one way or another. This aspect will be reflected on later in the section *Sources of error* found in chapter 13.

Collection of relevant data

The data we needed from the examination included knowledge about the users' way of navigating the websites and their thoughts on the structure and feel of the sites. Before initiating the session, the participants were asked to fill out an online questionnaire with information about their education, age, gender, et cetera. To make sure they understood the questions as we intended, one of us took on the role as a moderator and answered the users' questions, if they had any. This moderator was the same person during all the examinations, in order to have a coherent context and process.

We chose to record only the participants' voices and the screen, as video filming was not relevant for us to investigate. The voice recordings were

important, as we were then able to listen to and analyse the recordings afterwards. Furthermore, when going through the audio, screen recordings were necessary in order to compare what happened on the screen with their statements. We used one of our Apple Macbook Pros as the test computer. Both the screen- and voice recordings were also made on the test computer using QuickTime, a media player application and multimedia framework available on Apple's Mac OS X. We connected an external mouse by USB cable, so that we could accommodate users that were experienced as well as inexperienced with navigating via the Mac mouse-pad. By having both options, chances are that the user feels familiar with the way of navigating. This may have influenced the user experience in two ways, and this will be reflected on in the section *Sources of error* in chapter 13.

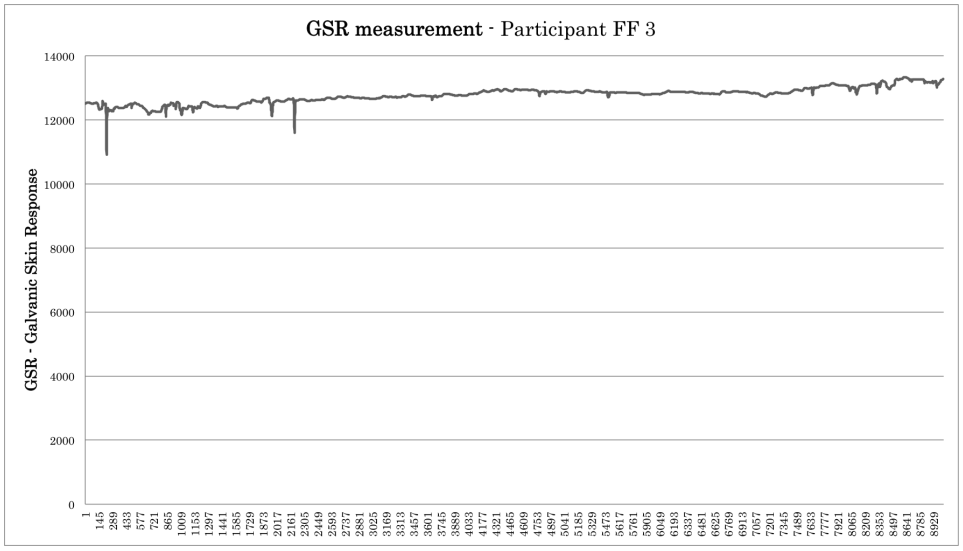

Figure 2.1: Example of graph with GSR measurements

In the usability lab we had access to a ThoughtStream USB sensor, which is a device that "*measures changes in the electrical conductivity of your skin.*" (ThoughtStream manual, 2010, p. 1) This is also known as Galvanic Skin Response (GSR) and can be used to reflect changes in the user's physiology caused by feelings, thoughts, and moods. The equipment is made for personal use to train relaxation, but we used it to measure the users while navigating the websites. The data was visualised as a graph, which was drawn in real time as the user was wearing it. An example of the graph can be seen in figure 2.1. Fluctuations on the graph could have been caused by changes in the electrical conductivity of the skin resulting from emotional changes, but they could also be based on movement of the hand or failure in the equipment. We used the graph to point out moments of irregularities and asked the participant about what they felt and thought in the situation.

After we had asked the participants to find different pieces of information, we showed them the screen recording of their navigation on the site and asked about their thoughts during the moment of a graph fluctuation. By doing this, the participants got to make some clear statements about what frustrated or surprised them, and thus, we got some data that would not have come forth otherwise.

Interpretation of data

The next step in Bryman's steps in qualitative research involves making an interpretation of the collected data. We started the task of interpreting and analysing data by performing a meaning categorisation and partial transcription of the audio-recordings from the usability examinations. Concretely, the meaning categorisation process involved listening to the audio-recordings and transcribing statements and parts that were relevant to the categories. The categories were made continuously during the transcriptions and were therefore created on the basis of the results form examination itself. This entailed adding new and relevant categories if needed, such as the two categories only relevant to The Survival Kit (*Products* and *Seriousness*). The categorisation ended up with having the following 14 categories, which can be seen as factors influencing or caused by the participants' interaction with the website:

1. **Communicative situation:** Transparency of the communicative situation (sender, product, receiver) on the website.
2. **Findability:** Locating information and statements about where the participant expects to find specific pieces of information.
3. **Products:** Statements, issues, and misunderstandings about the products sold (only relevant on The Survival Kit).
4. **Navigation and IA:** Navigational structures and information architecture. Also statements about labelling, organisation, or search.
5. **Perceived affordance:** Whether or not the participant interpreted specific objects as affording specific sets of action.
6. **Credibility:** Notions about how the participants judge the overall credibility of the site, and the basis of their assessments.
7. **Complexity:** Whether or not the structures were logical to the participants, and if they mention simplicity or complexity on the website.
8. **Familiarity:** Whether or not the participants mention that they are familiar with the structure from somewhere else.
9. **Aesthetics:** Statements where the participants mention anything about the aesthetics or graphical user interface (GUI).
10. **Frustration:** If the participants mention being frustrated about specific parts or features on the website.

11. **Design flow:** Overall statements about the design's flow and frustrations about the design flow are put into this category.
12. **Expectation:** Note whether or not the participant stated that something was easier, harder, or different than they expected.
13. **Awareness:** Note if participants mention something about their navigation on single pages or previous experience with the genre.
14. **Seriousness:** Any statements about the seriousness, or lacking thereof, are placed within this category (only relevant on The Survival Kit).

After creating the meaning categorisation we moved on to processing the data collected from the semantic differential scale (which can be found in Appendix F). On the basis of UX metrics, we made some statistical calculations and found the average, differences, and medians of the answers. We measured task completion time with the aim of looking at learnability, and whether or not the participants became quicker at solving the tasks after navigating the site for a while. Furthermore, we wanted to connect long task completion times to specific tasks, thereby using them as an indicator for problem areas on the website. However, we refrained from doing this since the usability sessions did not involve switching the order of the tasks in order to eliminate the learnability from the equation, which would be indicated by proportional development where the participants become quicker at solving the given tasks.

When looking at the data from the semantic differential scale, we put them into the following nine categories, which correspond with the nine questions on the assessment sheet:

1. Findability
2. Confusion
3. Credibility
4. Complexity
5. Familiarity
6. Aesthetics
7. Efficiency
8. Frustration
9. Design flow

Results from the meaning categorisation were not connected with the statistical data from the semantic differential scale until the discussion, and they were therefore not compared during the analysis. Hereby we let the data collected during the think-aloud control the direction of the analysis, rather than being influenced by the quantitative data. This corresponds with the phenomenological approach. During the process of writing the discussion we experienced that some of the data from the think-loud did not correspond

with the data from the semantic differential scale. Therefore we present and reflect on these aspects in the discussion, which is located in chapter 10.

Conceptual and theoretical work

According to Bryman, "*[i]t is this step, coupled with the interpretation of data, that forms the study's findings.*" (Bryman, 2008, p. 372) In the case of this thesis, our design principles for single page websites count as the conceptual and theoretical work. On the basis of our preliminary research involving the collection of 100 single pages, we gain knowledge about the characteristics and context of single page websites. Coupled with our usability study, aimed at gaining insights into the users' interaction with the websites, we will propose a framework of design principles. These principles should build on the preliminary research and embed newly acquired knowledge about how users interact with single pages.

In relation to the sub-questions of this step, *Collection of further data* and *Tighter specification of the research questions(s)*, we have not seen the need to rephrase or tighten our research questions, nor have we collected further data in order to provide an answer to the problem statement. However, we think that the results of this thesis could benefit from being tested within a wider time frame than we have had the opportunity to, and we therefore find it relevant to suggest ways to continue the further work. In order to collect data about single page websites in the user's own context, the method of cultural probing could be used. By providing the user with different means of documenting his/her use of single pages on his/her own premises, a different kind of data might emerge. This could open up the opportunity to work within the scope of the interpretive phenomenological analysis (IPA), where close examinations of experiences and activities in a given context offer insights into making sense of a phenomenon. This method could not be used in our thesis, since we did not get the chance to engage in meaning-making activities with the participants, based on in-depth personally-salient accounts. (Reid, Flowers & Larkin, 2005) Furthermore, the design principles proposed as a result of our study should also be tested further on various single page sites in order to strengthen their validity in relation to single pages as a genre. Lastly, the results and design principles could benefit from being put to the test in other cultural contexts. Our study has only engaged in the context of Danish citizens, but different results might emerge if the principles are examined with people with other cultural understandings and contexts.

Writing up findings and conclusions

In the conclusion of this thesis, found in chapter 12, we will elaborate on in what way our problem statement and sub-questions have been answered.

This elaboration will involve a presentation of which parts of the process have been aimed at answering which questions, and how that has affected the process.

2.4 The final research design

In this section, the final research design will be exhausted and described. The process involved usability examinations of two single page websites; the Avantgarde single page website *The Survival Kit*, and the Conventional single page website *Factory Forty*. These two examinations were think-aloud studies, and we therefore recorded the audio. A participant was only involved in examining one of the two websites. The moderator was present in the test room with the participant, while the other person was placed in the observation room in charge of monitoring fluctuations in the GSR measurements. Prior to the examination, the participant was instructed to let the moderator know when he/she would have given up on locating specific information on the website, if they had been looking for it at home. In order to ensure that the participant did not have any prior experience with the particular websites, the participant was asked about his/her knowledge about single page websites, and as the website was loaded onto the screen, the participant was asked whether or not he/she had seen this particular website before. We wanted to avoid a situation where the participant had any prior experience with the websites, which could lead to unreliable data. During the examination, the moderator attempted to use the *echo* technique when talking to the participants, where the moderator repeats, or echoes, the last phrase or word the participant said, in order for the participant to elaborate on his/her own statement with the same words. (Pernice, 2014) In table 2.1 we have set up an overview of all the steps taken in the data collection process leading to the development of a framework of design principles for single page websites and their application.

Steps taken	Description
Historical context	A complete walk-through of the evolution of the web. This aspect provided us with a fundamental understanding of the context within with single page websites have emerged.
Current technologies and features	The historical aspect equipped us with the knowledge technologies have influenced the look and specifications of websites. We therefore investigate which features and technologies are associated with the genre today.
Current context and use	In order to gain insights into the current use and context of single page websites, we collected 100 single pages and divided them into categories. This gave us an overview of how single pages are used, and in what context.
Structure and anatomy	The anatomy and structure of single page websites have clear differences. The structural differences propelled us towards creating a sub-genre division of single page websites: Conventional and Avantgarde.
Planning research design	In order to plan and prepare the research design we outlined the process using the DECIDE model. This enabled us to be clear about what to investigate and how to investigate it. Furthermore it made us reflect on choice of participants.
Selecting relevant websites	After creating a sub-genre division we became interested in examining a website from both sub-genres. In order to represent each sub-genre, we picked two websites also representative to the two largest categories (Showcase/showroom and Companies).

Finding participants	In the process of locating participants for the usability examination, we put a post on Facebook asking for people to participate. We aimed at involving between 15 and 20 participants, equally divided in both genders, in all ages.
Testing research design	With the aim of testing and optimising our research design before initiating the usability sessions, we tested our research design in iterations. This led us to make some changes to the design in order to make sure that we collected relevant data in accordance with our stated objectives.
Usability examinations	We set up an observational study involving 17 participants in a usability lab where participants were asked to complete a series of tasks by locating information on single page websites from both sub-genres.
Data processing	We started the task of processing the data by performing a partial transcription and meaning categorisation of the audio-recordings from the usability examinations. We then moved on to processing data from the semantic differential scale by making statistical calculations.
Data interpretation	We looked at the content from the meaning categorisation in relation to the assessments collected on the semantic differential scale and reflected on the ways they were consistent and where they differed. The data interpretation became the foundation for developing the design principles.

Design principles	On the basis of our findings in the data collection, as well as the knowledge we have acquired about single pages, we have used conceptual models and theoretical knowledge about information architecture and usability to propose a framework of design principles.

Table 2.1: Steps taken in the process of developing a framework of design principles for single page websites and their application

Testing the research design

In order to test and optimise our research design for the empirical work process properly, we tested our research design in iterations. These iterative tests were aimed at making an assessment of our research design in order to see if it could benefit from small changes or rephrasing of the tasks given to the users. The questionnaire about age, gender, education, et cetera was first drafted and then sent out in two iterations, and tested in a third iteration. The first iteration involved asking a test-person to fill out the questionnaire, and then go through the responses with the user, while he/she was thinking out loud about how the questions were interpreted and why they led to the responses they did. This unveiled some misunderstandings of the questions, so we rephrased some of them, and sent the second edition to a second test-person. During this iteration we also found some miscommunication in different sections of the questionnaire, which led us to include additional rephrasing. The third iteration was part of our test of the whole research design, where we had a test-person participate in the entire usability examination, and this last iteration showed that the test-person understood the questionnaire and interpreted the questions as they were intended.

Before the actual usability examinations, we invited two test-participants to join us in the usability lab to test the entire research design. The first participant, a fellow student from Aalborg University, was part of a test with both websites, where we went through all the questions. After doing the usability tasks, the test-participant then gave us feedback on how we could improve some of the tasks. After the screen recording review, the participant expressed that it was hard for him to recall the reasons for his own actions in the system, since we had not noted at which tasks the GSR measurements had fluctuations. Because of this feedback, the person who monitors the GSR measurements also noted what the participant was looking for, and what task he/she was currently doing. After this test, we brought in another test-participant in order to test the changes made to the research session, which

also included creating a manuscript for the moderator, ensuring a uniform way of presenting the examination agenda and tasks to the participants. From this test-usability examination we found no further changes, and since she only examined one website, we included the results as part of the data collection. Thus this became the last iteration, and we reached our final research design involved the following steps:

1. Questionnaire about age, gender, education, and employment.
2. Two usability examinations - one on the Avantgarde single page *The Survival Kit*, and one on the Conventional single page *Factory Forty*.
3. Recording screen-movements during usability session, as well as audio throughout the entire examination.
4. Collecting sensory data from Galvanic Skin Response measurement-equipment throughout the usability session.
5. Assessing fluctuations on the GSR graph together with the user, while reviewing the screen recording.
6. Assessing the general usability and user experience on the semantic differential scale.
7. In-depth questions to the user regarding their user experience and their perceptions on the general usability.

On the basis of our iterative process, we have attempted to create a visualisation in figure 2.2. Our iterative process involved testing specific steps in the research design, followed by assessing and adapting it to the results, followed by a repetition of the test, and so on. We repeated these steps until we were satisfied with the results.

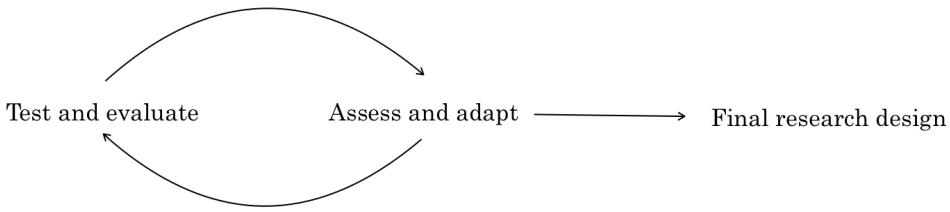

Figure 2.2: Iterative process during tests of the research design

As an addition to the think-aloud session, we collected sensory data from the Galvanic Skin Response measurement-equipment, as well as a screen recording of the user moving about the website. By noting the fluctuations on the GSR graph, the specific times of irregularities in the graph from the GSR measurements was connected to the screen recording. These fluctuations were paired with specific points in the session, and the user was shown these situations in the screen recording and asked to describe what was happening, and whether or not the system had in any way birthed a reaction from the

user. After this assessment, the participant was then given a sheet of paper with 9 questions aimed at quantifying the user experience and usability on the semantic differential scale. This session was followed by in-depth questions regarding the participant's user experience and perceptions on the general usability of the website. If the participant had not expressed any prior knowledge about single page websites, then he/she would not be asked whether or not the particular website examined was representative to their view on single page websites.

2.5 Kanban method

Throughout the entire process of writing this master's thesis, we have been working within the limits of the development method called Kanban. Kanban is a Japanese word and translates to *visual card* in English, and is widely known to have been used by the Toyota Production System and in the context of Lean manufacturing. (Scotland, 2010) Concretely, the involvement of the Kanban method has meant that we have been working with a task board on Trello (an online organisation and administration tool), where, much like with Scrum, we have taken a systematic approach to what, when, and how something should be written or produced. On this story board we were able to insert tasks on digital post-its, and mark these tasks with detailed descriptions, priorities, categories, deadlines, and much more. This way of working has enhanced our organisational capabilities, since we have had easy access to an overview of the tasks, as well as how they needed to be done. As opposed to Scrum, Kanban does not force us to take on specific roles in our work process, nor work in sprints, but instead we have been able to work in a way best suited to our needs.

3 | The phenomenon and its context

In order to investigate single page websites we have looked into the history and evolution of the World Wide Web. We believe that single page websites are a product of the history and continuous development of both technology and the World Wide Web, and therefore the following section will convey this dissemination.

3.1 History of the web

"*The only web constant is change.*" (Nielsen, 2000)

The statement by Jakob Nielsen from 2000 is easily justified if you take a look at the changes which the design of websites has undergone in the early years of the World Wide Web. In 1990, English computer scientist Tim Berners-Lee published the very first website (W3C, Facts about W3C ¶ History, 2015). At the time, the visual expression of all websites was single-column text-based pages, which were all produced in HTML (HyperText Markup Language). With today's eyes, the websites more or less resembled a series of text documents, all strung together through contextual links, and they had no styling whatsoever (Wikipedia: HTML, 2015). Already a few years later, in the middle of the 1990s, the visual expression of web pages started to change. Pages were now built using tables, and it became possible to create better organised content. Online page builders were introduced, and the website structure therefore expanded from the text-based design model to a table-based structure, and animations such as animated text and moving GIFs influenced the look of many sites. The visual expression of websites fundamentally changed in 1996, when Flash technology was introduced. This added interactive features to the design elements, and websites became a mix of Flash and table-based structures. (Work, 2015, ¶ The Evolution of Web Design)

In 1997, PHP (short for PHP: Hypertext Preprocessor) was effectively introduced, and allowed programmers to use Perl-like variables with the ability to embed HTML (Wikipedia: PHP, 2015). Perl, short for Practical Extraction and Report Language, is a collection of interpreted dynamic programming languages, developed in 1987 (Wikipedia: Perl, 2015). The PHP syntax was much simpler than Perl, and was not intended to be written as a programming language. Nevertheless, PHP allowed programmers to build

simple, dynamic web applications. Around year 2000, CSS (Cascading Style Sheets) began to disseminate, enabling designers to separate the structure (HTML) and style (CSS) when building a website. The CSS1 specification was already completed in 1996, but it would take the web four years to see its potential, and in 2000 Internet Explorer 5.0 for the Macintosh was the first browser to have better than 99 % (full) support for CSS1. (Wikipedia: Cascading Style Sheets, 2015)

The next big change in web design came around the early 2000s when the technology JavaScript was introduced for front-end page layouts. Hereby designers could avoid animating menus using Flash, which resulted in a less resource-draining website. Concurrent with the dissemination of JavaScript, new design possibilities such as drop-down menus became popular. New trends arose, and the navigation bars slowly began moving from the left side of the screen to the top of the page, thus giving rise to the drop-down functionality. (Work, 2015, ¶ The Evolution of Web Design)

In just ten years, the web underwent a change from being only text-based to be more like the websites we know today, with a menu structure and interactive animations. Around this time, more specifically the early 2000s, the interaction on the web also started to transform: User-created content and folksonomic structured social media arose, and users were able to add and create content through online profiles on pages such as MySpace, Delicious, and Twitter. The popularity is extended in the late 2000s, where Web 2.0 became popular as multimedia applications grew. The design focus hereby moved from selling products to publishing content, and the users hereby also became the senders of content, and not merely the receivers. This movement could also be seen in the growing popularity of social media sites. An example of this can be found in Delicious and Twitter's attempt to engage the users in sharing content. Web 2.0 also brought along HTML5, which became known as an efficient alternative to Flash, thus allowing web pages to use interactive elements without the high cost of computer resources. (Work, 2015, ¶ The Evolution of Web Design)

In 2008, something revolutionary happened to mobile access to the web: Access to the internet from mobile was for the first time in history higher than desktop access (Work, 2015, ¶ The Evolution of Web Design). Since then, a lot more mobile friendly versions of websites have been designed, and a shift in the design of websites emerged; from being horizontal and short, an increasing amount of pages adopted the vertical and long design, and the navigation was reduced to the most important areas of the site. The continuous development of smartphones and tablets force developers and designers to think outside the box. The vast difference between browsing a website on a mobile device and a desktop involves differences in amount of horizontal and vertical scrolling, and sometimes even screen rotations. In order to create a positive user experience for all users, both on desktops, smartphones, and tablets, responsive web design can be used to automatically scale to

fit the screen of the device. Responsive web design uses percentages instead of pixels, which results in a website, that automatically scales to fill up the viewing area of the device. Responsive websites are hereby slowly challenging the role of some applications only designed for viewing website content. The same goes for mobile versions of websites, which usually involves stripped down versions of the desktop websites: They are starting to be replaced by responsive web, where one site fits all devices. (Glassman & Shen, 2014)

3.2 Defining the genre

The historical aspect on single page websites provided us with the knowledge that technologies have influenced the look and specifications of websites. With this knowledge in mind, we have proceeded on to investigating which features and technologies are associated with the genre single page website, and how it has influenced the look and anatomy. The first attempts of defining the genre of single pages involved looking at their features. Concretely this step started with looking at the Awwwards (awwwards.com) and One Page Love (onepagelove.com) websites, and how they defined single pages. We then continued to look at the individual pages under this section of the Awwwards website, and what other tags were used to describe them. We encountered tags describing specific features (parallax and custom scroll), structures (fullscreen and infinite scroll) and technology (responsive web design). The results from this process will be described and presented in the following sections.

3.2.1 Characteristic features

During our investigations on the World Wide Web, we have encountered the following tags on Awwwards.com, that are sometimes used as features, structures, and technology in relation to single page websites:

- Parallax scrolling
- Responsive web design
- Custom scroll
- Fullscreen
- Infinite scroll

These features are not limited to single pages, but they can often be found used in the genre. They are merely characteristic features, structures and technology, which are often used in the context of single pages, and not defining elements of the genre. The only consistent characteristic of the overall single page genre is the use of only one page for content.

Parallax scrolling

Parallax scrolling websites have layers that move independently of the others, creating a simulation of depth. (Awwwards, 2015, ¶ Parallax websites). This effect can be applied to the website in a greater or lesser extent, moving from using it on the whole site or just on single elements.

Figure 3.1: Mélanie F index view
(Mélanie F, 2015, melanie-f.com)

The website of Mélanie F (melanie-f.com) is an example of parallax scrolling implemented on the whole site. The green logo seen in the bottom part of figure 3.1 is fixed and floats above everything else. The white background is stationary, but with figures that float up and down. The green-blue background behind the title "*LOOK BOOK*" moves faster than the text itself, when a user scrolls down the site. All the way to the bottom, elements pop up in animations, and several layers appear to be moving at different paces when they are passed. These different scrolling speeds create the simulation of depth, as the layers and background move independently.

Responsive web design

Responsive websites respond to adjustments in the size of the browser window, as they are made by using fluid grids. One of the benefits of using responsive coding is that the designers only have to develop one site, as it will adapt to the screen size of both desktop computers and mobile devices. (Awwwards, 2015, ¶ Responsive Design websites) Figures 3.2 and 3.3 show how the single page Diagnosite responds to small screen sizes.

Figure 3.2: Diagnosite in desktop size
(Diagnosite, 2014, diagnosite.com)

Figure 3.3: Diagnosite in mobile size
(Diagnosite, 2014, diagnosite.com)

The differences between the two sizes are common for most responsive websites; pictures or images in the index ribbon are usually made smaller or completely removed, and the menu options are compressed into the menu icon (an off-canvas menu) seen in the top left corner in figure 3.3. These changes are made to accommodate the small screen size without making it difficult to see the content of the page.

Custom scroll

Websites using custom scroll features seem to have two kinds of structures: One kind is composed of fullscreen images that the user scrolls through. Instead of the smooth scrolling known from many websites, this kind of website jumps to the next frame - no content is overlooked. The other kind does not have ribbons to define different sections of content (the ribbon concept is presented in section 3.3 and visualised in figure 3.5). Most websites use vertical scrolling, but some sites use horizontal. (Awwwards, 2015, ¶ Scroll websites) These are often gallery websites or portfolios.

Fullscreen

Websites with the fullscreen feature fill the whole browser window independently of the screen size. (Awwwards, 2015, ¶ Fullscreen websites) There are different kinds of fullscreen websites: They are all made up by fullscreen images or videos, but the difference lies in the scrolling. Some jump from one picture to another when the user scrolls, others scroll smoothly without having fixed points. A third kind of fullscreen website includes a single image, often a video, without the ability to scroll.

Infinite scroll

Websites with infinite scroll structures do, as the name suggests, scroll infinitely. An example of a website with infinite scroll is the French site The Metrics Factory (themetricsfactory.com). It ends at the top, but is infinite at the bottom, thus showing the same content over and over again. It does not have a scroll-bar either, so you cannot monitor how far you have scrolled. On Power of Possible (powerofpossible.com), a site about what the company Statoil does, a scroll bar is included, though it scrolls infinitely too. When you reach the bottom of the page you can see the indicator jump to the top, showing the same content over and over again.

Like the fact that the features are not limited to single pages, the amount of features on a website is not limited either. They are features because they can be used to make the design of a website more interesting, and they can be combined as the designer pleases. Even though the features are not definite characteristics of single pages we found them relevant to mention, as they might influence the performance of the site, the usability, and the user experience.

3.3 Examples of single page websites

The next sections will involve showing examples of two single page websites; *Pikuseru* and *This Year in Hashtags*. These websites are used as examples in our attempt to define the genre and structure, and we therefore find them to be somewhat representative for the genre as a whole. During the presentation we will use terms from the theory presented in chapter 4.

Website: Pikuseru

Pikuseru (which means *pixel* in Japanese) is a digital agency located in Aalborg with a responsive single page website. They design online solutions and campaigns, create responsive websites, mobile applications, web shops, help companies with managing social media strategies, and help create applications.

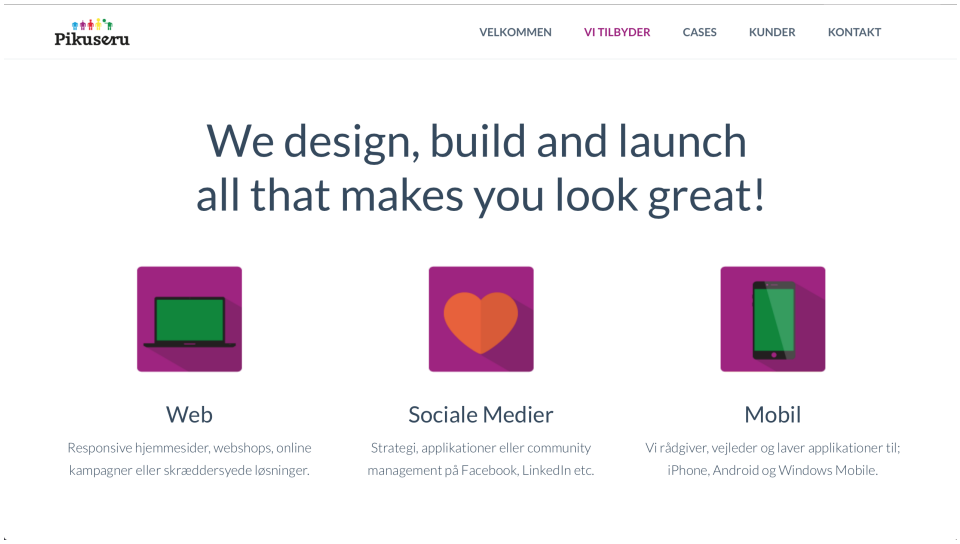

Figure 3.4: The initial screen when entering the site (Pikuseru, 2014, pikuseru.dk)

When you initially load the website, the first thing you see is the quote "*We design, build and launch all that makes you look great!*" (Pikuseru, 2014, ¶ Vi tilbyder), as seen in figure 3.4. Located right beneath the quote, you can see three boxes in flat design, depicting the three main technologies for which they develop digital solutions: web, social media, and mobile. When scrolling down the site, the global menu in the top of the page sticks to the top, so that it follows the scrolling. This is called a sticky top-menu, and is accessible from everywhere on the website. The current position on the website is highlighted in the menu, functioning like a kind of breadcrumb

informing the user of his/her position. When clicking a menu-item, the site jumps to the section of the page, thus sparing the user from scrolling there manually. This feature is called automatic scroll.

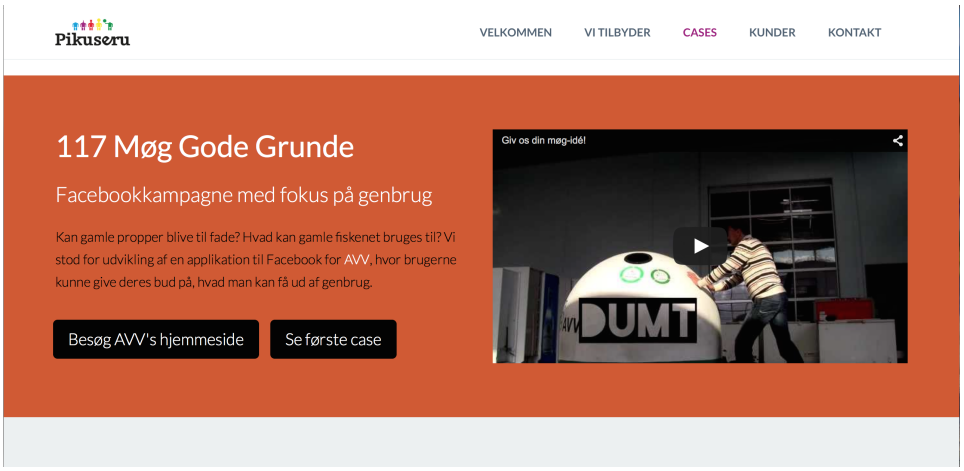

Figure 3.5: Ribbon structure on the website (Pikuseru, 2014, pikuseru.dk)

The content on the website is divided into a structure of confined areas, which we have chosen to call *ribbons*. A website with a ribbon structure has its content divided into areas with different coloured backgrounds, creating boundaries between the sections of content. These sections are referred to as ribbons, since they have 100 % width and go all the way from the left to the right side of the screen - just like a ribbon. An example of the ribbon structure on Pikuseru's website can be viewed in figure 3.5, where the ribbon with a rust-coloured background contains a project with a Facebook campaign.

Modal windows are often seen in single page websites, since they basically overlay the existing content, hereby avoiding sending the user away from the site (One Page Love, 2014, ¶ But what about Modal windows?). This kind of navigation is known from tablets and smartphones, where the global navigation has been hidden away in order to save space. When entering the Pikuseru website, a modal window appears, offering the user to sign up for news letters in order to receive news about web, social media, and mobile applications. This modal window can be seen in figure 3.6, where the background website has been dimmed out by a dark-grey gradient, forcing the user to focus on the modal window.

The website mainly functions as a presentation of the company and also contains portfolio-like features, where the company displays digital solutions designed for other companies. An example of the portfolio-like display under the menu-item *Cases* can be seen in figure 3.7.

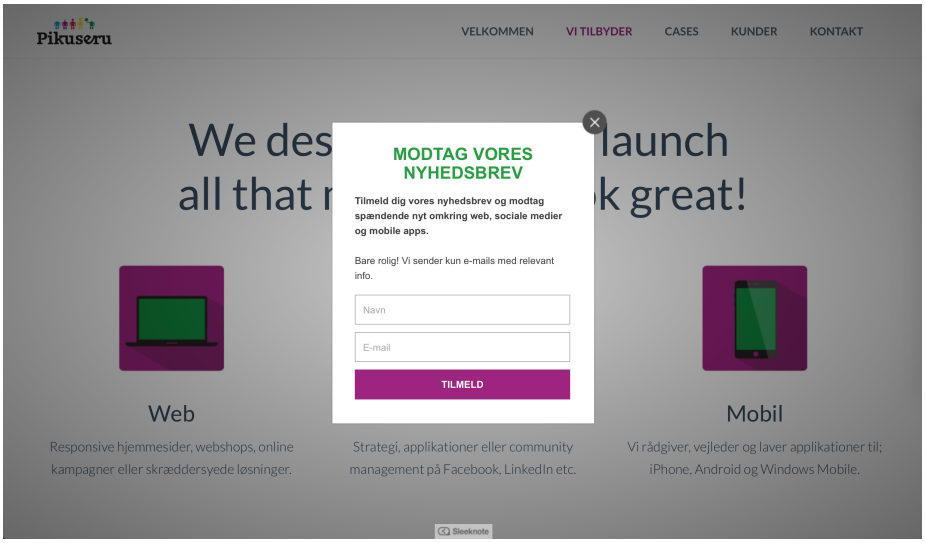

Figure 3.6: Modal window when loading site (Pikuseru, 2014, pikuseru.dk)

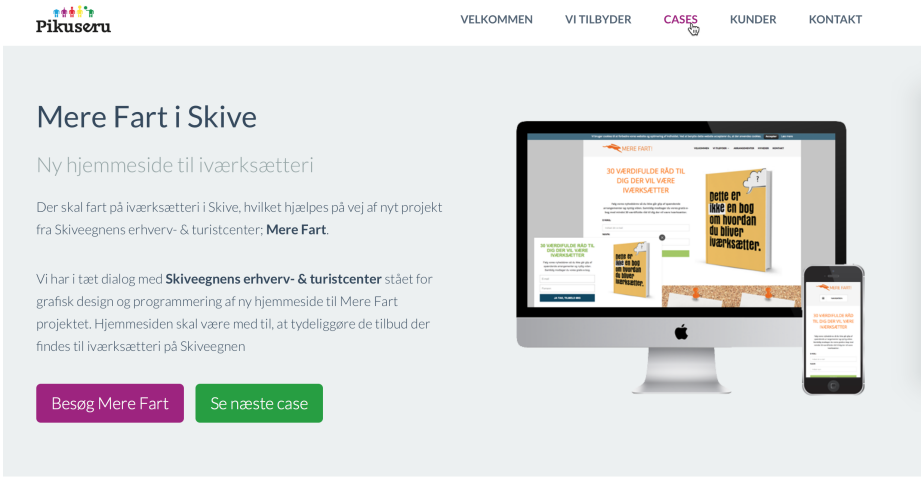

Figure 3.7: Navigation via menu (Pikuseru, 2014, pikuseru.dk)

When scrolling to the bottom of the site, the footer of Pikuseru is seen. It contains the year of Copyright, the name Pikuseru, and iconic labels with external links to their profiles on various social media.

Website: This Year in Hashtags

This Year in Hashtags is a responsive single page website dedicated to displaying the most memorable hashtags of 2014 with illustrations. Hereby, the hashtags have been visualised by various artists, and put up on the website for users to explore.

The index section of the page, shown in figure 3.8, contains a title heading at the top, *"This Year in Hashtags"*, and a subheading reading *"A few of the most memorable hashtags of 2014 visualised by various artists"*. Below the subheading, the word *hshtags* accompanied by a hashtag icon is placed. This is actually the sender of the website, which is a company aimed at supplying other companies with the opportunity to monitor how often their own hashtags are used, as well as the context in which they are used.

Figure 3.8: Index page
(This Year in Hashtags, yearinreview.hshtags.com)

As shown in figure 3.8, the main menu is placed at the bottom of the page. The menu has no labels and is made up of a horizontal line, indicating that the navigation on this website is horizontal, and not vertical. The horizontal line has diamond-shaped ends and a white diamond-shape that can be dragged along the line. The line also contains small dots, that indicate key points of content on the site. The diamond shape is not limited to be dragged onto the dots, but can also be dragged between the dots.

When the diamond is dragged to the right on the line, the user is navigated further right on the website, and if the diamond is dragged left, the site moves left. In figure 3.9 the navigation is displayed. In reality the diamond-shape on the horizontal line is like a common slider in a scroll bar normally

seen in the right side of a website, but instead the scroll bar is represented as the main menu and global navigation of the site.

Figure 3.9: Horizontal scroll
(This Year in Hashtags, yearinreview.hshtags.com)

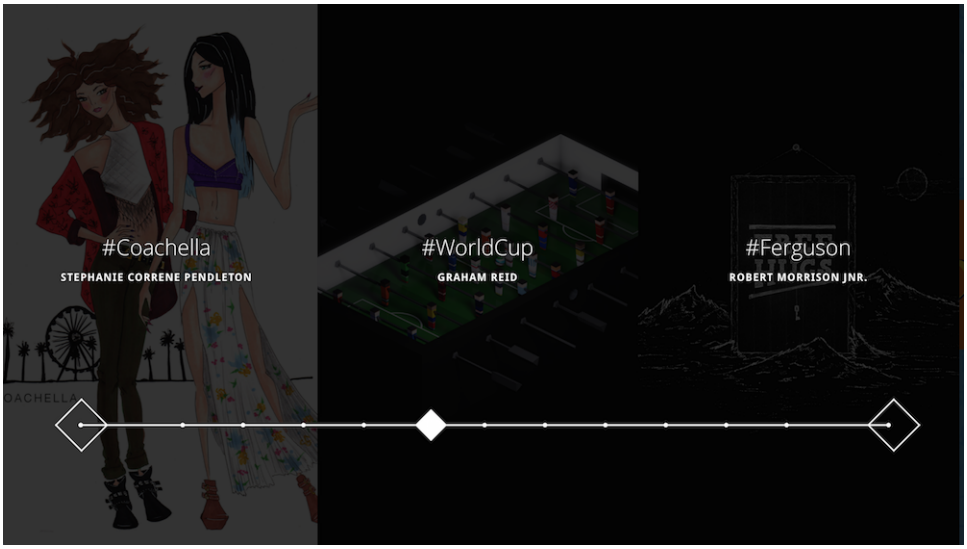

Figure 3.10: Hashtags
(This Year in Hashtags, yearinreview.hshtags.com)

Figures 3.9 and 3.10 show how the hashtags are displayed on the website. They are represented as horizontal ribbons, and when the cursor is hovered

on the ribbon, it turns from a picture with a blackish transparent layer on top to an all-black ribbon. When the hashtag is clicked, the ribbon extends into a modal window, and is locked in place. This can be seen in figure 3.11, where the hashtag #WorldCup has been opened. By opening a hashtag, vertical scrolling is activated, and horizontal scrolling is not possible until it is closed.

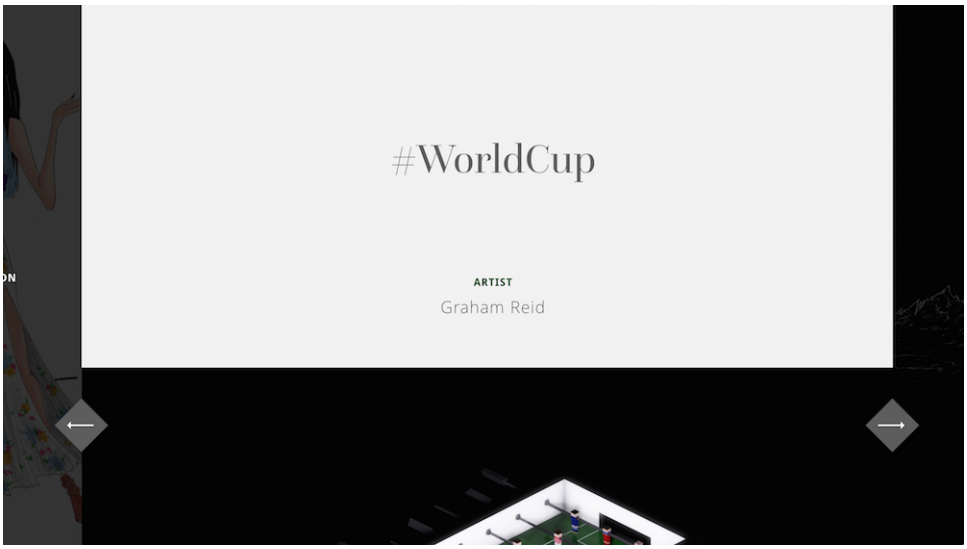

Figure 3.11: Open hashtag
(This Year in Hashtags, yearinreview.hshtags.com)

The extended ribbon contains a top ribbon with the title of the hashtag, and below that is the artist of the illustration. Under the top ribbon the illustration is displayed. This can also be seen in figure 3.11. Even though the horizontal scrolling is deactivated, one can still navigate between the different hashtags, or vertical ribbons, by pressing the arrows that have appeared in the right and left side of the hashtag-window. Just below the illustration, which can be seen as the black ribbon in the bottom of figure 3.11, a contextual link with the label *View fullscreen* is located. This link opens another modal window with a fullscreen view of the illustration. This modal window (shown in figure 3.12) can be closed by clicking *Close* in the top right corner of the screen. When this window is closed, the user returns to the previous modal window. This shows that modal windows are in fact layers placed on the remaining content of the website.

In figure 3.13, the bottom of the modal window, or extended ribbon, is displayed. This is where the user can read a note from the artist about the illustration, and simultaneously the hashtag. Just below this is information about the artist, accompanied by contextual links with iconic labels leading to a personal website and a Twitter account. The contextual link in the

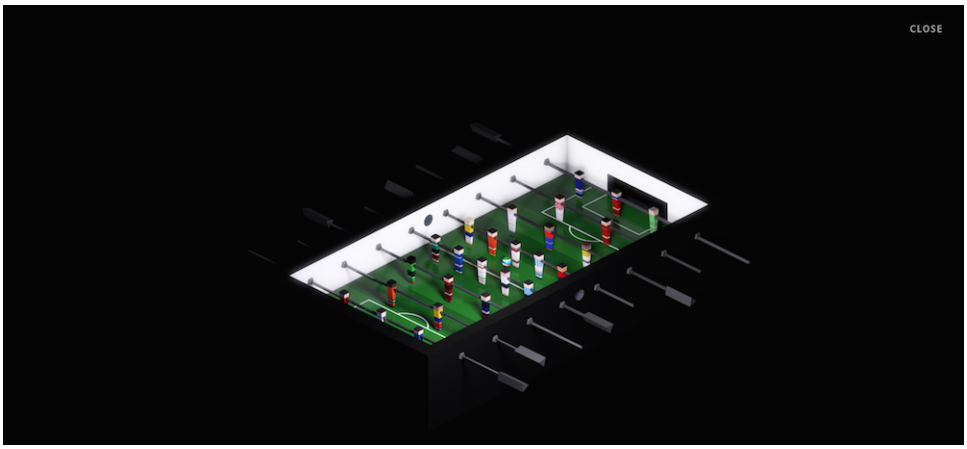

Figure 3.12: Modal window of illustration
(This Year in Hashtags, yearinreview.hshtags.com)

green box labelled *View posts for this tag* leads to an external page with an overview of posts with the hashtag #WorldCup.

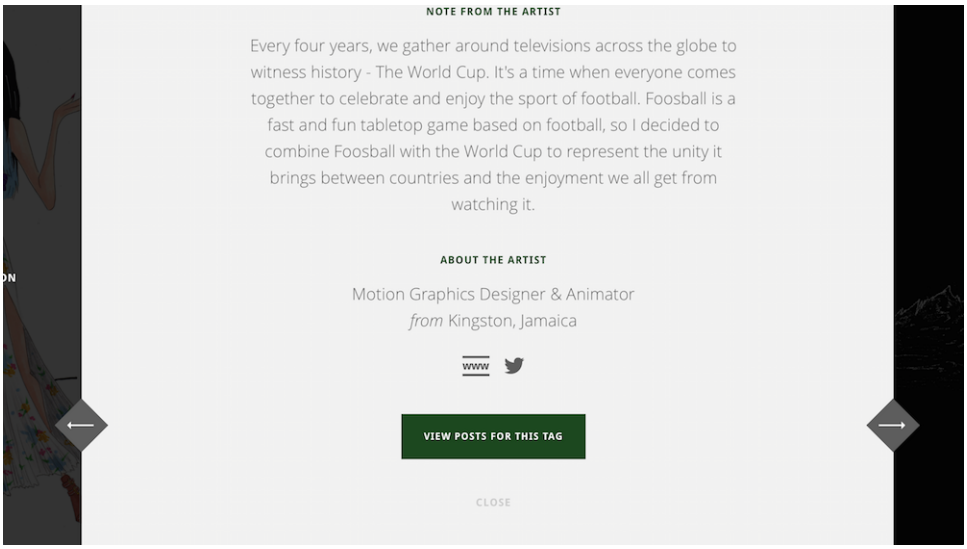

Figure 3.13: Bottom of open hashtag
(This Year in Hashtags, yearinreview.hshtags.com)

The link for closing the modal window, labelled *close*, is placed at the very bottom of the modal window, and when clicked, the user is returned to the view displayed in figure 3.10. After scrolling through all the horizontal ribbons with hashtags, the end of the website, as well as the horizontal scroll bar, is reached. This section can be seen in figure 3.14, and contains the text

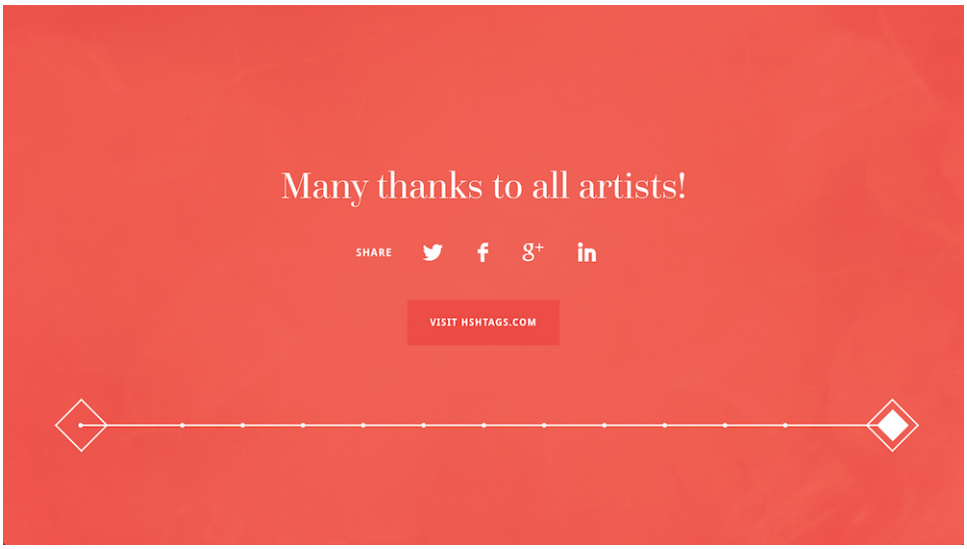

Figure 3.14: End of page
(This Year in Hashtags, yearinreview.hshtags.com)

"*Many thanks to all artists*", five contextual links leading to external sites, and one leading to hshtags.com.

If figure 3.14, displaying the last section of the site, is compared to figure 3.8, displaying the index section of the site, it is clear that the colours of the background differ. The reason for this is that the website's background colour is not constant, but slowly changes and fades from red to orange and back again.

4 | Information architecture

In order to present the field and general scope of information architecture (IA), we look at the internationally acclaimed book *Information Architecture for the World Wide Web*, 3rd Edition from 2006, written by Peter Morville and Louis Rosenfeld. The book is primarily used to present the components of information architecture, thus outlining our definition of information architecture. This is relevant since every website has an information architecture, and we will use IA components as a tool to analyse the anatomy of single pages. The scope of the analysis will be to analyse and interpret the statements from the participants in the context of the general structure and components in terms of information architecture, and hereby investigate how users navigate the websites during the usability examinations.

In order to determine and define information architecture, we have looked into Morville & Rosenfeld's definition in the book *Information Architecture and the World Wide Web*. Since an all-purpose definition is almost impossible to find, the definition is not a one-liner, but instead consists of four different aspects:

in • for • ma • tion ar • chi • tec • ture n. (Morville & Rosenfeld, 2006, p. 4)

1. *The structural design of shared information environments.*
2. *The combination of organization, labeling, search, and navigation systems within web sites and intranets.*
3. *The art and science of shaping information products and experiences to support usability and findability.*
4. *An emerging discipline and community of practice focused on bringing principles of design and architecture to the digital landscape.*

4.1 Information architecture components

The information architecture components are described by Morville and Rosenfeld (2006) as the parts that make up mediated information architecture. Including organisation-, labelling-, navigation-, and search systems, the components combined can be applied to achieve the best possible user-friendly navigation. (Morville & Rosenfeld, 2006, p. 116)

Organisation

Organisation can be said to be one of the key parts to good navigation, since the focus of organisation involves categorising content in a logical way. This can be a difficult task, as people sometimes perceive the same things differently. When categorising content it is important to keep this in mind, since it can lead to ambiguity in both labelling and the way of categorising. (Morville & Rosenfeld, 2006, ch. 5)

Labelling

When content has been organised into categories, these categories should be named according to the content they represent. Labels are used to communicate information without using a lot of space, physically on the page, and in the mind of the user. Labels can be used in a variety of contexts: Contextual links, headings, navigation systems choices, and index terms. (Morville & Rosenfeld, 2006, ch. 6)

Contextual links are hyperlinks to similar information located elsewhere, and they are usually embedded in the surrounding text. Since the author of the text might have a different association with a piece of information than the reader of the text, the understanding of what contextual links redirects to relies on the context within which they are shown. This is also what differentiates contextual link labels from other varieties of labels: Rather than deriving meaning from being a part of a hierarchy, the understanding of link labels depends on the context. (Morville & Rosenfeld, 2006, p. 87) To ensure that contextual links are representational, it can be helpful to ask what kind of information the users would expect to find when clicking the link, before the label is made.

Labels can be used as headings to establish a hierarchy. Different variations of headings can be made by using different font sizes, colours, and space between sections, as examples. In this case, labels that otherwise would have no connection with each other would make sense by being presented in a hierarchy. Headings can also be accompanied by a number to mark out steps in a process. (Morville & Rosenfeld, 2006, p. 92) This is sometimes seen in check-outs when buying online.

Labels used in navigation systems need to be consistently applied to prevent confusing the users. This also means that the same label should not be used in several ways with different meanings. Some labels, *Home*, *About*, *Contact*, can be found on a variety of different pages, which makes them familiar to the users. (Morville & Rosenfeld, 2006, p. 93) By testing whether or not the labels are familiar to the users, confusion and misunderstandings can be prevented.

Labels can also be used as index terms like keywords, tags, metadata, et cetera. These are used to describe the piece of content they are linked to, such

as content type, year of creation, and author, to state some examples. These index terms are made by a individual who has assessed the content and found the labels descriptive, which means that they may not be comprehensible to all users. Index terms are mostly used in searching, as they support the search experience. (Morville & Rosenfeld, 2006, p. 95)

A last version of labels is iconic labels. These are pictograms, often accompanied by a text label, which through illustrations are intended to help the user recognise and recall the content available on the site. (Morville & Rosenfeld, 2006, p. 97)

Navigation

User-friendly navigation can be achieved through applying the IA components. In this section, navigation is presented in the context of linking and organising content in menus, making it is easy to find as well as navigate through.

The main part of navigation is embedded navigation systems, which include global, local, and contextual navigation systems. The global navigation primarily functions as the main navigation on the site, as it is intended to be present on every page. This means that the user always has direct access to main areas of the site, such as the *Home* or *About* pages, but it also means that the global navigation has a vast impact on the usability on the site, as it may be the only consistent navigation element. (Morville & Rosenfeld, 2006, p. 122) The global navigation is sometimes accompanied by a local navigation, which is an expansion of the menu-item that is chosen, so that the sub-options are shown. An example of this could be drop-down menus. (Morville & Rosenfeld, 2006)

Contextual navigation is made up by contextual links: It is embedded in the content text on the site, making it possible to navigate beyond the global and local navigation, and to other sites as mentioned with contextual labels. (Morville & Rosenfeld, 2006, p. 126)

Another form of navigation systems is supplemental navigation. These include sitemaps, which provide a clear overview of the content on the site; indexes, sorted alphabetically to make it easy for the user to quickly retrieve information; and guides, with a linear navigation based on the target group, task, or topic. Supplemental navigation does, as the name suggests, supplement the embedded navigation by providing an alternate way of finding what one is looking for. (Morville & Rosenfeld, 2006, p. 131)

Search

A search system is a complex system of indexed content and different configurations on how to retrieve information based on search queries. (Morville & Rosenfeld, 2006, ch. 8) Before implementing a search system, it is important

to make some considerations based on the amount of content, the users, and whether or not the site would benefit from it. Sometimes it would be wiser to work on strengthening the global, local, and supplemental navigation on the site, as most users might prefer to navigate a site through browsing rather than searching. (Morville & Rosenfeld, 2006, ch. 8)

5 | Gestalt theory

Since the field of information architecture takes on the structural design of information environments with the aim of optimising the user's navigation and information-seeking tasks, it is relevant to look at user perception and more specifically how users naturally perceive objects as organised patterns. In order to do this, we include the Gestalt principles and use them to analyse how the anatomy and structure of single pages might be perceived by users. This theoretical section takes its point of departure in the newer take on the Gestalt within the field of design: The Gestalt principles. In order to present the principles, we look at *Designing Interfaces*, 2nd edition (2010) by Jenifer Tidwell, and present the Gestalt principles within the scope of designing visual systems. When browsing literature within this particular field, we discovered several differences, and we therefore present more angles and definitions of some of the design principles, since they all are in accordance with the early psychological theory of the Gestalt. To get an understanding of this original context of the Gestalt principles, we also present the early field of Gestalt Psychology and look at the journal article *The Psychology of Gestalt - Some Educational Implications* written by George Humphrey and published in 1924. This journal article presents the main ideas and literature of Gestalt theory, and looks at the key authors within the field: Wertheimer, Köhler, and Koffka. The publication also explores the experiments of the time, thus presenting the early experimental and literary scope of psychological theory of the Gestalt.

5.1 Gestalt principles

The word "Gestalt" is German for *form* or *shape*, and the principles describe how people senses objects from another. The Gestalt principles are not meant to be seen as strict rules for good design, but instead guidelines. Therefore, a design may not follow some of the Gestalt principles but can still be seen as a good design. (Birkvig, 2004, p. 41)

Similarity

The principle of similarity states that people will often associate objects as connected if they look alike, or perceive them as a group or pattern. (Tidwell, 2010, p. 139) The similarity can for example be found in the shape, colour, and size of objects.

Continuity

When objects are aligned to form continuous lines and curves, it is an example of the principle of continuity. Our eyes automatically follow the lines which the elements are aligned to make, and we will assume that they belong together. (Tidwell, 2010, p. 139)

Proximity

The principle of proximity states that elements that are placed closely together, compared to other elements, are perceived as a group. (Tidwell, 2010, p. 139) Figures 5.1 and 5.2 display examples of how relations between objects can either be perceived as individual shapes, or as a group. In figure 5.1, the shapes are spread out with no specific pattern, and therefore they are perceived as separate shapes. In figure 5.2, nine separate shapes are perceived as a group that form a large square, since they are placed in relation to each other. (Spokane Falls ¶ The Gestalt principles)

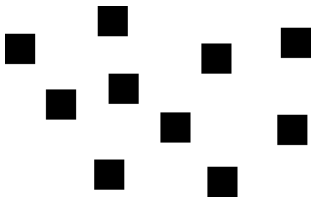

Figure 5.1: Shapes without a specific pattern
(Spokane Falls ¶ The Gestalt principles)

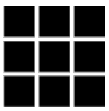

Figure 5.2: Individual shapes perceived as a group
(Spokane Falls ¶ The Gestalt principles)

Closure

There are two meanings to the principle of closure. The first is, that if a shape is not fully enclosed, but enough of the shape is indicated, the brain completes the shape and fills out the missing information and perceives the object as closed. An example of this can be seen in the WWF logo, displayed in figure 5.3. Some of the lines in the panda are missing, but because the shapes are indicated, we perceive them as forming a panda. (Spokane Falls ¶ The Gestalt principles; Tuck, 2010 ¶ Closure) This form is related to the

principle of proximity, since objects that are put together are perceived as belonging together.

Figure 5.3: The logo of WWF
(Spokane Falls ¶ The Gestalt principles)

The other meaning of closure is that objects closed into boxes or lines belong together. This is often seen in online web-forms where different parts are divided into sections by lines. (Birkvig, 2004, pp. 46-47; Niels Gamborg, 2015 ¶ Loven om lukkethed) An example of the principle of closure can be found on the AAU homepage, where the content is divided into boxes with solid background colours. Through this division and enclosure, the content is perceived by the users as being different entities.

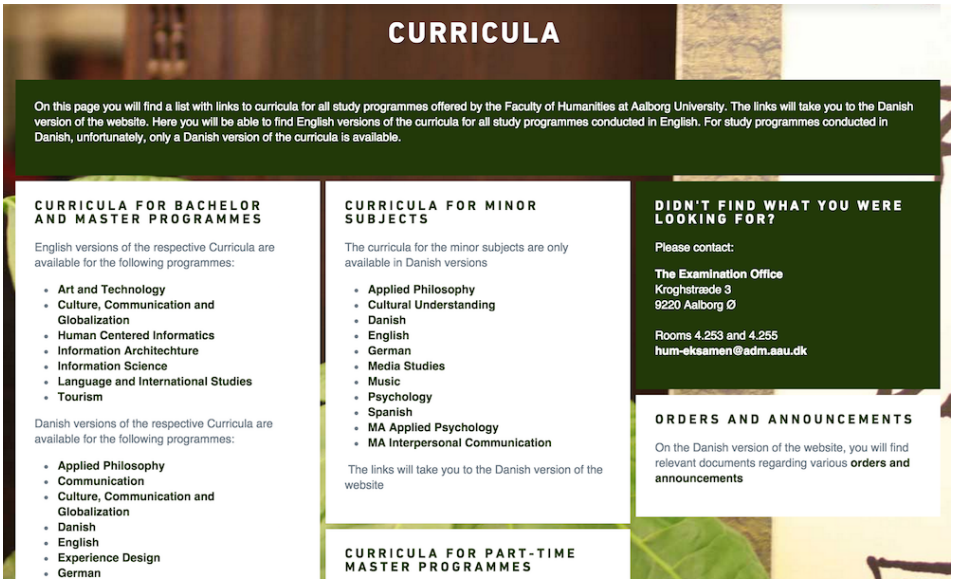

Figure 5.4: Principle of closure on the AAU website
(Aalborg University, en.hum.aau.dk/studying-at-the-humanities/curricula)

Figure and ground

According to this principle, an image is divided into an object and a background; a smaller shape or silhouette will be perceived as an object, and the surrounding area as the background of the object. A well-known example of how tricky the principle of form and ground can be is Rubin's vase, which can either be perceived as two heads facing each other, or a vase placed in the middle of the picture. This happens when the two different areas take up the same amount of space; the brain is tricked to only see one figure at a time. The principle of figure and ground is breached when text is placed on top of an image with similar colours. (Birkvig, 2004, pp. 42-43; Tuck, 2010 ¶ Prägnanz (Figure-ground))

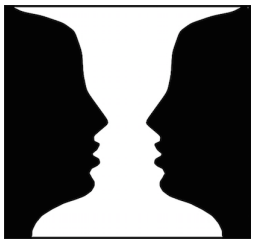

Figure 5.5: Rubin's vase
(Spokane Falls ¶ The Gestalt principles)

5.2 Gestalt psychology

Gestalt psychology is a psychological direction from the 1920s aimed at understanding human perception and cognition, and sees human beings as actively trying to make sense of their otherwise chaotic surroundings. (Den store danske: Gestaltpsykologien)

Gestalt psychology principles

The original principles formed by Koffka and Köhler on the early years of Gestalt psychology have later on been adapted and adopted into other academic fields; among others, the field of design. This has resulted in several Gestalt rules or principles for design, aimed at guiding the designer for designing towards user perception. Humphrey lays out Koffka's, as well as Köhler's assertion that the Gestalt principle can be divided into criteria (Humphrey, 1924, pp. 408-409).

1. A structure is more than its parts, the parts serve in a "functional relationship" with one another
2. a structure can be transposed, meaning transferred to a different place or context

3. in a structure, separation brings alteration of the parts (added by Köhler)

Prägnanz

One of the concepts within the field of Gestalt psychology is referred to as *Prägnanz* or "*pregnancy of the Gestalt*" (Humphrey, 1924, p. 405). This concept involves several principles of perception, and states that a variety of elements are interpreted in specific sets of perception - in German referred to as *Hervorgehobensein* (Wikipedia: Prägnanz, 2013). Human beings have a "*tendency to come to a condition of simple structurisation*" (Humphrey, 1924, p. 405) and therefore tend to order experience, and sometimes alter characteristics towards simple, more memorable forms.

In the journal article "*The psychology of the gestalt - some educational implications*" by Humphrey (1924), he presents experiments carried out by Bourdon, where participants would look at figures with a certain amount of points arranged around a center. The participants would then perceive the points as forming figures with respectively three, four, five, or six sides, while eight points would give the participants the impression of looking at a circle. According to Humphrey, "*... this tendency towards simplicity, shows itself, it is claimed, not only in the formation of the phenomenal perception but also accounts for the change that takes place in a Gestalt during lapse of time.*" (Humphrey, 1924, pp. 405-406). A similar experiment was carried out by Wolf, where participants were shown a figure of two concentric circles, and later asked to reproduce the figure. This experiment showed that time can alter a Gestalt, since the participants reproduced the figure with a larger radial angle than the original figure. Several more experiments showed that the figures suffered alteration with participants, and that "*the threshold was higher in the figure than in its ground*" (Humphrey, 1924, p. 406), thus making the balance between a figure and its ground asymmetrical, diminishing the effect of the ground rather than the figure.

6 | Complexity and perceived affordance

This section about complexity and affordance takes its point of departure in the book *Living with Complexity* by Donald Norman from 2010. The book dives into the complex world that surrounds us, and argues that complexity fades away once the structure is revealed and understood (Norman, 2010, p. 2). Affordance, which was originally presented by Gibson, was appropriated by Donald Norman in 1988 into the field of design, where Norman coined the term *perceived affordance*. In design, perceived affordances and signifiers are methods for communication, and can help users comprehend the digital environment. Since the field of information architecture among other things involves shaping structural design of information environments to support usability and findability, the scope of complexity is relevant. Seen in the context of helping the user reveal and understand the system and structure, perceived affordances can help make the system more perceivable and informative.

> "*Once the structure is revealed and understood, the complexity fades away.*" (Norman, 2010, p. 2)

Norman (2010) has in his book, *Living with Complexity*, attempted to decipher and account for the complexity of the world that surrounds us. Norman expresses that people continually ask him why technology is so complex and not simple, whereto he answers "*Because life is complex*" (Norman, 2010, p. 2). He distinguishes between the word *complexity*, and the word *complicated*, saying that complexity is used to describe the world, whereas complicated is a state of mind, and therefore infers that complication, as a state of mind, is a reaction to the world. (Norman, 2010, p. 2)

According to Norman, we therefore need to stop accusing complex designs of feeding confusion, and instead we should start to look at designs that make the users feel helpless and confused (Norman, 2010, p. 4). Norman does not take on defending bad design, saying that this is just a natural part of the complex world we live in, instead he points out that there is no excuse for bad and unnecessarily complex design, and instead good design can help users manage complexity by addressing the underlying structures and understandings of the users.

Most of our daily lives involve interpreting complex things based on our intuition and experience. Complexity is therefore a big part of our world, but that does not mean that it should be difficult to understand and act on. Our

abilities to tame complexity are built on a foundation of good design and understanding of the underlying structures of complexity: "*Just as the owner of a cluttered desk sees order in its structure, we will see order and reason in complexity once we come to understand the underlying principles.*" (Norman, 2010, p. 4) Anytime devices require signs and labels, it indicates bad design, since the main task of the product required instructions. When taking a walk through any city, one can often encounter doors with push/pull-signs: These are examples of bad design. Since it was not clearly visible to the users which of the doors required pushing and which required pulling, it has become necessary to supplement the door with use instructions. This is particularly bad, since the signs are often put up by the owners of the doors, and not the designers: "*..the users of the devices should not have to add their own signs. Even the simplest operation can become complicated when it is one of many operating in different, arbitrary ways*" (Norman, 2010, p. 64).

On this note, a simple way of designing devices that roam within the users' frame of understanding, is to pay close attention to user behaviour. For example, when considering designing a website or device, it is wise to look at actual user behaviour in order to ensure that the system is within the scope of user behaviour. "*We must design for the way people behave, not for how we would wish them to behave*" (Norman, 2010, p. 86) and therefore it is vital to investigate user behaviour before, during, and after a design process in order to design the product, test the product, and to ensure that the product is functioning as planned/imagined.

6.1 Signifiers and affordances

When walking down the street we are pushed and persuaded towards specific behaviours based on signifiers such as lights, street signs, and paint. Norman presents signifiers as the helpful details that help us navigate complex environments by acting as subtle cues: "*A 'signifier' is some sort of indicator, some signal in the physical or social world that can be interpreted meaningfully*" (Norman, 2010, p. 89). There are different kinds of signifiers, such as social, deliberate, and incidental signifiers, and they all help us navigate complex environments. As Norman himself states, signifiers are derived from the concept of affordance: "*In the vocabulary of design, signifiers are often called affordances or, more precisely, 'perceived affordances.'*" (Norman, 2010, p. 89). Norman continues to express that the two terms, affordance and signifier, do differ from each other, since:

> "*an affordance exists whether or not anyone ever notices it. To the designer, if affordances are not known, then they might as well not exist. In other words, the designer is primarily concerned with perceived affordances; the perception is critical.*" (Norman, 2010, p. 229)

This pushed Norman towards using the word *perceived affordance*, indicating that the affordance is known. In the context of this thesis, we will also look at the perceived affordances, and not deal with the concept in its original meaning, which was laid out by Gibson.

In relation to websites, these conceptual frameworks of affordance and signifiers can be translated and viewed in the context of an interface. Here, affordances can be small cues or objects that help users comprehend the layout - or *digital environment*. When users move through a website or a system, they depend on affordances of digital objects, which help them recognise which parts afford action and how they can get to where they want to go. The overall layout might seem like a mess to some users, while others perceive and comprehend it as an ordered interface. Therefore it is important for designers to attempt to gain insights into the perceptions of the target users and select the appropriate design scheme. If the designer is able to help the user reveal and understand the system and structure, the complexity fades away - and this can be reached through perceived affordances and signifiers:

> "*Note that all perceived affordances and signifiers are methods for communication. The art and science of selecting appropriate signifiers is an important design skill: good designs have signifiers that are perceivable and informative as well as being aesthetically pleasing and harmonious with the rest of the product.*" (Norman, 2010, p. 229)

7 | Usability and UX

In this section, the concepts usability and user experience will be presented. Focus will not only be on defining the two concepts, but also on comprehending the history, and the different views and definitions that exist in the context of both concepts and how they relate to one another. By looking at the historical aspects of both usability and UX, we aim at getting insights into the discourse within which they exist.

7.1 History of usability

The history of usability can be tracked to both World Wars, where the roots of usability can be found in the design of artillery cannons. Through the overall task of killing more enemies while avoiding getting killed, military designers came up with concrete usability metrics:

> *"How quickly will a new crew member learn how to use the artillery cannon (now that the former crew member is dead)?* [...] *How does a design improvement decrease soldier fatigue (as a consequence of a lighter cognitive load)?*" (Soegaard, 2012, ¶ The History Of Usability: From Simplicity To Complexity)

Despite the very different context, somewhat dark theme, and design goal, the idea is very similar to today's concept of usability, including task time, difference between experienced and inexperienced users, and consequences of design improvements.

Much later, in the 1980s, the prices on computers fell, making it feasible for employees to own a PC. Back then, the typical computer-user had little to no training in how to operate the software or operating system in general, and thereby it became a source of frustration and anxiety. Software design practices assumed that users would be familiar with the systems and develop an aptitude for solving problems through the use of a computer, but when users found computers hard to use, the need for usability arose. "User-friendly" became a popular used term, and the term "usability" covered whether the software was usable or not. Unusable software could be fixed through redesign, which could make it usable. (Cockton, 2014, ch. 15)

During the 1990s, the focus of human-computer interaction shifted from usability to the use context of the interactive software. It was no longer a question of whether software was usable or not, but how well it fitted the context in which it was used. This made way for a new term: *User experience*. (Cockton, 2014, ch. 15)

7.2 History of user experience

The term, as well as the definition of user experience has a long history involving many different names and meanings. Many people believe that the understanding and importance of end-user experience began in the field of industrial design. One of the noteworthy publications in this field was published in 1955, when the industrial designer Henry Dreyfuss wrote the book *Designing for People*. This book in many ways presented the understanding of user experience that we know today, where the focus on the end-user's experience is crucial:

> "*If the point of contact between the product and the people becomes a point of friction, then the industrial designer has failed. If, on the other hand, people are made safer, more comfortable, more eager to purchase, more efficient—or just plain happier—the designer has succeeded.*" (Dreyfuss, 2012, p. 24)

Hereby, it became knowledge to many companies that good design could actually be considered a silent salesman, and that good user experience in turn could build fundamental customer relations.

This brings us to the invention of the term itself: Many people in the industry have had a fundamental understanding of the importance of designing for the user's experience, but when did we start linking this to the word *user experience*? The term is believed to have been established by Donald Norman in 1995. With expertise within the fields of cognitive science and usability engineering, Donald Norman worked as a User Experience Architect at Apple Computer from 1993-1998. He presented *What you see, some of what's in the future, and how we go about doing it: HI at Apple Computer* at CHI 1995 Conference Companion on Human Factors in Computing Systems. Published in the proceeding of the conference, Norman, Miller & Henderson (1995) describe their work with user experience as involving "*some of the critical aspects of human interface research and application*" (Norman, Miller & Henderson, 1995, p. 155). In regards to inventing the term "user experience", Norman explains:

> "*I invented the term because I thought human interface and usability were too narrow. I wanted to cover all aspects of the person's experience with the system including industrial design graphics, the interface, the physical interaction and the manual. Since then the term has spread widely, so much so that it is starting to lose its meaning.*" (Merholz, 2007)

The initial use of the term user experience therefore involved aspects of usability associated with end-users, and not the more holistic interpretation

of the term we know today, where UX is descriptive of the emotional responses of a human being using an interactive system/product.

Whether or not UX has its roots in the field of human factors and ergonomics or industrial design, it is clear that UX has strong ties to the field of usability. Over time, it has also been discussed which part of experience is the most important to focus on: Before, during, or after the interaction. Hassenzahl, one of the essential actors within the field of UX, focuses on the first two aspects of experience: "*I primarily focus on experiences as meaningful, personally encountered events (in German: 'Erlebnis') and not so much on the knowledge gained through these events (in German: 'Erfahrung')*" (Hassenzahl, 2014 ¶ 3.3 The evasive beast called User Experience).

Donald Norman on the other hand, states that "*Memory is more important than actuality*" (Norman, 2009, pp. 24-26) and refers to this as *the distancing effect*. He explains that human emotion fades faster than human cognition, and that people are able to recollect events differently when they are distances away - and by distance, Norman is both referring to time and space.

These two examples were just fractions of the vast amounts of disagreements and different perspectives you can find when looking into the field of user experience. These disagreements also result in different ways of testing and researching user experience. On this note, Bargas-Avila & Hornbæk wrote a paper exploring how the many faces of user experience have given birth to a vast amount of different methodological approaches used for researching user experience. The focus of the paper was on the empirical methods used to research user experience (UX) with a focus on a total of 66 empirical studies from 2005-2009. This paper, called *Old Wine in New Bottles or Novel Challenges? A Critical Analysis of Empirical Studies of User Experience* attempted to, as Bargas-Avila & Hornbæk put it: "*explore the products, dimensions, and methodological approaches used for UX research.*" (Bargas-Avila & Hornbæk, 2011, p. 2).

In terms of distinction between usability and user experience, Bargas-Avila & Hornbæk have not included all the usability metrics used in the analysed materials. Mentioned as usability metrics are efficiency, effectiveness, and satisfaction, but there seems to be much discussion within this field in regards to whether or not to include factors of performance and satisfaction within the scope of UX. According to Bargas-Avila & Hornbæk, "*the most frequent dimensions of UX that were assessed are emotions and affect (24%), followed by aspects of enjoyment (17%) and aesthetics (15%). This was unsurprising, as all three are often-mentioned core dimensions of UX.*" (Bargas-Avila & Hornbæk, 2011, p. 4)

In order to define what we mean by the term "aesthetics" we have looked at an article by Udsen & Jørgensen (2005), where the authors have made

a review of various texts on aesthetics. Through this review, the authors have identified four approaches that have emerged in connection with the growing use of digital products. The article should not be seen as a definite categorisation of the different fields, but more as *"an attempt to structure and document the most significant positions in the academic landscape of digital design, research and use."* (Udsen & Jørgensen, 2005, p. 207)

The four approaches to aesthetics identified by Udsen & Jørgensen can be described as the following: (Udsen & Jørgensen, 2005 pp. 206-207)

- **the cultural approach**, which provides a new, cultural perspective on interfaces
- **the functionalist approach**, which believes that the aesthetic qualities of an interface can be an enhancement of usability
- **the experience-based approach** with ways of creating experiences through engagement, seduction, and emotional friction
- **the techno-futurist approach**, which uses philosophy-based perspectives to design user experience in computing environments

We associate the conceptual models and academic viewpoints presented in this thesis with the ones of the *functionalist approach*. Based on the description of the approach by Udsen & Jørgensen (2005), we try to define our own understanding of aesthetics in relation to websites.

Various research has verified a correlation between beautiful interfaces and usability. Through tests on an ATM interface, Noam Tractinsky documented a connection between the appearance of the interface and the user's general appreciation of it, and Patrik Jordan concluded that it is "dehumanising" to ignore the aesthetic potential of a product; aesthetics can appeal to users' emotions and hereby make a product more interesting. (Udsen & Jørgensen, 2005, p. 208)

Donald Norman has written a vast amount of texts on the topic of aesthetics and argues that, in a design process, aesthetic quality should have a high priority, since the aesthetics of a product influence humans emotionally. It can also be argued that simplicity is an aesthetic appeal that increases the perception of trust (Udsen & Jørgensen, 2005, p. 209). The authors conclude on the functionalist approach by saying that "*the aesthetic appearance of products increases usability.*" (Udsen & Jørgensen, 2005, p. 209)

As mentioned, aesthetics can be viewed as a term of a difficult nature, because it has no clear definition. It is highly subjective, which is why we find it important to define what we associate with the term. Based on the research and the statements mentioned above, we think of aesthetics in relation to websites as attractive, simplistic designs, which delight the user in the way elements move and interact on the page. Balance between the elements is important, since interrupting the visual experience should be avoided while navigating through the site, be it either "noisy", out-of-context elements, lag in scrolling, or the like. We take on the functionalist approach in the

context of aesthetics, and we are very much aware that any participants in our usability examination can have a very different interpretation of the concept.

7.3 Our definition of user experience

As we have laid out above, there are many different ways of defining user experience. We take on the concept of UX in its original meaning, which was laid out by Donald Norman, where user experience is said to "*cover all aspects of the person's experience with the system including industrial design graphics, the interface, the physical interaction and the manual.*" (Meerholz, 2007). This bears some resemblance to the discourse laid out by Tullis & Albert (2013), where "*UX covers all aspects of someone's interaction with a product, application, or system*" (Tullis & Albert, 2013, preface). This thesis recognises this as the core viewpoint on user experience, where UX functions as a broader view on use situation than usability, since it in turn involves looking at the user's "*thoughts, feelings, and perceptions that result from that interaction*" (Tullis & Albert, 2013, p. 5). Through this scope on UX, we are able to measure the user experience both qualitatively and quantitatively through UX metrics with quantifiable results, which will be elaborated on in section 8.2.

Research methods and best practice is constantly changing within the field of user experience, and in order to broaden our view and knowledge about how to measure user experience, we look at how UX metrics can help quantify UX, which is normally described as being of a nebulous and vague nature, which cannot be quantified. Therefore, in order to investigate and get insight into users' interaction with single page websites, we look into the practice and concept of UX metrics laid out by Tullis & Albert in the book *Measuring the User Experience* from 2013. Through investigation of best practice in researching user experience and usability, we attempt to gain a fundamental understanding of how to build and manage our own empirical study in the best possible way.

8 | Empirical work

This chapter will involve a presentation of the results from our preliminary quantitative research, and a description of how the results have influenced the following empirical work process. Section 8.2 is aimed at presenting how user experience can be measured, and in connection with our empirical work process we will present how UX metrics have been embedded into the process. Additionally, in section 8.3 we will go over the structure and anatomy of the websites included in the usability examinations.

8.1 Quantitative research

To get an idea of the organisation and website structures used in the single page genre, we wanted to make a quantitative research. We went to the *single page*-tag on Awwwards.com (Awwwards, 2015, ¶ single page) and looked at 100 different sites. When categorising the single page websites within this tag, we attempted to order them by sender and product in order to decipher the context. The categories were made along the way as we found sites that did not fit into the existing categories. Every time we visited a website, we assigned it to a category and gave it some keywords describing the features and structure - such as *parallax*, *fullscreen*, *infinite scroll*, and so on. When we reached the 100 websites, we counted how many were in each category, and made it into a pie chart (figure 8.1).

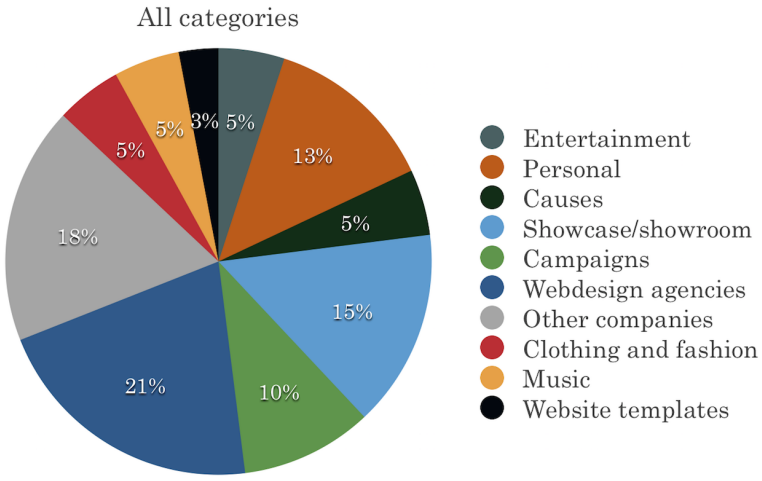

Figure 8.1: Pie chart of single page categories

The categories visualised in the pie chart are described and exemplified in table 8.1. All websites collected and categorised from Awwwards can be found in Appendix D. During the categorisation we experienced that some websites could be put into more than one category, and the categorisation should therefore be seen as highly subjective.

Categories	**Description**
Entertainment	Covers websites with the sole purpose of entertaining the visitor. This includes Pablo the Flamingo, dancing to the song playing on the website, short stories, and the like.
Personal	Involves portfolios for web designers/developers, but a website about a couple's wedding can also be found here. Overall, the category contains sites intended to display a personal and/or professional side of someone.
Causes	Related to environmental/community-related causes with the purpose of making us aware of our surroundings and how we affect them. This category contains websites such as Open Your Heart, informing people about accepting mental illness.
Showcase/showroom	Aimed at showcasing a product and context by using pictures and graphics. These sometimes link to a shop where the product can be bought. One example involves Teye, a communication device that shows emotions, showcased with pictures, sounds, and animations.
Campaigns	Similar to "Causes", but aimed at making people aware of events or specific messages that are not connected to environmental or social causes. Within this category is Redbull Kumite, which is an international Street Fighter competition.
Webdesign agencies	Websites promoting creative digital agencies. These are in a way similar to the personal portfolios, but with an organisation as the sender, and not a single person. An example from this category is CreativityKills, a Nigerian web design company.

Other companies	Other organisations than webdesign agencies. Not limited to a specific field - it is just companies that have adopted the single page website genre, and they are everything from smoothie production to Mix Event, a French music agency.
Clothing and fashion	Clothing companies or collections of clothing items. This is a mix of some of the "Other companies" and "Showcase/showroom" sites, and the websites could therefore have been divided into these two categories as well. An example is Tribord swimsuits 2014, which displays a swimsuit collection.
Music	Websites about musicians, bands, or promotions of specific albums or songs. Dreaming with Jeff is an example of a website within this category: Created by Squarespace, Jeff Bridges has made a CD aimed at reaching a high level of relaxation before sleep.
Website templates	Website templates are demo sites of Wordpress templates. These templates can be bought, and the site functions as a demo of the design and functionalities of the templates. An example is Shore, a fullscreen Wordpress theme for web developers.

Table 8.1: Description of categories within the context of 100 single page websites.

Because some of the categories are similar, we decided to merge them, ending up with eight categories:

- “Webdesign” and “Other companies” became “Companies”.
- “Campaigns” and “Causes” became “Campaigns and causes”.

After this, the pie chart looked a little different (figure 8.2).

From the pie charts we can see that the categories "Webdesign agencies", "Personal", and "Showcase/showroom" are among the largest percentage of uses. According to this sample, "Other companies" and "Campaigns and causes" are largely represented in the single page genre. Overall, this quantitative research shows that the single page genre currently is used across many different contexts.

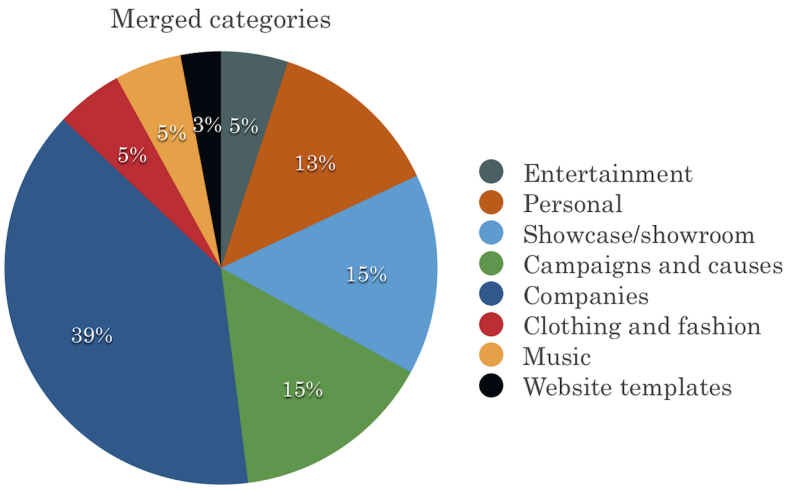

Figure 8.2: Pie chart with merged single page categories

When looking through the different website structures we discovered that single page websites not only can be put in different categories, they can also be divided into sub-genres. We found two main sub-genres of single page websites, as well as a combination of the two: *Conventional* and *Avantgarde*.

The Conventional single pages are structured by having a somewhat traditional menu, that usually functions as both navigation and breadcrumb (displaying current position, and not how one got there). This creates a clear structure and makes it possible to navigate to specific anchored sections of the website rather quickly. The content of the page is often divided into ribbons or the like, and it is often easy to get an overview of the structure rather quickly, as well as the current position on the site.

Avantgarde single pages have a more loose structure than the Conventional single pages. It is harder to predict what comes next, since the user is not informed about the next step: What happens if I scroll further? Where am I and where can I go? Sometimes, the design element is the surprise, since clicking elements in the design can result in unexpected things happening. Sometimes these websites are like videos, or long series of animations, all controlled by the user scrolling, and sometimes the ribbon-less and loose structure makes it difficult to get an overview and navigate the site.

Combination sites are sites that have characteristics of both Conventional and Avantgarde sites. The navigation is not always clear, and the site can seem confusing before initiating scroll, but once you have started navigating, it is very clear what is going to happen next, and things do not happen unexpectedly.

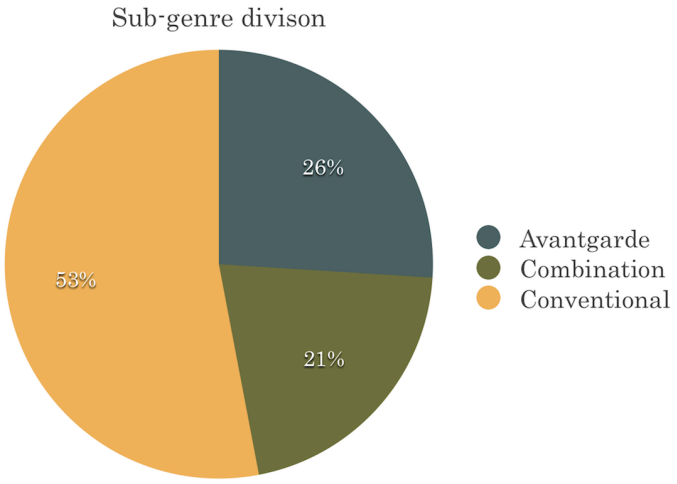

Figure 8.3: Pie chart of the sub-genre division

In accordance with the sub-genres described above we have attempted to categorise the 100 websites found on Awwwards. This was not entirely easy, and therefore some inconsistencies may be present in the sub-genre categorisation. This sub-genre division can also be found in Appendix D.

In figure 8.3, it is displayed that the majority of single pages in our research belong to the Conventional sub-genre, while just over a quarter of single pages can be seen as Avantgarde. The division is interesting, as the majority of single pages are Conventional and often have elements in common with traditional websites with sub-sites, and therefore might not differ that much from what users are familiar with. Even though we have managed to divide the single page genre into categories and sub-genres, the main genre is highly influenced by the developers of the sites and their creativity and experimentation in regards to the possibilities of website navigation, rather than following strict design rules.

8.1.1 Sub-genres and information behaviour

Convergent information behaviour is goal-directed information seeking behaviour with an explicit goal. This focused information behaviour is, according to Björneborn (2008), "*typically based on specific problems and work tasks*". In other words, the user knows what he/she is looking for, and is driven by focused and rational behaviour, looking for objects that might reflect what they explicitly are searching for. *Divergent* information behaviour is, on the other hand, a more exploratory and tacit way of searching. This behaviour is an externalisation of an information need described as "*driven by pleasure, curiosity and the user's interest space*" (Björneborn, 2008), and

the user therefore discovers, rather than recovers information.

We believe that these two ways of approaching information are distinctive for the two sub-genres, Conventional and Avantgarde. While Conventional single pages are constructed in an orderly manner, Avantgarde single pages are often structured in a way different from convention, creating a steeper learning curve than with the Conventional. This differentiation is fundamental when it comes to the main goal of the website: Is it to inform the user about a specific subject, or is it to showcase and sell a product? Is it to wow the user, creating an experience very different from other websites, or is it to create an easy-to-approach website with a structure known to the user? We see this distinction as being the core of the two sub-genres, since Avantgarde websites are dominated by an unconventional flow of information that might actually sometimes be aimed at confusing the user, while Conventional websites are aimed at providing the user with easy and quick access to information, which is important to the goal of the website. Therefore it can be assumed that Conventional single pages are created for recovery, and with Convergent information behaviour in mind, while Avantgarde single pages are aimed at providing the user with the experience of discovery, and therefore Divergent information behaviour. Results from our usability examinations will be compared with this suggestion in the discussion, which can be found in chapter 10.

8.2 Measuring UX

As we discussed in chapter 7, many professionals operate under their own ideas of what constitutes user experience and usability. In the book *Measuring the User Experience* by Tullis and Albert from 2013, the authors present the broad view on the two aspects. Usability is considered as focusing on "*the ability of the user to use the thing to carry out a task successfully*" (Tullis & Albert, 2013, p. 5), whereas user experience is described as taking "*a broader view, looking at the individual's entire interaction with the thing, as well as the thoughts, feelings, and perceptions that result from that interaction*" (Tullis & Albert, 2013, p. 5). In the preface, the authors state that "*UX covers all aspects of someone's interaction with a product, application, or system.*" (Tullis & Albert, 2013, preface). The authors' presentation of user experience, and how it can be quantified into UX metrics, reveals their scope on user experience as involving the entire interaction, containing usability as well as the user's reactions and perceptions thereof. When defining user experience, the authors present three main characteristics (Tullis & Albert, 2013, p. 4):

1. *A user is involved*
2. *That user is interacting with a product, system, or really anything with an interface*
3. *The users' experience is of interest, and observable and measurable*

Why is it important to focus on user experience? The evolution of technologies result in products with increasing complexity, thus enhancing the importance of attending to the user experience (Tullis & Albert, 2013, p. 6). This in many ways complies with the conceptual model laid out by Norman (2010), since complexity opens the opportunity that paying close attention to the user experience and usability can help design professionals in developing efficient, user-friendly, engaging products diminishing designs that make us feel helpless.

8.2.1 UX metrics

Tullis & Albert (2013) present UX metrics as a tool for measuring, evaluating and quantifying user experience, thus enabling professionals to make decisions based on a reliable system of UX measurements. In other words, UX metrics can help designers measure the user experience, which results in quantified and comparable outcomes, revealing something about the user's experience with the product. A UX metric can unveil quantified information about the specific interaction between the product and the user, such as task efficiency, effectiveness, or satisfaction. Contrary to the typical usability evaluation with a product and a user, the designers are able to estimate the magnitude of an issue in a bigger perspective: How many users will en-

counter this problem, and how severe is it? Hereby UX metrics contribute to a better understanding of user behaviour. (Tullis & Albert, 2013, p. 8)

This aspect of UX metrics as involving user experience as a quantifiable result is compelling in the context of our usability examination. Since UX metrics can contribute to a better understanding of user behaviour, it complies with our aim of gaining insights into the behaviour and experience of the users when navigating on single page websites.

User experience study

In preparation to a user experience study, it is important to be familiar with the practical details as well as the purpose and user goals of the study in order to use the appropriate UX metrics. Tullis & Albert (2013) present two essential ways to apply UX metrics: with formative and summative usability. (Tullis & Albert, 2013, p. 42) **The formative approach** involves continuously evaluating a design, iteratively making adjustments to the products with the best possible outcome in mind. **The summative approach** to usability involves evaluating the product after it has been finalised - thus looking at whether or not the product or design upholds its promised functionalities and objectives. Our approach to usability will be presented later on in this thesis, and can be seen in chapter 9.

What to measure

It is crucial to understand the context of the user before initiating the usability study. What is the user trying to accomplish with the product, and what are the primary drivers - satisfaction or performance? How frequent is the user likely to use the product, and is efficiency a driver? What about the aesthetics of the product - is that important? Tullis & Albert underline satisfaction and performance as the two primary aspects of UX, and therefore it is important to outline the context in relation to these two aspects. (Tullis & Albert, 2013, p. 44)

All metrics of performance (task completion time, effort, errors made, and learnability) are assessed in the context of specific user behaviours, and therefore it is necessary to have strong focus on the context. When measuring performance metrics such as task success, it is necessary to provide the user with specific sets of goals, or in other words, articulate user tasks. By measuring the performance, the design team is able to estimate the significance of the issues discovered by looking at the number of users stumbling upon specific usability issues. Through this particular kind of usability scope, the data output can point to specific parts of the system or interface which need improvements. The metrics themselves do not tell the designer *why* the issues occur, and therefore self-reported data from the users can help identify the causes for the problems at hand. (Tullis & Albert, 2013, ch. 4)

A common issue during usability testing is when to stop the user when and if the user is not able to complete the task, which he/she has been given. Therefore it is wise to set up some basic rules before starting the usability test, so that every test is done with the same procedure, so the results can be compared. One of the approaches to end an unsuccessful task is to inform the participants before beginning the session that they should try to complete the tasks, and when/if they come to the point where they would give up in the real world, they should let the moderator know. Whether or not they would stop trying, seek assistance from technical support or a friend, should be evident. (Tullis & Albert, 2013, ch. 4)

During our usability examination, we laid out a series of tasks for the participants to complete. These involve locating specific parts of information on the website, and the moderator will be observing how they come about completing them. The examinations were started by introducing to the participant to the context, and during this step we informed the participants that they should let the moderator know if they reached a point where they would have given up if they were sitting at home. Several times during the usability examinations, participants gave up, and the moderator then asked the participants how they would then proceed to get the information they needed.

Task time

When measuring task time, one measures how much time it takes for the user to complete the task he/she has been given (Tullis & Albert, 2013, p. 65). By measuring task completion time, the designers are able to establish a measurement of the efficiency of the product: If the website or system has long loading time on each page, the task completion time would naturally be long. It is especially important to measure task time if the main tasks in the product/system are repeated by the users.

When measuring task completion time in the usability examinations made in the context of this thesis, we have looked at the time elapsed from start of the task, until the point is reached where the user has completed the task. If the participant gave up he/she was asked to explain what alternate way they would have completed the task, since the unsuccessful task times could then bring value to the data. During our examinations we did not inform the participants that they were being time measured, since it might have stress them, thus impacting the results in a negative way.

Learnability

Measuring learnability involves looking at how fast the user *learns* the way of the system, and hereby how the user performance improves or decreases over time. (Tullis & Albert, 2013, p. 65) When users encounter a new sys-

tem, they often have some kind of learning curve; be it steep or moderate. Learning does not occur in an instant, and since learning occurs over different lengths of time, it also depends on what system you are trying to use. Learnability therefore has some connection to complexity. Complexity sometimes is unavoidable, since it merely mirrors the surrounding, complex world, and then it is learnable. It all depends on unveiling the structures in order for the complexity to fade away (Norman, 2010) - just as it is the case with learnability. It involves overcoming learning curves, which is not easy. Furthermore, learnability can tell us something about how much effort is required to become either an expert, or merely proficient at using the system. In order to measure learnability, one must collect the necessary data in trials. In other words; learnability should be collected in multiple instances. As Tullis & Albert express it - it is all about gradual improvements:

> "*Learnability can be measured using almost any performance metric over time, but the most common ones are those that focus on efficiency, such as time on task, errors, number of steps, or task success per minute. As learning occurs, you expect to see efficiency improve.*" (Tullis & Albert, 2013, p. 94)

When deciding how much time to put between the trials, it is sometimes wise to look at how learning would occur in real life: How many times a week do you suppose your intended user group will use your product? If this type of learnability trial sessions seems unrealistic, the moderator can bring in the participants over a much shorter time span, and hereby conduct the tests in a way that works best for the particular study. Tullis & Albert present three suggestions for this kind of situation (Tullis & Albert, 2013, p. 94):

- Learnability trials within one session, where the participant tries to do the tasks in a continuous session with no breaks. One of the benefits is that it is easy to conduct, while a downside is that it does not take into account that the participant has not been a subject to any significant memory loss.
- Learnability trials within one session, but including breaks in between each task. This is also easy for the moderator to administer, but the duration of the usability tests is extended.
- Learnability trials in-between sessions, within which the participant is asked to repeat the same set of tasks over and over. This kind of trial design needs to have at least one day between sessions.

Learnability has been measured in our usability examination within one single session, where the participant attempts to finish the tasks in one continuous session with no breaks. We chose to do it like this for practical reasons since it was the easiest way, and it therefore saved us a lot of time compared to the other ways of measuring learnability.

8.2.2 Self-reported metrics

Satisfaction involves the user opinion in relation to the interaction with the design or product. The user might think of the product as (un)trustworthy, (un)appealing, (un)aesthetic, et cetera, which is critical to a situation where the user can choose between a wide range of products for a specific purpose. To test the degree of satisfaction in a usability study, the designer could ask the user a series of questions or self-reported metrics from the user, hereby rating the satisfaction via UX metrics. (Tullis & Albert, 2013, p. 44)

As Bargas-Avila and Hornbæk (2011) discovered in their research in the field of UX (a study presented in chapter 7), dimensions in regards to emotions, enjoyment, and aesthetics are most frequently assessed in recent UX studies. But how can we best assess these highly subjective dimensions? And how can the moderator in the best way ask questions to the participant, and in turn be able to derive good data from the session? Through the self-reported data we wish to get insights into the user's experience, general perception of the system, and preferences. All these aspects are aimed at telling the design team something about the users' emotional responses to the system and interface. In other words, the subjective data gives insights into the user's system interaction at an emotional level: Which parts do the user prefer? What makes the user happy? All these user reactions investigate the aspect of likeability and satisfaction, and can paint a picture of the user's likelihood to choose this particular product over others. (Tullis & Albert, 2013, ch. 5)

One way to get comparable data on subjective remarks and statements, is to operate with some kind of rating scales. This quantifies the user experience, and makes it easier to process the results. According to Tullis & Albert, two traditional ways to quantify statements, is to use the semantic differential scale.

Semantic differential scale

The semantic differential technique was developed by Charles E. Osgood, and basically contains a list of opposite adjectives, as seen in figure 8.4.

Weak	o	o	o	o	o	o	o	Strong
Ugly	o	o	o	o	o	o	o	Beautiful
Cool	o	o	o	o	o	o	o	Warm
Amateur	o	o	o	o	o	o	o	Professional

Figure 8.4: Example of the semantic differential scale (Tullis & Albert, 2013, p. 124)

By presenting pairs of bipolar adjectives, the users are forced to make up

their minds about their own perception on a specific subject by positioning themselves on the scale.

In our examination, we included a sheet with metrics on the semantic differential scale to function as post-task self-reported metrics. This sheet can be found in Appendix E. This assessment was aimed at making the participants position themselves and make up their minds about specific parts of the user experience and usability. We had included the following nine questions, which have been translated from Danish:

1. Specify how easy or difficult it was to find the things you were looking for (*difficult/easy*)
2. Indicate to what extent you found the website confusing or clear (*confusing/clear*)
3. Specify how credible you found the website (*unreliable/credible*)
4. Specify whether you found the overall navigation simple or complex (*complex/simple*)
5. Specify how familiar or unfamiliar you were with this kind of page structure before you started (*unfamiliar/familiar*)
6. What do you think about the site's aesthetics - was the design stimulating or boring? (*boring/stimulating*)
7. How fast or slow do you think you were when it comes to finding the things you were looking for on the site? (*slow/fast*)
8. How frustrating/satisfying was your overall experience when navigating the site? (*frustrating/satisfying*)
9. How was your overall experience of the design flow? (*lagging/smooth*)

These questions were accompanied by an assessment on the semantic differential scale, and the words inside the parentheses are opposite adjectives, with are divided by seven small dots. We chose to use seven dots for the assessment instead of five, since it gave the users more leeway in their evaluations. The results from the semantic differential scale sheet can be used to support some of the statements or remarks made by the participants during the usability examination. The entire session was audio-recorded, and therefore the participants' post-task self-reported metrics on the semantic differential scale are also often accompanied by remarks, such as whether or not the participant felt that this particular aspect changed over time as he/she navigated the website.

Sensory data

There are a variety of ways to measure and observe the behaviour of participants, as well as their emotions. During our usability examinations, the participants passive hand (not used to navigate) was connected to equipment

measuring the GSR (Galvanic Skin Response). The usability lab had four rooms in total: *A technical room* with monitors of all the remaining rooms, controls, power switches, et cetera, *two test rooms* with computers, treadmill, screens, and other equipment, and *an observation room* with speakers transmitting audio from the test room, screens transmitting video feed, and other screens for other measuring equipment. During our examination, one of us would take on the role as the moderator, and stay with the participant in one of the test rooms, while the other would be placed in the observation room, monitoring the GSR graph. As previously mentioned, this enabled us to collect valuable data through a screen recording review in order to dive into specific parts of the user experience together with the participant, and explore situations and factors that would otherwise be easy to miss in the course of an examination.

8.3 Websites

The aim of the usability study was to get insights into the use of single page websites. In other words, the usability examinations are targeted towards investigating users' navigation, as well as the general use of the interface and structure. In order to get insights into these aspects, we decided to investigate two typical single page websites, which we think to be representative of the two sub-genres; Conventional and Avantgarde.

8.3.1 Factory Forty

The first website, which is aimed at representing the Conventional sub-genre of single pages, is Factory Forty (factoryforty.be/en). Factory Forty is an idea breeding-ground and "*Digital Factory*" (Factory Forty, 2015, ¶ Philosophy) located in Brussels, and was during our preliminary research divided into the largest category "Companies", as seen in figure 8.2. The following description is placed under *Philosophy* on the website, and describes the purpose and location of Factory Forty:

> "*Factory Forty is located in Brussels, at the heart of Europe, just a stone's throw from the Gare du Midi and the ring road. 1200 m^2 of event rooms, private office spaces and open-plan coworking areas arranged around a large garden are made available to businesses and self-employed people.*" (Factory Forty, 2015, ¶ Philosophy)

Figure 8.5: Factory Forty index
(Factory Forty, 2015, ¶ Home)

As figure 8.5 displays, the initial view of the index page of the website displays a logo, company name, and a short description in the form of two sub-headers, "*A living place to work*" and "*1200 m^2 dedicated to digital*" (Factory Forty, 2015, ¶ Home) - all accompanied by a navigation at the bottom. All this together provides the user with a solid first impression of the website by communicating the following: Who the sender of the website is (logo and company name), what we are dealing with (sub-headers), and where the user can go on the website (the navigation). The arrow pointing downwards just above the menu in figure 8.5 can be seen as an iconic label. It is accompanied by the help-text "*Scroll down*" which tells the user to scroll down to see more content. The arrow can also be clicked, which makes the page automatically scroll down to the next section. In this way, the arrow is also used as a contextual navigation. Furthermore, the navigation, which on the index page can be seen in the bottom, sticks to the top of the screen when the user scrolls the website.

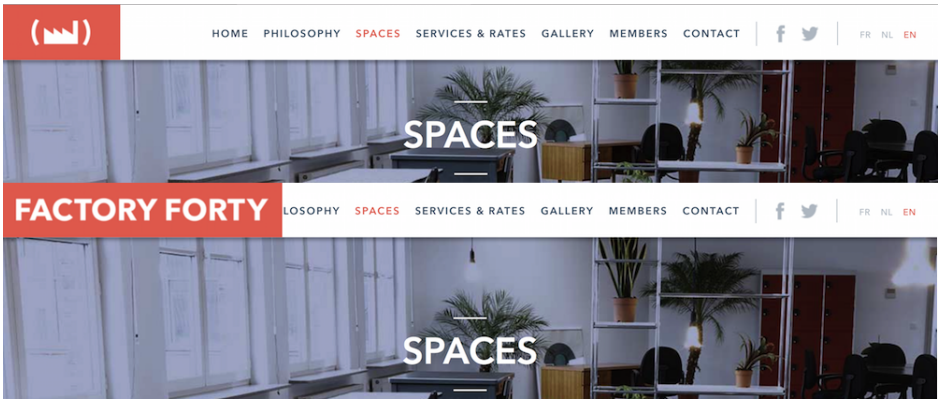

Figure 8.6: Factory Forty navigation and hover-effect on logo (Factory Forty, 2015, ¶ Spaces)

This sticky top-menu can be seen in figure 8.6, where the current location on the website is *Spaces*, as seen in the navigation. In this way, the menu functions as both a global menu and a breadcrumb trail (displaying current position, and not how one got there), showing the user their location on the page, just like on the Pikuseru website (as seen in figure 3.7). Some of the labels used in the global menu differ a bit from the headings used in the ribbon headers. It is mostly small changes or additions, which might not result in confusion for the user, but in some cases they might. These changes will be mentioned as we walk through the sections of the page. When a user hovers the cursor over the logo in the top left corner of the screen, it unfolds and changes from a logo to the name "Factory Forty". This effect can be seen in figure 8.6.

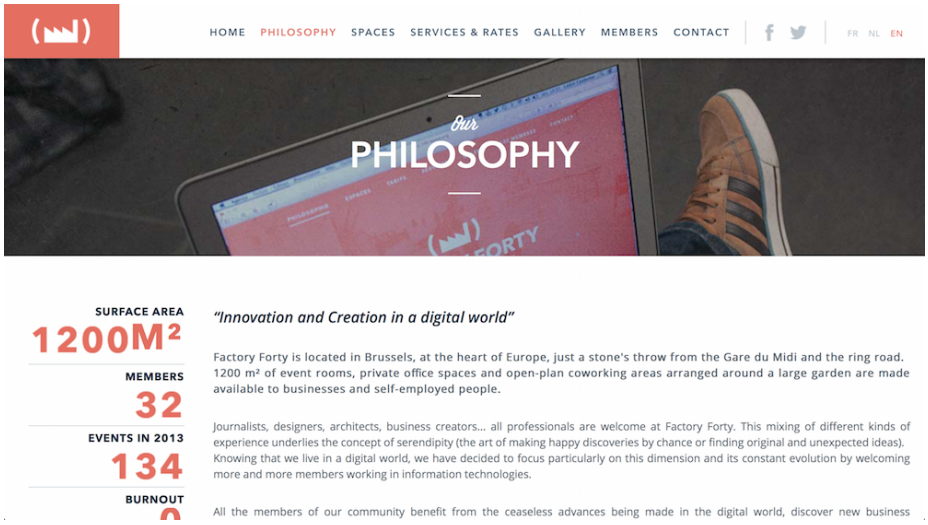

Figure 8.7: Factory Forty, Philosophy section (Factory Forty, 2015, ¶ Philosophy)

As the user scrolls away from the index page, or clicks the arrow shown beneath the label "*Scroll down*" in the Home section, the next content displayed is labelled *Philosophy*. This section describes Factory Forty through text and quotes, displayed to the right, and factual numbers displayed to the left. As the user enters this section, the numbers all count from zero, and interactively slide down the left side of the screen. The image in this section, which displays a computer laptop rested on a person's lap, has a parallax scrolling effect, which creates a layer-like effect when the user scrolls. The heading used is an example of a change in the way of labelling the section: In the global navigation it is named *Philosophy*, but in the ribbon header the word "Our" is added, as it can be seen in figure 8.7. Because the word "Philosophy" is bigger and in a different font than "Our", it can be seen as "standing out" and more important. Since the two words are not similar they can be seen as having different importance, even though the Gestalt principles of proximity and closure state that since they are placed close to one another, and within the same proximity, they are perceived as belonging together.

The next section on the page is *Spaces*. This section also contains a ribbon with a background image and parallax scrolling effect. According to the Gestalt principle of similarity, this means that these ribbons are perceived as similar to one another, and therefore they are probably perceived as equally important. This is also the case with the sticky top-menu, where all menu-items are similar to one another. The section *Spaces* contains a floor plan of Factory Forty where the various rooms can be seen. This is the first section on the page which contains horizontal navigation: The user can either click

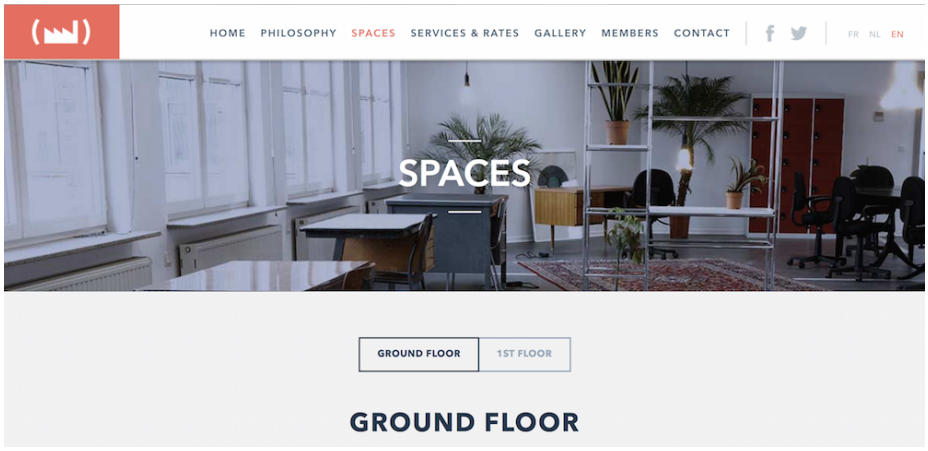

Figure 8.8: Factory Forty, Spaces section
(Factory Forty, 2015, ¶ Spaces)

between *Ground floor* or *1st floor* as seen in figure 8.8, or alternatively the user can press the arrow, which can be viewed next to the map in figure 8.9. Just like the arrow in the *Home* section (the index ribbon), these arrows are iconic labels. As it can be seen in figure 8.9, another label with the picture and name of the floor appears when the user hovers the arrows. The left arrow is not active at first, and is displayed in a lighter shade of grey. Only after the right arrow has been pressed, and user is led to a map of the 1st floor - then the left arrow can be pressed to return to the ground floor map. When the 1st floor is viewed, the right arrow is therefore inactive as well, since there are no other maps to display.

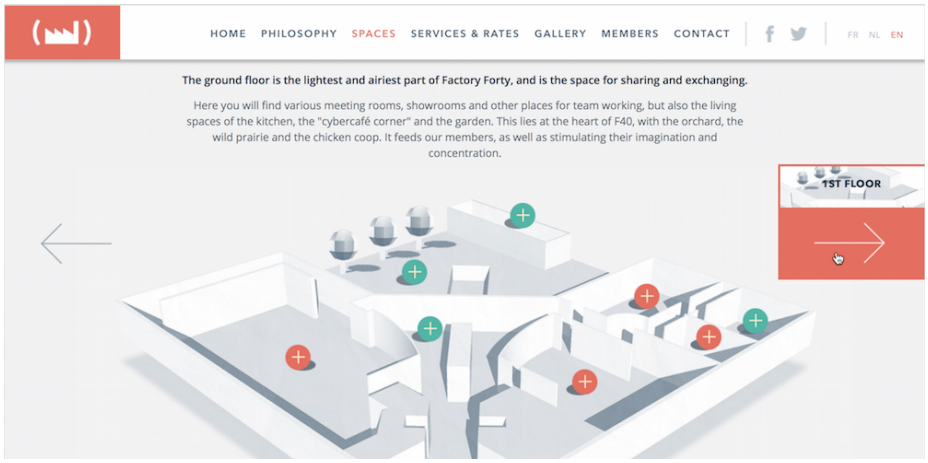

Figure 8.9: Factory Forty, map in Spaces section
(Factory Forty, 2015, ¶ Spaces)

As figure 8.9 shows, every room has a round icon with a plus sign attached, from now on referred to as plus-icons. When hovering these icons, a picture and the name or function of the room appears.

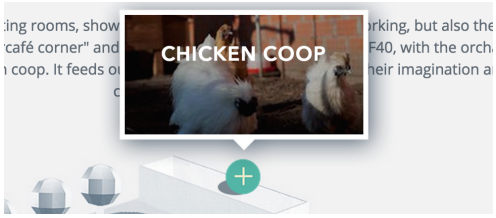

Figure 8.10: Factory Forty, hover-box from map in Spaces section (Factory Forty, 2015, ¶ Spaces)

When clicking the plus-icon seen in figure 8.10, a modal window pops out from the right, which can be seen to the right in figure 8.11. When the cursor hovers over the plus-icon, a "hover-box" appears with the name of the room and a picture connected to it. Therefore, the hover-box for the "Chicken coop" contains a picture of a chicken, and the name "Chicken coop", as seen in the hover-box in figure 8.10. When clicked, a description of the room appears, as well as a range of icons representing it (in this case, an icon of a chicken). Furthermore, the modal window contains contextual links to the two sections *Services & Rates* and *Contact*. In order to close the modal window, one must either click the button with an "X" displayed in the top right corner, or click the residual space outside the modal window (the darkened space to the left of the modal seen in 8.11).

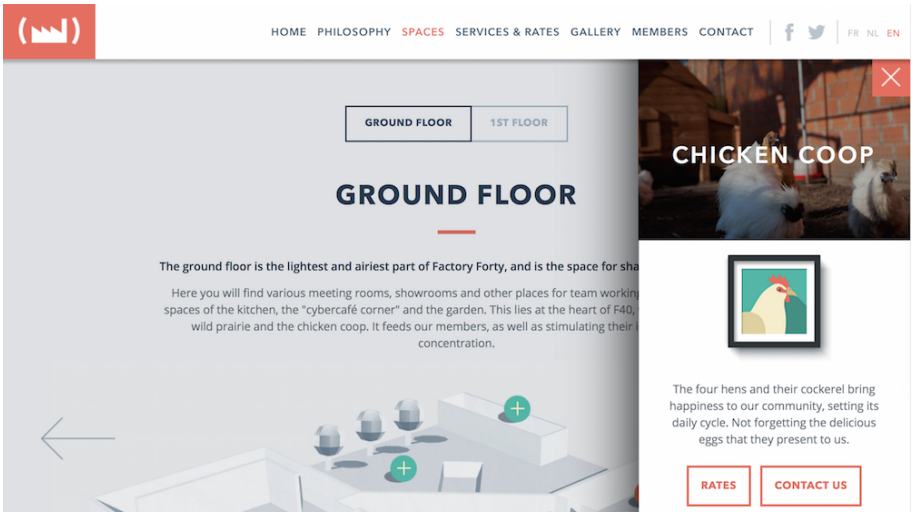

Figure 8.11: Factory Forty, modal window in the map in Spaces section (Factory Forty, 2015, ¶ Spaces)

In the next section, labelled *Services & Rates* in the navigation and *Services & Pricing* as a heading, the user can read about what to buy at what prices. In information architecture, consistency in use of labels is rated as important, since users might be confused as to whether or not the labels are intended to represent the same, or several different things. Therefore, since the heading label differs from the navigation label in the last word, it may confuse some users, or it may be perceived as a mistake that Factory Forty has forgotten to edit. This section also contains content, which can be activated by the user, just as the content in *Spaces*. By clicking one of the five pictures, displayed in figure 8.12, the text section below the pictures interactively swipes to the left or right.

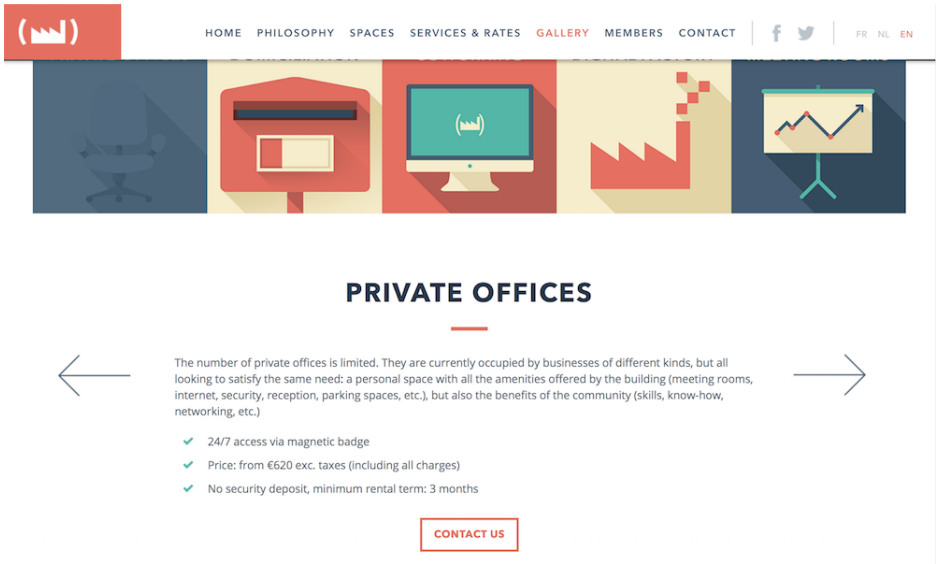

Figure 8.12: Factory Forty, Private Offices in Services & Rates (Factory Forty, 2015, ¶ Services & Rates / Services & Pricing / Private Offices)

In that way, these pictures, which are iconic labels, function as a local menu to access the content hidden behind them. The content can also be accessed through arrows, like in the *Spaces* section, but it is possible to swipe right to *Meeting Rooms*, as both arrows work at all times. This is because the website uses infinite rotation, which much resembles the *infinite scroll* feature presented in chapter 3. The text section for *Private Offices* can be seen in figure 8.12. In the bottom of all the text areas of this section, there is a *Contact us* button, which scrolls to the *Contact* section when clicked. The labels in this section is also a way of navigating the site, and therefore they can be seen as a navigational labels. When hovering the images, they change to a label, as seen in figure 8.13 where the default icon for *Private Offices* is

displayed on the left, while the hover-induced change can be viewed on the right. The icon therefore changes from being an iconic label to merely being a label, when the user hovers his/her cursor over the image.

Figure 8.13: Factory Forty, Services & Rates icon
(Factory Forty, 2015, ¶ Services & Rates / Services & Pricing)

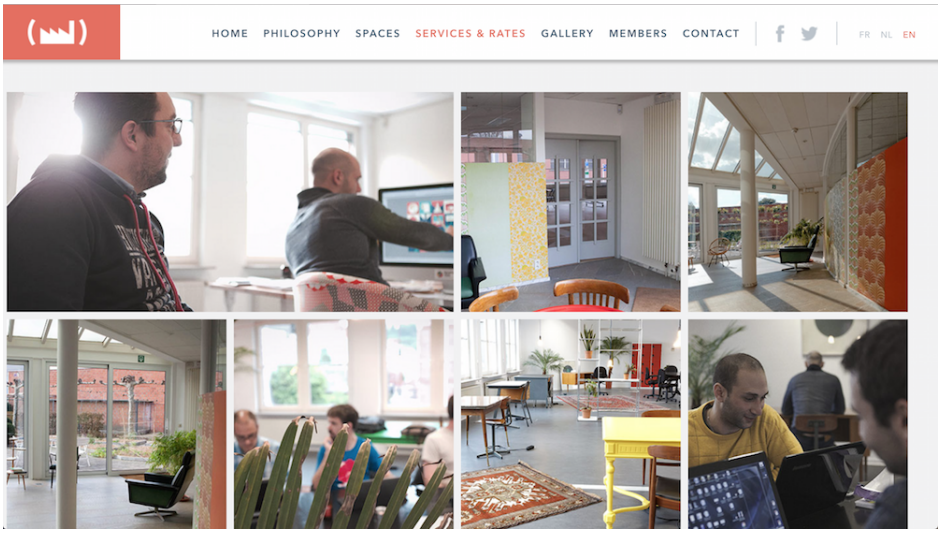

Figure 8.14: Factory Forty, Gallery section
(Factory Forty, 2015, ¶ Gallery)

The next section after *Services & Rates* is called *Gallery*, and can be seen in figure 8.14. This section is the only one without a header ribbon, and thus it has no heading label to inform the user about his/her current location. Since this section differs from the rest, it might confuse users, since the Gestalt principle of similarity states that similar objects are perceived as being equal to one another. Therefore the users might not perceive this section as being similar to the rest. Nevertheless, the *Gallery* section contains images of the work environment and facilities. When the images are clicked, they open in a bigger size in a modal window.

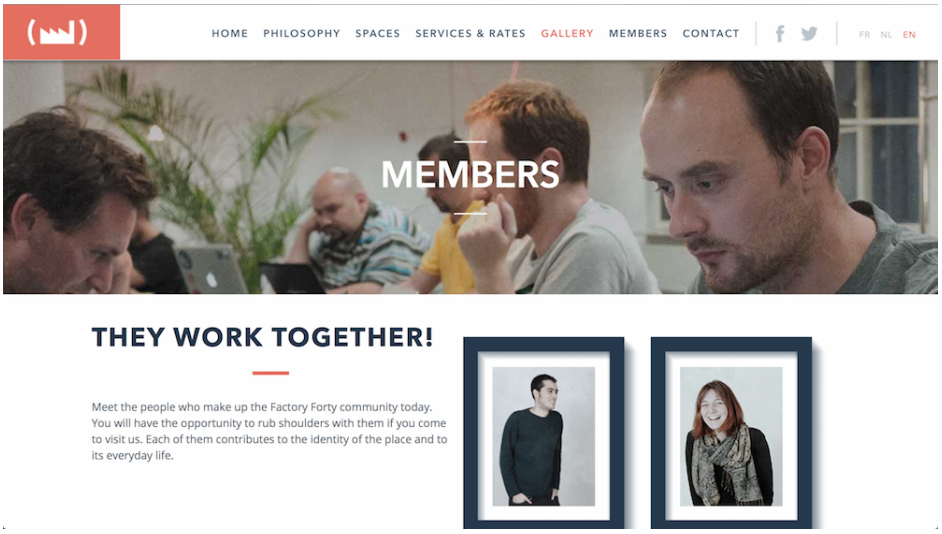

Figure 8.15: Factory Forty, member overview
(Factory Forty, 2015, ¶ Members)

When scrolling past the gallery, the user meets the next section called *Members*, which is dedicated to presenting the members of Factory Forty. This section can be viewed in figure 8.15, and the header image in this section is also shown with a parallax-effect, which makes the image seem like a layer behind the content. The images in this section are displayed as a picture wall, and the pictures are arranged randomly every time the user reloads the website. When the user hovers over an image of a member, the name and position is shown as it is displayed in figure 8.16.

Figure 8.16: Factory Forty, member image hover-effect
(Factory Forty, 2015, ¶ Members)

The last menu-item in the navigation is *Contact*, which is placed in the footer of the website, as displayed in figure 8.17.

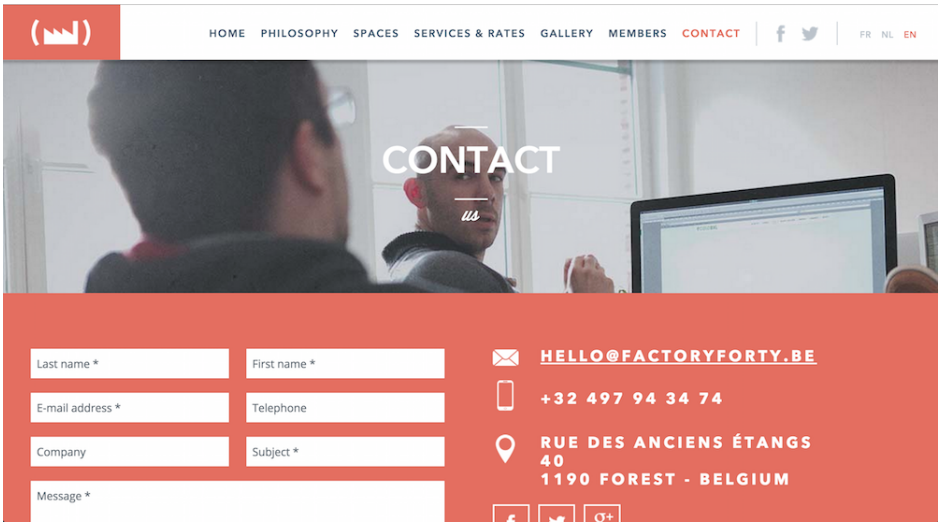

Figure 8.17: Factory Forty, Contact section
(Factory Forty, 2015, ¶ Contact)

The first part of the section, which contains a header, is accompanied by an image with parallax-effect. The image displays two men sitting by a computer desk, where the left man has his feet on the table. This adds a relaxed ambiance to the section, and combined with the text "*Drop in and say hello, we have hot coffee ready!*" (Factory Forty, 2015, ¶ Contact), the organisation may seem very relaxed and welcoming to some users. The label used in the header ribbon has the word "Us" added to it, differing it from the navigation label. It is similar to the labels used in *Philosophy*, as it can be seen in figure 8.17.

Located right beneath the contact form in the *Contact* section is a map, which displays the location of Factory Forty. This map, as well as the website footer can be viewed in figure 8.18. The footer contains a copyright-message and a note that the website was created by Mountain View. The map can only be viewed in the Safari browser: If the user visits the site in the browsers Chrome, Firefox, Internet Explorer, or Opera, the space where the map should have been only shows as an empty space in the same red colour as the background of the *Contact* section. This means that the map will be invisible for a lot of users, and they will only see the empty room that looks like a waste of space. Based on this, we have decided to use the Safari browser during the usability examinations, since the website is optimised for this.

The overall design of Factory Forty's website can be said to follow the Gestalt principle of closure. The content of the page is divided into ribbons containing a header-picture with parallax effect and a heading, and in this

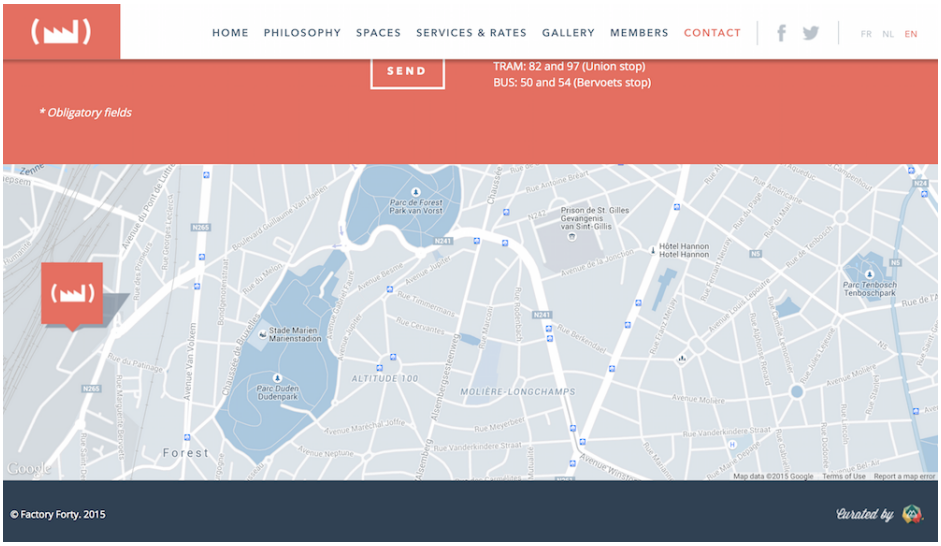

Figure 8.18: Factory Forty, map in Contact section
(Factory Forty, 2015, ¶ Contact)

way the different content sections can be distinguished, as a new ribbon header marks the beginning of a new content section. The only exception is the section *Gallery*, where the ribbon header is missing, and the beginning of new content is not clearly marked. This kind of ribbon-division of content can also be seen on the Pikuseru website. Pikuseru has not labelled their ribbons with headers as Factory Forty has done - instead they change background colour, distinguishing when a ribbon ends and a new starts (as seen in figure 3.5). Both websites indicate the user's position in the sticky top-menu. Just like Pikuseru, the website of Factory Forty is responsive. Nevertheless, it does not seem to be fully optimised for use on smaller screens. The menu is compressed into the same off-canvas menu as on Diagnosite (figure 3.3), but even though the rest of the content responds to the screen size too, it does not seem to be tailored to the size.

8.3.2 The Survival Kit

In order to investigate the second sub-genre of single page websites, earlier referred to as *Avantgarde*, we found the website from Phoenix the Creative Studio fitting. This section will involve taking a close look at the structure, interface, and features of the website. The creative agency Phoenix the Creative Studio has made a series of survival kits for other creative agencies, to whom it might be useful. The survival kits are designed for helping employees in their time of need in case of forgotten presentations, overtime work, or power outage in the office. The survival kits are described on the website in the following way:

> "*Advertising agencies frequently deal with little disasters that, more often than not, could be avoided or at least contained. Overtime, a power outage or a surprise presentation... Which is why Phoenix, the Creative Studio, decided to create a collection of survival kits to help agencies get through these kinds of situations.*" (Agency Survival Kit, ¶ ????)

Other than survival kits, Phoenix the Creative Studio also offer marketing, design, and web development related services:

> "*We can also help you with your design, marketing and web development needs. I guess you could say that we are the survival kit to making your projects successful.*" (Agency Survival Kit, ¶ ????)

Overtime

The initial page, which the user meets when first entering the site, can be seen in figure 8.19. The index page displays a red background and a wooden box with the text "*The Survival Kit*" written on it. Beneath this text, a small imprint is located with the text "*Overtime*". Above, as well as to the left and right of the box, three menu-items are located with the labels *Presentation*, *Overtime*, and *Power Outage*. The menu-item located above the box, reading *Overtime*, indicates the name of the survival kit currently viewed. The effect of pressing the menu-items will be presented later on. In the top left corner of the screen, four question marks are visible. This menu-item, when pressed, opens a modal window with a description the entire communicative situation: Who is behind the website (sender), what the product is (product), and who the intended target group is (receiver). This particular modal window can be seen in figure 8.20. When the modal window is opened, the cursor changes into a cross, which is marked by a yellow circle in figure 8.20. As the cursor might indicate, the modal window is closed again by clicking on the screen. Furthermore, the modal window can be closed by pressing any of the active menu-items.

Figure 8.19: Agency Survival Kit, index
(Phoenix the Creative Studio / Agency Survival Kit, ¶ Overtime)

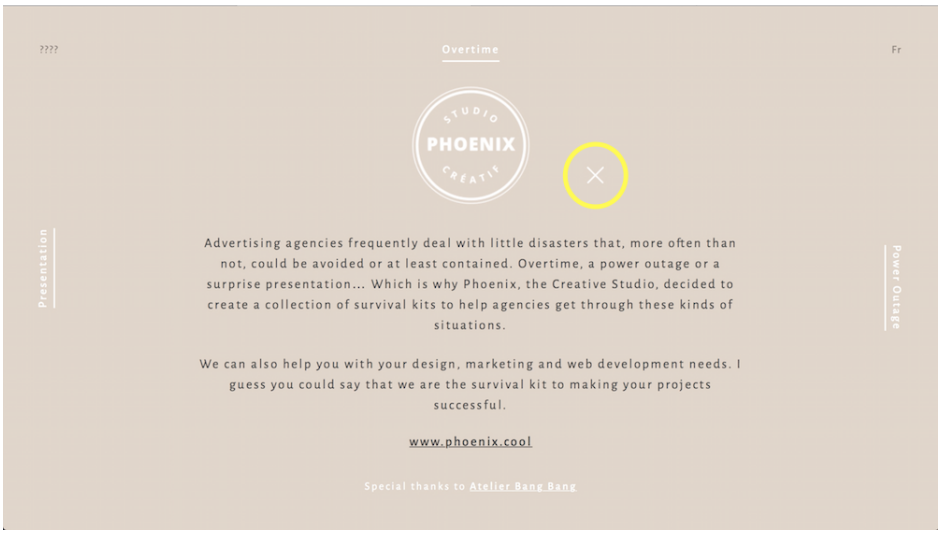

Figure 8.20: Agency Survival Kit, modal window and cursor (marked by yellow circle)
(Phoenix the Creative Studio / Agency Survival Kit, ¶ ????)

Under the wooden box an arrow is located, which is pointing downwards. This arrow is an iconic label that can be pressed, and the cursor changes from the custom cursor of the website into a pointing glove. This can be seen in figure 8.21. As shown in this figure, the custom cursor on the website is shaped as a double-tipped arrow pointing to the left and right.

Figure 8.21: Agency Survival Kit, pointing glove-cursor hovering over arrow (left, blue) and the custom cursor (right, green)
(Phoenix the Creative Studio / Agency Survival Kit, ¶ Overtime)

When the arrow is pressed, the website automatically scrolls down to the next section. As this is happening, the lid of the wooden box slides off, and the content is exposed. This effect can be seen in figure 8.22. Because of this, the arrow also functions as contextual navigation.

Figure 8.22: Agency Survival Kit, Overtime content
(Phoenix the Creative Studio / Agency Survival Kit, ¶ Overtime)

The next section, displayed in figure 8.23, which was accessed by clicking the arrow, contains a description of the Overtime survival kit:

> "*What a beautiful surprise! The project you've been working on for the past 3 months is due tomorrow morning and the client just asked for 500 last minute changes... Don't panic, we've come up with a simple way to make your upcoming extra hours easier: the*

> *Overtime Survival Kit. In it you will find everything you need to overcome the task at hand.*" (Agency Survival Kit, ¶ Overtime)

A button is displayed below this description with the label *Order this kit*. When clicked, an e-mail client opens, and therefore the button does not lead to a sub-page or the like. This is a type of contextual navigation, even though it is an external link directing the user to an e-mail client.

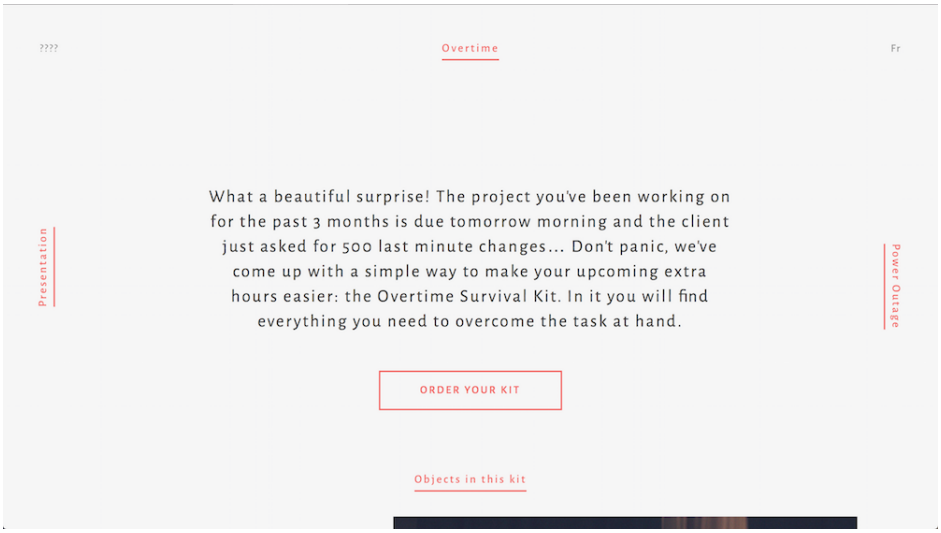

Figure 8.23: Agency Survival Kit, Overtime description (Phoenix the Creative Studio / Agency Survival Kit, ¶ Overtime description)

The section, containing a description of the Overtime survival kit, also displays an additional menu-item at the bottom with the label *Objects in this kit*. This part of the website also contains pictures of a man working and using the survival kit. When the cursor hovers over the images in the section, it turns into an arrow pointing right (see figure 8.24). When the images are clicked, they slide to the right, making way for another image - much like in a slide-show. The page with the images, that are initially loaded when the page is loaded contains a man, and after the images have been clicked they display images of the kit. An example of this image-view can be seen in figure 8.24. When scrolling further down the page, the user scrolls past a ribbon with a parallax scrolling-effect, where the image stays fixed as a layer behind the content. This ribbon can be viewed in figure 8.25, and it displays the man sitting at his desk with a badge from the survival kit placed on his t-shirt sleeve. This ribbon separates the two areas of content: The section containing information about the kit, and the one displaying the objects in the kit.

This brings us to the next section of the website, which is located just

Figure 8.24: Agency Survival Kit, Cursor when hovering over images (marked my yellow circle)
(Phoenix the Creative Studio / Agency Survival Kit, ¶ Overtime)

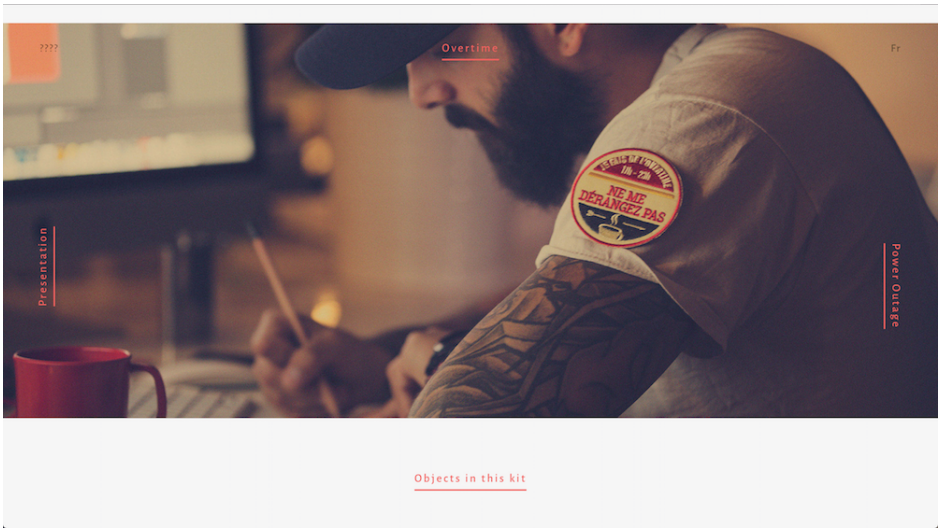

Figure 8.25: Agency Survival Kit, Overtime images, Ribbon
(Phoenix the Creative Studio / Agency Survival Kit, ¶ Overtime)

under the ribbon, and can be accessed by manual scroll or by pressing the menu-item *Objects in this kit*. The section contains an overview of the eight items in the Overtime survival kit, a button with the text "*Order your kit*", and at the very bottom the user can press an iconic label formed as an arrow pointing upwards and automatically be scrolled back to the top of the

page. The initial view of the section *Objects in this kit* can be seen in figure 8.26, where it is also visible that the images of the items in the survival kit are equipped with a hover text. This means that the user first sees the appearance of the content items, and then next, by hovering over the images, can read a short description of them. The pictures are also perceived as a group because of the Gestalt principles of proximity and similarity. The pictures are the same size, have the same white background, and most of the the objects has a reflection, as if they were standing on a glossy surface, which make them look alike. Since the pictures share the same size and white space between them, they are perceived as belonging together, which concurs with the Gestalt principle of proximity.

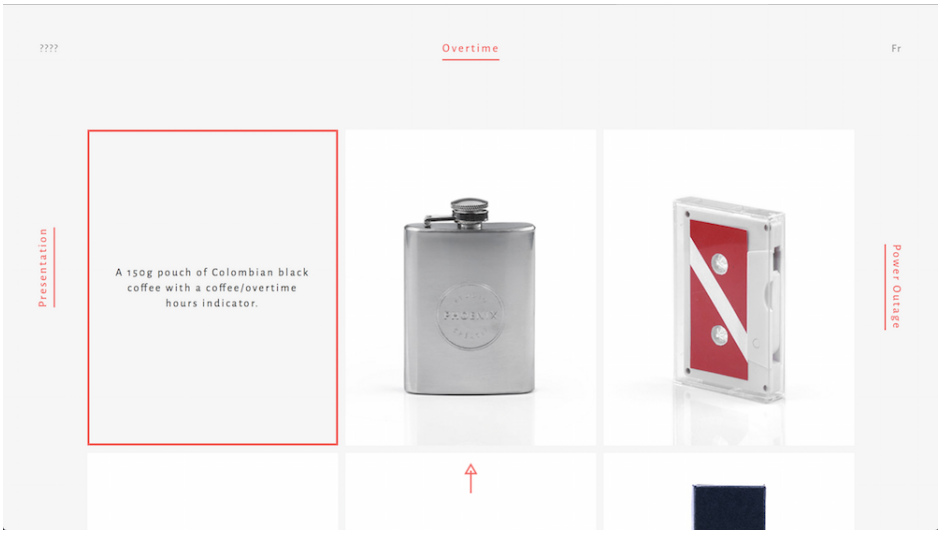

Figure 8.26: Agency Survival Kit, Objects in the kit
(Phoenix the Creative Studio / Agency Survival Kit, ¶ Objects in the kit)

The navigation in this particular website might seem very unstructured at first, but in fact the placement of the global menu stays the same when navigating the site. This semi-fixed structure can be seen in figure 8.27. With that said, it is necessary to point out that the position and accessibility of the menu-items differ when the user navigates through the site. This brings us to what was mentioned when we went through the index page: The menu-items *Presentation* and *Power Outage*. Both menu-items are linked to alternate survival kits aimed at helping people in situations involving power outages or forgotten presentations. When the menu-items are clicked, the entire screen image swipes to the right or left, and the menu-items change place, so that the menu-item related to the current survival kit is centered above the wooden box. The same effect can be achieved by clicking and dragging the index ribbon to either sides (from now on referred to as *click-*

Figure 8.27: Agency Survival Kit, The menu structure
(Phoenix the Creative Studio / Agency Survival Kit, ¶ Overtime)

and-drag feature). If the user is currently located in the bottom of the page, and not the in the index section, and clicks one of the alternate menu-items, the site automatically scrolls to the top of the page before scrolling horizontally to the side of the kit the user has clicked. This resembles the navigation on the website *This Year in Hashtags*, where the user navigates horizontally by using the global menu (as seen in figure 3.9). In our opinion, This Year in Hashtags can also be said to belong in the Avantgarde sub-genre, and just like on the website The Survival Kit, the exploratory factors in navigating seem to have been valued highly when the structure was created.

Presentation and Power Outage

The structure for the presentation of the two other survival kits is identical to the one on the Overtime survival kit, but instead of having a red background-colour, the colour scheme is yellow for Presentation and orange for Power Outage. Figure 8.28 and 8.29 show the Presentation and Power Outage kits as they look after the user has scrolled down and opened the lid of the boxes. The figures also displays the different colour schemes and content of the kits.

On the index page of all the kits the position of the menu-items leading to the other survival kits switch places, so that the survival kit that is currently being viewed is now placed at the top of the screen. This brings the feature of infinite rotation into the picture, since the user can keep clicking the right menu item and be taken through the different kits infinitely. This rotation is an example on how the website's menu structure is only semi-fixed, since it does not move around on the screen, but the arrangement of the menu-items

Figure 8.28: Agency Survival Kit, Presentation content
(Phoenix the Creative Studio / Agency Survival Kit, ¶ Presentation)

Figure 8.29: Agency Survival Kit, Power Outage content
(Phoenix the Creative Studio / Agency Survival Kit, ¶ Power Outage)

switch as the user navigates the site. As these menu-items function as the global menu of the site it may be confusing that their position is constantly changing. There is a logic behind the labels switching places, but it may take time to understand it and be able to navigate the site without getting lost. It is also difficult to return to the starting point, as no real starting point is marked.

On The Survival Kit, the Gestalt principle of similarity in many ways applies to the structure. The three sections for the kits have identical structures, and only differ in the colour scheme, the pictures used in the middle of the site, and the content of the kits shown in the bottom. A similarity can also be found in the pictures, as they only show either the boxes of the kits, the objects, or a person in a work situation using the objects. The person in all the pictures is the same male with different clothing: A white t-shirt in Overtime, and two different red, blue, and white chequered shirts in Presentation and Power Outage.

The Survival Kit website is partly responsive. The site scales to fit the smaller screen, but the content is not tailored to be shown in that size. The box in the index ribbon has a tendency to float independently, and the pictures do not scale to fit the width of the screen.

9 | Analysis

In this chapter, we will present and analyse results from the usability study. Through preliminary research we have gained insights into the structure and design of single pages. As a result, we have set up a study aimed at gaining insights into the user's interaction and understanding of the phenomenon. Consequently we seek to develop a framework of design principles building on the knowledge gained from the preliminary research, which takes into account how users navigate, perceive, and interact with single pages.

9.1 Participants

This section will present profiles of the participants in the usability study. The sessions involved 17 participants, of which 9 were female and 8 were male. The eldest participant was 85, while the youngest was 21, and the average age of the participants was 37,4. Table 9.1 contains an overview of the participants, where participants with "FF" in the title examined the website Factory Forty, and participants titled "TSK" examined The Survival Kit.

Participants	Gender	Age	Profession / Study
Participant FF 1	Female	36	*Graphic designer*
Participant FF 2	Male	25	*Humanities master's student*
Participant FF 3	Male	85	*Retired shipyard worker*
Participant FF 4	Female	25	*Business bachelor student*
Participant FF 5	Male	21	*Technology bachelor student*
Participant FF 6	Female	45	*Municipal worker*
Participant FF 7	Female	48	*Service worker*
Participant FF 8	Female	25	*Humanities master's student*
Participant TSK 1	Female	25	*Humanities master's student*
Participant TSK 2	Male	37	*Humanities master's student*
Participant TSK 3	Female	53	*Museum employee*
Participant TSK 4	Male	51	*Marine Defence employee*
Participant TSK 5	Male	22	*Technology bachelor student*
Participant TSK 6	Female	52	*Biology teacher*
Participant TSK 7	Male	25	*Technology ph.d student*
Participant TSK 8	Male	29	*Technology ph.d student*
Participant TSK 9	Female	32	*International dept. employee*

Table 9.1: Participants in the usability examination

During the usability examinations we needed to take some factors into consideration. Participants FF 3, FF 6, and TSK 3, did not have strong English language skills, which in some way influenced their performance negatively, since the websites are in English. This may have influenced the examinations, since the participants may have made errors on the basis of a language barrier, and not because of the interface or structure. In the session with Participant FF 3, who is 85 years old, we left out some of the questions that required the ability to read and understand English, and instead focused on locating specific pieces of information in the structure. Participant TSK 7 studied in Brussels for a year, which is where Factory Forty is located, and therefore he could have had domain expertise. Because of this possible advantage in domain-related familiarity, we decided to assign Participant TSK 7 to The Survival Kit instead of Factory Forty. Some technical failures were also present during our examinations. The GSR measurement equipment stopped working during the examination of Participant FF 1, and we decided to continue without it. Therefore we did not conduct a screen recording review. As a consequence, we might have missed out on data which could have played an essential role in the investigation. Furthermore, during the examination with Participant TSK 9 our recording program crashed, and we had to find another way of recording. Therefore we do not have the full audio recording of the examination with Participant TSK 9, which further added shortcomings to our investigation.

9.2 UX Metrics

Before we begin analysing the data gathered through usability sessions, we will first present some clarifications as to how we have used UX metrics. The investigation is aimed at locating formative results (what does/does not function in the interface and why), but done in a summative manner (studying actual working websites to determine metrics and measure usability) (Tullis, 2013, ch. 3). Therefore, through summative usability we have attempted to gain insights into the usability and functionalities of two websites, which we prior to the usability sessions have evaluated as being within two separate sub-genres.

In order to get an overview of the usability and user experience (UX) we intended to measure UX metrics with the aim of processing the data with a quantifiable outcome. These quantitative results can be used as a tool to get a better overview of the qualitative data. During the usability study we collected metrics in the form of performance (task time) and self-reported metrics (semantic differential assessments). This entailed keeping in mind that the results from our usability investigations primarily say something about the specific sites examined and the individual examining them, and not necessarily something about the whole genre and all users. Therefore, the

results from our usability examination could benefit from further empirical studies in order to assess the significance of the issues found, as well as the applicability of our design principles.

The goal of the performance metrics is, combined with statements from the participants during the examinations, to identify parts of the system and interface that cause problems, and how they can be improved. Through task completion time we are able to see how quickly the participants can complete tasks, and throughout the usability examinations we have noted every time the participant completed a task with help from the moderator. We could have set up some completion levels for measuring task success and level of completion, but we found it most important to note whether or not the task was solved with or without assistance, rather than note specific aspects of completion (complete success, complete failure, partial success). The participants were asked to express when they would have given up if they were sitting at home, and this important distinction of task completion has been noted next to the task completion time, which can be found in Appendix G. Through the measurements of task time we are able to assess the effort needed at every task. Efficiency could also have been measured in amount of effort required to perform a task. This could involve counting steps which the users go through in order to say something about cognitive and physical effort. Seen in retrospect, these measurements could have been useful in the measurements of any incremental increases in effort, and could have been somewhat applicable in our case. Hereby, effort measurements could have been used to determine parts of the interface requiring high amounts of physical and/or cognitive effort, which could have provided us with knowledge about issues in the interface. Nevertheless, we did not record the data needed to analyse effort, and therefore we are not able to interpret on either cognitive or physical effort.

Our main interest in the UX metrics was very much connected to the participants assessing their own user experience with semantic differentials. These self-reported metrics are a quantification of the user experience, and can be used as a tool for gaining an overview of the qualitative data from the think-aloud sessions. Furthermore, the semantic differential assessments can help the participants reflect on and position themselves in terms of different aspects of the usability and user experience. In addition to the semantic differentials, we have obtained subjective data involving explanations, opinions, and assessments from the participants - both during the think-aloud and the session for the post-task self-reported metrics. These were audio recorded. Furthermore, during our usability sessions we used measurement equipment for Galvanic Skin Response to pinpoint fluctuations based on changes in the user experience. These changes might have been in moments of excitement or frustration experienced by the participant, and the screen recording review conducted before the semantic differential assessments therefore in a way helped the participants clarify where and in what way they experienced

usability issues. Hereby the screen recording review may have influenced the semantic differential assessments in a positive way, making the participants more aware of their own user experience, thus making it easier for them to assess it afterwards.

Analysing the empirical work

When presenting statements made during the usability examinations we will include a parenthesis in the end stating the following: Who made the statement, at what step during the session was the statement made, and at what time? In order to make distinctions on the different steps we have made the following definitions presented in table 9.2.

Step	Description
Pre-task Q&A	Before initiating the session participants were asked about any familiarity with single pages.
Tasks 1-10	During this step the participants were given 10 tasks. Note that these tasks differed depending on which website was examined.
Screen recording review	The participants were presented with a screen recording of their movements on the website and were asked to assess what might have caused fluctuations on the GSR graph.
Post-task self-reported metrics	Semantic differential assessments were made at this step. These were often accompanied by statements from the participants about the different aspects being assessed.
Post-task Q&A	This step involved asking the participants a series of in-depth questions about their user experience and view on the usability of the website.

Table 9.2: Steps in usability examination

9.3 Semantic differential assessments

The participants were asked to assess their user experience and thoughts on usability on the semantic differential scale right after they finished their tasks on the websites. The variables on the semantic differential scale have been numerated from left to right, displayed in figure 9.1:

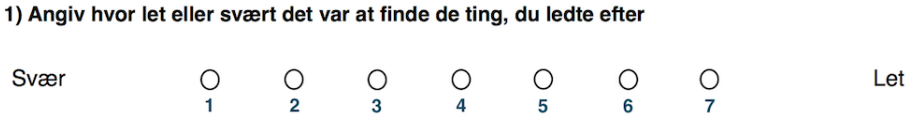

Figure 9.1: Adding numbers to the semantic differential scale

An overview of the questions asked during the Q&A session can be found in Appendix A, and a complete outline of the semantic differential assessments can be found in Appendix E. Note that these are in Danish, and that a translation can be found under *Self-reported metrics* in section 8.2.

In addition to the assessment, the participants were audio-recorded, and their comments and statements to their semantic differential assessment were therefore collected. These statements clearly suggest that the participants experienced that their perception of the website changed from the beginning to the end of the usability session:

> **Moderator:** "*Du må gerne svare ud fra sådan som du husker det nu - den samlede oplevelse.*"
> **Participant TSK 8:** "*Jeg husker den som om den ændrede sig.*"
> (TSK 8, post-task self-reported metrics, 11:16)

Therefore, the answers and assessments might differ in relation to what part of their experience the participants assessed. Some participants might have given self-reported metrics with the *initial* impression in mind, while others might have made assessments with a more *experienced* impression in mind. This aspect will be reflected on further in the section *Sources of error* in chapter 13.

Table 9.3 contains an outline of the average of the responses made in the context of both websites, as well as how much they differ.

	Q 1	Q 2	Q 3	Q 4	Q 5	Q 6	Q 7	Q 8	Q 9
FF	3,75	4,00	5,25	5,25	2,12	5,50	4,00	4,38	4,75
TSK	3,22	3,22	4,44	3,89	2,44	5,67	3,33	3,89	5,22
Difference	0,53	0,78	0,81	1,36	0,32	0,17	0,67	0,49	0,47

Table 9.3: Semantic differential scale average responses

Question 1: Findability

In usability, findability refers to how easily information can be found on a website. Throughout the usability sessions we have not been looking at external findability, which involves the use of external search engines and the like, but only on-site findability, which involves whether or not users can find what they are looking for within a specific website. (Hendron et al., 2014)

The Survival Kit

The findability on The Survival Kit was in average assessed to be 3,22, which is below middle and leans towards difficult. Overall, 2/9 found it to be mostly easy to locate information, while 5/9 found it to be mostly difficult. When assessing findability on the semantic differential scale, some participants described to the moderator why they made the assessments they did. Most of the statements about findability were directed towards the website not being easy to navigate:

> **Participant TSK 7:** "*Jeg synes ikke ligefrem det var let.*" (TSK 7, post-task self-reported metrics, 08:45)

Participant TSK 8 described the website as not being directed towards locating information in an efficient way, but rather aimed at giving the user a positive experience targeted towards them making a purchase:

> **Participant TSK 8:** "*Den virker mere sådan målrettet på* [...] *at give nogen en god nok oplevelse til at de overhovedet vil tænke over at købe noget hvor der ikke står pris på.*" (TSK 8, post-task self-reported metrics, 12:58)

Taken from the context, this opinion is based on the small amount of textual content on the website compared with the large amount of images and animations. This aspect laid out by Participant TSK 8 coincides with the website being designed with the aim of discovery rather than recovery.

Factory Forty

On Factory Forty, the average rating of the findability was 3,75. This is placed just below the middle leaning towards difficult. 3/8 found that locating information on the website was mostly easy, while 4/8, which is half, found it to be mostly difficult. In a statement made by Particpant FF 6 during the assessment of complexity on Factory Forty, it is mentioned that she found it difficult to locate the information she was looking for:

> **Participant FF 6**: "*Fordi jeg synes faktisk at selve det der, det var simpelt, men det var sgu ikke særligt nemt at finde hvorhenne de ting så var som man alligevel troede der var under det afsnit.*" (FF 6, post-task self-reported metrics, 25:52)

This statement about findability was made in relation to the complexity of the local navigation, and the quote is therefore also connected to complexity. This aspect will be elaborated on in relation to the collected data later on in this thesis.

Comparison

The two findability assessments from Factory Forty and The Survival Kit are rather close, since the mean difference is 0,53. Therefore, interestingly enough, both websites were in average rated as more difficult than easy. The Survival Kit, which was rated as being most difficult in relation to findability, was described as being more directed towards creating an experience for users rather than helping them to recover information. The overall structure of Factory Forty was described as being simple, while the local navigation made it harder to recover information, thus lowering the findability.

Question 2: Confusion

When assessing confusion it is mostly done in relation to other usability issues, for example navigation or labelling. (Morville & Rosenfeld, 2006) Therefore, when asked to assess confusion on the semantic differential scale, many participants related it to specific terminologies or pieces of content on the two websites, and therefore statements in relation to their assessments are crucial.

The Survival Kit

The overall rating of confusion on The Survival Kit was on average assessed as being 3,22, which is below the middle and leans towards the website being confusing. 2/9 found the website to be mostly clear to them, while 5/9, which is over half of the participants, experienced the website as being mostly confusing. From the following statement made by Participant TSK

6 we can derive that the website caused confusion because it was unfamiliar to the user:

> **Participant TSK 6:** "*Hvis jeg kendte den, så ville jeg jo synes at den var overskuelig fordi den er enkel. Men når jeg ikke kender den, så er det forvirrende for mig.*" (TSK 6, post-task self-reported metrics, 38:00)

One participant mentioned that the overall structure on the website was clear, but that the "extra dimension" of navigation, being horizontal navigation, was confusing to him:

> **Participant TSK 7:** "*Denne her - 'I hvilken grad fandt du hjemmesiden forvirrende eller overskuelig' - altså, jeg synes hver enkelt side er helt vildt overskuelig i sig selv. Men jeg synes den ekstra dimension af navigation, de har, gør det forvirrende at navigere på den* [...] *Det at den kører horisontalt, eller at man ikke har en præsentation af indholdet på siden. Det her det er jo - jeg synes både den er forvirrende og mega overskuelig.*" (TSK 7, post-task self-reported metrics, 09:20)

The statement about missing a presentation of the content on the website further adds to the *discovery* aspect of The Survival Kit. By not being presented with the content in a clear way, users are compelled to explore their way to understanding the structure, and this causes confusion for some participants.

Factory Forty

The average assessment of the confusion of Factory Forty is exactly in the middle of the scale at 4,00. 3/8 participants assessed the website as being mostly clear, while 4/8 found the website to be mostly confusing. The only participant to make a statement about confusion was Participant FF 3:

> **Participant FF 3:** "*I og for sig, så var den jo overskuelig, synes jeg, Altså, når først man kom til at kigge på den, ikke, og forstod hvad der stod. Så var den jo overskuelig nok.*" (FF 3, post-task self-reported metrics, 13:02)

This quote can be used to explain why the confusion of the participants in average lies in the middle of the scale. In the section *Question 4: Complexity*, we mention the suggestion that the overall structure of the site is simple, but it is difficult to find information in the local structures with horizontal navigation, because navigating horizontally is unintuitive to some users. Therefore, as a result of this, the overall level of confusion can be difficult to determine, because it is based on the participants' individual experiences of the degree of complexity and familiarity.

Comparison

Overall, Factory Forty was rated as less confusing than The Survival Kit, with a difference of 0,78. On both websites the horizontal navigation is an unfamiliar way of navigating, and therefore adds an element of complexity, which in turn makes some participants confused. In addition, the statement made by the participant examining The Survival Kit shows that unfamiliarity further adds to the overall confusion, which complies with this suggestion.

Question 3: Credibility

The assessment of credibility is, just like confusion, also often based on other usability and user experience aspects. For example, if a website has high-quality graphics, an aesthetically pleasing interface, and high transparency, it is often valued as a page which can be trusted. (Nielsen, 1999) Therefore it is crucial to note what participants found to be determining factors for credibility assessments on the two single page websites used in the usability examination.

The Survival Kit

The credibility on The Survival Kit was assessed as being mostly credible with an average of 4,44. 4/9 participants assessed the the website as being mostly credible, while only 2/9 assessed it as being mostly unreliable, or non-credible. During the semantic differential assessments participants stated that they valued the graphical user interface as being professional, which was a crucial aspect in the credibility evaluation:

> **Participant TSK 1:** *"Den var professionelt udført, siden. Altså, den var pæn. Det betyder noget."* (TSK 1, post-task self-reported metrics, 25:33)

The same participant also stated that the credibility was lowered when she discovered that the transaction on the website involved sending an e-mail to the manufacturer:

> **Participant TSK 1:** "*Jeg fandt den troværdig til at starte med. Men så til sidst, da der bare kom den der mail op, så fandt jeg den ikke troværdig mere.*" (TSK 1, post-task self-reported metrics, 25:00)

Therefore we can derive that participants mostly valued the aesthetics and transparency as being determining factors in credibility assessments on The Survival Kit. It was a clear disadvantage for the website to have embedded order by e-mail, since it lowered the perceived credibility.

Factory Forty

Factory Forty was perceived as fairly credible by the participants, with an average of 5,25, leaning towards credible. 6/8, which is three fourths of the participants, assessed the website as being mostly credible, while only 1/8 found it as leaning mostly towards the non-credible end of the scale. In relation to the self-reported metrics, most participants did not specify the basis for their credibility assessments; in fact, Participant FF 6 was the only one to make a comment about it:

> **Participant FF 6**: "*Det er nok alle de billeder der, at man ligesom synes 'jamen de ser meget fortrolige ud' eller 'de ser meget almindelige ud' eller... Også det der med at du kan komme i kontakt med, det fandt jeg jo rigtigt hurtigt det der, du kan jo komme i kontakt med dem på mange måder og sådan noget. Og selve bygningerne, øh, det så også meget* [...] *ja, troværdig ud, faktisk.*" (FF 6, post-task self-reported metrics, 24:22)

Hereby images taken of the location and members were included in this credibility assessment of Factory Forty. Furthermore, the participant valued being able to contact them through several channels, which heightened the company's accessibility, and therefore credibility.

Comparison

The difference between the two averages is 0,81, and both credibility assessments lean towards the credible end of the scale. In both cases, participants linked credibility to transparent design. Participants examining The Survival Kit also focused on professional design, while the ones from Factory Forty assessed credibility based on images and accessibility.

Question 4: Complexity

When assessing complexity users look at the structure and determine whether or not they understand the relative order of objects in the interface. (Norman, 2010) Often, new structures come across as complex, and once they are understood the complexity turns into simplicity. It is important to stress that complex interfaces do not always result in bad usability, since some can perceive the complexity as being *ordered*. Therefore, to some, an unordered clutter of information might result in heightened efficiency if the structure and system is understood, but on the other hand make it difficult for others to learn. (Norman, 2010, p. 1)

The Survival Kit

The overall complexity on The Survival Kit was on average assessed as being more complex than simple with an average of 3,89 on the scale. 3/9 found the structure and navigation to be mostly simple, while 4/9 participants assessed it as being complex. According to the following statement made by Participant TSK 7, the horizontal navigation was a key factor in the interface being perceived as complex in the beginning:

> **Participant TSK 7:** *"Navigationen, når man først lærer den, er simpel, fordi den er ligesom - du kan kun gå til venstre, du kan kun gå til højre, og den har den her swipe.*" (TSK 7, post-task self-reported metrics, 10:05)

Hereby, once the navigational structure was understood, the horizontal navigation became simple in the eyes of the participant. This aspect is backed by the following statement by Participant TSK 2, to whom the website was complex to figure out:

> **Participant TSK 2:** "*Det er et godt spørgsmål, for den er faktisk pisse simpel når man finder ud af den. Men den var bare lidt kompleks at finde ud af, på en eller anden måde.*" (TSK 2, post-task self-reported metrics, 17:08)

Derived from the statements above, the website was complex at first since the participants were unfamiliar with navigating horizontally. Nevertheless the website was perceived as being simple towards the end of the usability examination since the structure was then known to the participants. Therefore, even though the website was mostly perceived as being complex, participants were able to learn the structure during the examination.

Factory Forty

The average rating of complexity of Factory Forty is 5,25, which means that the structure leans towards being perceived as simple. 6/8 participants found Factory Forty to be mostly simple, while 2/8 assessed it as being mostly complex. Nevertheless, when the following statement is seen in context to the semantic differential assessments, it is clear that the structure in its entirety was perceived as simple, but complex to learn:

> **Participant FF 6**: "*Jeg er godt nok ked af at sige at den var jo nok nogenlunde simpel,* [Laughs] *men jeg kunne fandeme ikke finde ud af den alligevel.*" (FF 6, post-task self-reported metrics, 25:16)

From this statement we can derive that the participant found the overall structure to be simple, but still had issues with findability. This could suggest that she perceived the overall and global structure of the site as being simple, but that the complexity of the local navigation (within the ribbons) has influenced her cognitive effort needed to retrieve information. This aspect is elaborated on by Participant FF 7 in the following statement:

> **Moderator**: "*Og hvad var det for nogle ting... ?*"
> **Participant FF 7**: "*Der var komplekse? Jamen det var det der med at jeg ikke lige kunne finde de der ting med åbningstiderne og med, hvor printeren var.*" (FF 7, post-task self-reported metrics, 19:19)

Thereby, Participant FF 7 finds the complexity to be embedded within the local findability. The information she was looking for (opening hours and printer location) is placed in ribbons with horizontal navigation, which is *Spaces* and *Services & Rates*. Hereby, the statement supports the suggestion that sections with horizontal navigation are adding to the perceived complexity of a site, making information difficult to find.

Comparison

The question with the largest differentiation in the semantic differential assessments is this question regarding complexity. 3/9 on The Survival Kit compared to 6/8 on Factory Forty assessed the website as being mostly simple. If you combine the ratings with the statements about the experience changing during the examinations, it is possible that the participants examining The Survival Kit rated their experience with the navigational complexity in context to their *initial* impression of the website, rather than their final impression. On the other hand, the participants from Factory Forty might have assessed with the *final* impression in mind, where the website seemed more simple in retrospect. This possibility shows that we should have been more precise in formulating the questions, since participants might not have been sure which part of the experience they should assess.

Question 5: Familiarity

Familiarity in usability is related to in what degree the user is able to draw on previous experiences in order to recognise interface components and their actions. Therefore, in connection to familiarity it is crucial to note which parts of the interface came across as familiar or unfamiliar, and in what way that affected the general assessment of the website's familiarity to the participants. (Bedford, 2015)

The Survival Kit

On The Survival Kit the average of the participants familiarity was 2,44 on the semantic differential scale. This rating is well below the middle of the scale and therefore leans mostly towards unfamiliar structures. Only 1/9 of the participants found the website to be familiar, while most of the participants, 7/9, assessed the website as being mostly unfamiliar. When seen in context to the previous sections, it is not surprising that the aspect described as most unfamiliar to the participants was the horizontal navigation between the survival kits:

> **Participant TSK 2:** "*Jeg er bekendt med det her op og ned, det var også det jeg sagde, at jeg forventede det her* [...], *men jeg ville ikke have forventet det her* [points at horizontal navigation between kits]" (TSK 2, post-task self-reported metrics, 18:00)

According to the same participant, the ribbon structure and vertical scrolling were familiar factors known by him from other single page websites:

> **Participant TSK 2:** "*Jeg synes faktisk at den her del med at du* [...] *kan gå ned, det virker som ved andre single pages, synes jeg. Jeg synes at det her den samme opbygning.*"
> **Moderator:** "*Det der med at den scroller dig automatisk ned til et sted?*"
> **Participant TSK 2:** "*Ja. Så det synes jeg ikke, at det* [...] *virker forvirrende, at det kommer i de lag her, det vidste jeg jo godt. Så det andet der, det var lidt nyt* [points at navigation between kits]." (TSK 2, post-task self-reported metrics, 21:00)

Therefore we can derive that scrolling vertically, contrary to horizontal scroll, was familiar to the user based on experience with other single page websites. Subsequently the ribbon-like structure was recognisable from experience with other websites, probably also single pages.

Factory Forty

The participants on Factory Forty rated the familiarity of the site to an average of 2,12, leaning towards the structure of the website being perceived as mostly unfamiliar. Only 1/8 found the website to be mostly familiar, while 6/8 participants assessed it as being mostly unfamiliar. In this connection 5/8 participants rated the familiarity as 1 on the scale, which is most unfamiliar. Participant FF 4, who rated Factory Forty as having a familiarity of 4 (in the middle of the scale), stated the following in connection to her assessment:

> **Participant FF 4**: "*Jeg synes det er nemt. Altså. Jeg har prøvet sådan en hjemmeside sådan... meget få gange før. Men jeg kan rigtigt, rigtigt godt lide det der med at det bare kører ud i én.* [...] *Og jeg synes, med menuen gør det nemt også, og den også ligesom fører mig fra det ene sted, hvis det ikke er lige der, så fører den mig faktisk hen til det sted hvor jeg skal hen.*" (FF 4, post-task self-reported metrics, 17:55)

The participant was already familiar with single pages and had the second highest rating of the familiarity among the all the participants. In spite of previous experience with single pages, the participant still only assessed familiarity as being in the middle of the scale, meaning that the structure of Factory Forty was equally familiar and unfamiliar to her.

Comparison

Both averages to the aspect of familiarity lean towards the websites being unfamiliar to the participants, since only one participant from each of the websites found it to be familiar to them. The assessments are very close with a difference of 0,32. The mean (most common number) of both website assessments is 1 and the semantic differential assessments therefore clearly show that most participants did not feel any familiarity with the structures on either of the websites.

Question 6: Aesthetics

According to the functionalist approach to aesthetics, aesthetically pleasing designs enhance the usability and are easier to use than the ones perceived as less aesthetically pleasing. (Sherwin, 2014) Therefore, when asked to assess the aesthetics it can be beneficial to pay attention to which parts of the interface are determining factors for the participants' assessments.

Statements connected to participants' assessments are also crucial if seen in context to our definition of aesthetics (the functionalist approach), since the participants' definitions might differ from ours. In connection to this, there might have been more descriptive opposites on the scale than *boring* and *stimulating*. For example we could have asked whether or not the aesthetics came across as *unpleasant* or *pleasant*.

The Survival Kit

When asked to assess the aesthetics on The Survival Kit, the average response was placed at 5,67 on the scale. 7/9 found the website to be mostly stimulating, and only 1/9 found it to be mostly boring. Most participants did not attach a response to their assessments, but rather just placed their judgement without arguments as to why. The only one to make a comment

on the aesthetics was the negative assessment, which was made by participant TSK 2:

> **Participant TSK 2:** "*Jeg synes faktisk det var kedeligt. Jamen jeg synes ikke at det var noget specielt - det var ikke noget, man ikke havde set før.*" (TSK 2, post-task self-reported metrics, 18:10)

This participant describes the aesthetics as being boring and nothing out of the ordinary. Thereby we can derive that the participant would have wanted the interface design to be more unfamiliar and new to him in order to find it more aesthetically stimulating.

Factory Forty

The aesthetics of Factory Forty was rated to an average of 5,50 by the participants, leaning towards stimulating. 5/8 found the design to be mostly stimulating, and no participants assessed it as being mostly boring. Few participants mentioned a reason for rating the aesthetics as they did, and according to Participant FF 6, pictures and text influenced the aesthetic appeal of Factory Forty:

> **Participant FF 6:** "*Det syntes jeg var mega godt, det syntes jeg var fint nok. Der var både billeder og tekst.*" (FF 6, post-task self-reported metrics, 26:54)

As mentioned, it is important to get an idea of the participants' interpretation of the term aesthetics, as they might not have the same interpretation as we do. In the statement from Participant FF 6 we can derive that images and text enhanced the aesthetic appeal, perhaps because of enhanced transparency.

Comparison

In terms of aesthetics, both averages lean towards stimulating designs. The difference between the two averages, 0,17, is a rather small difference, but nevertheless The Survival Kit was assessed as having a more stimulating aesthetic expression than Factory Forty. In both cases very few participants attached a subjective comment to their assessment, so we have little information to relate to the quantification of aesthetic appeal.

Question 7: Efficiency

Efficiency is related to how quickly users can complete tasks after getting familiar with the structure and learning the design. Higher user efficiency can be reached by reducing steps taken by users, but this can involve prioritising

efficiency over user expectation, which in turn can break with users' mental models and frames of understanding. (Nielsen, 2012)

During our presentation of the semantic differential assessments for efficiency during the usability sessions, we could have been more specific as to eliminating learnability from the equation. This would have involved asking the participants to evaluate their own efficiency *after* they had learnt the structure. This might have changed the results, since some participants appear to have made efficiency assessments based on their learning curve.

The Survival Kit

The assessments of efficiency on The Survival Kit was in average 3,33, meaning that the perceived efficiency was assessed as being on the slow end of the scale. 3/9 assessed their own efficiency and information-retrieval as being mostly fast, while 6/9 assessed it as being mostly slow. According to Participant TSK 6, who rated her own efficiency as 1 (slow) on the scale, it was easy to locate and retrieve information once the structure was understood:

> **Participant TSK 6:** "*Efter noget tid så var den jo hurtig nok at navigere rundt i, fordi jeg kunne hurtigt skifte fra den ene eller den anden, synes jeg.*" (TSK 6, post-task self-reported metrics, 40:06)

From this statement we can derive that once the participant had understood the horizontal navigation she was efficient in completing the tasks. Furthermore this efficient information recovery might have been based on the identical structures of the three survival kits, since understanding the structure of one survival kit means understanding all three. The fact that this participant assessed her own efficiency as being very slow, but states that she had efficient information retrieval after learning the structure, coincides with the participants not eliminating learnability from the equation. Therefore the assessments might not reflect the actual efficiency on the website, but rather the participants' own impressions of their learning curves.

Factory Forty

The participants rated their own efficiency to an average of 4,00, in the middle of the scale between slow and fast. 4/8 mostly found their own efficiency as being fast, while 3/8 assessed it as being mostly slow. In connection to making their assessments, two participants stated that it became easier to solve the tasks after they had learnt the structure of the site:

> **Participant FF 3**: "*Det synes jeg, når først man, så var den ret... let, når først man kom ind i det, hvordan det bruges.*" (FF 3, post-task self-reported metrics, 13:54)

> **Participant FF 7**: "*Jamen jo mere jeg har været inde på det forskellige, der, jo nemmere blev det jo så lige at finde ud af hvad der var inde bag de der...*" (FF 7, post-task self-reported metrics, 18:36)

Therefore, according to assessments of their own performance, these two participants felt that they had an efficient recovery of information after getting familiar with the structure. This corresponds with many of the statements made by other participants examining Factory Forty, and therefore, when seen in context to the semantic differential assessments, it is possible that participants accounted for how efficiently they completed tasks before learning the structure. Nevertheless, the efficiency was rated by these two participants as being 4 and 2 on the scale, and hereby it was rated as being in the middle and mostly towards the slow end of the scale. This further suggests that we should have formulated the question in a different way, underlining the fact that the participants should not consider learnability.

Comparison

In comparison, the two websites differ by 0,67 with Factory Forty placed in the middle of the scale and The Survival Kit placed below, leaning towards the feeling of being inefficient in locating information. As mentioned in the introductory text to this question, the phrasing of the question could have benefited from eliminating learnability from the equation, since it may have been unclear to some participants that they were intended to rate the efficiency without taking the learning curve into consideration.

Question 8: Frustration

As it is with confusion, frustration is a part of the user experience and functions as a by-product of usability issues. (Nielsen, 2007) This makes it even more important to take subjective remarks into account, since they can help pinpoint in what way the participants experienced frustration and what might have caused it.

The Survival Kit

The overall frustration in the use experience of The Survival Kit was assessed as being mostly frustrating, rather than satisfying, with an average of 3,89 on the scale. 3/9 assessed their experience of the usability as being mostly satisfying, while 5/9 found it to be mostly frustrating. According to Participant TSK 8, he was frustrated because of the implicit way of presenting information to the user:

> **Participant TSK 8:** "*Der er lidt uoverensstemmelse mellem hvad jeg tænker om hvad jeg synes, og hvad jeg synes - jeg har*

> *sådan lidt en afsky over for noget af det, men på den anden side så giver den mig jo sådan set også en mere faktuel oversigtsinformation - det er det her, du får, hvis du køber.*" (TSK 8, post-task self-reported metrics, 16:00)
> **Moderator:** "*Ja - hvad er det, du har en afsky overfor?*"
> **Participant TSK 8:** "*Det er det, jeg ikke kan forklare. Det er nok det at de skjuler... Nej. Man får stadig informationen, men det er ikke informationen, der er i - der har højst prioritet, der er mere det med at få smidt nogle fancy billeder i hovedet og en æske, der kan åbne.*" (TSK 8, post-task self-reported metrics, 16:20)

There were not many subjective remarks made in the context of this assessment on the semantic differential scale, but Participant TSK 8 found that the designers of the website valued fancy effects and animations higher than informing the users, and this was a source of frustration to him.

Factory Forty

The average frustration rating of Factory Forty was 4,38, which is just above the middle, leaning towards a satisfying experience of navigating the site. 4/8 assessed the use experience as being mostly satisfying, and 3/8 found it to be mostly frustrating. One of the participants, who rated the experience as being mostly frustrating, stated the following:

> **Participant FF 7**: "*Det var mere frustrerende end det var tilfredsstillende, i hvert fald.*" (FF 7, post-task self-reported metrics, 20:38)

Unfortunately the participant does not elaborate on why the experience was mostly perceived as frustrating rather than satisfying. However, if this statement is seen in connection to other semantic differential assessments made by the same individual, it is clear that the participant experienced being confused, since the website was complex and had low findability.

Comparison

The assessments of Factory Forty show that the average experience of the website was mostly satisfying, while the participants examining The Survival Kit had an average leaning towards frustration. Both averages are close to the middle of the scale and only differ 0,49.

Question 9: Design flow

This aspect about design flow was largely based on our own experiences in the preliminary investigations of single page websites. We found that many

single pages were slow and lagging (hanging on the screen) rather than running smoothly. This was mostly because of the many design elements put into the interface which slow down the response time. Therefore we wanted to investigate whether or not this was perceived to be the case on the two websites in the usability sessions, as well as how it affected the participants' user experience.

The Survival Kit

On The Survival Kit none of the participants made statements about the design flow during the semantic differential assessments. The average response is placed at 5,22 on the scale, which is well above the middle and leans towards a smooth design. 5/9 participants assessed the design flow as being mostly smooth, while 1/9 found it to be mostly lagging. From this we can derive that most of the participants did not find the design to be lagging, and therefore the response time did not affect their user experience in a negative way.

Factory Forty

The responses to the design flow were spread in both ends, and with a score of 4,75 the design flow was perceived as being mostly smooth. 5/8 assessed the design flow as being mostly smooth, while only 2/8 found it to be mostly lagging. Unfortunately, participants did not elaborate on their assessments, and therefore it is difficult to derive a reason for their rating.

Comparison

Both websites were on average assessed as having a design flow that is mostly smooth, with The Survival Kit scoring the highest. Furthermore the difference between the two averages is 0,47, which is quite a small difference. From this we can derive that in case of both website the design flow (on average) did not affect the use experience in a negative way.

9.4 Think-aloud study

In this section we will look into the data collected during the usability sessions where the participants were thinking out loud. The scope will be on investigating the following aspects:

- Communicative situation
- Learnability
- Complexity
- Familiarity

- Credibility
- Aesthetic appeal
- Efficiency
- User expectation

These aspects were all based on the data collection, and were therefore not created beforehand. Nevertheless, the coding of the results was still in some way only semi-open, since we had structured the research design beforehand, and therefore had focused on certain aspects. Furthermore, the meaning categorisation also involved categorising the statements of the think-aloud, and this has also influenced the results in some way. Nonetheless, an open coding of results coincides with the phenomenological approach, since the collected data creates the foundation for the data interpretation. Hereby we gain insights into aspects which were not stated beforehand.

Communicative situation

Before initiating the usability examinations, we were interested in knowing whether or not the communicative situation, which we define as *sender*, *product*, and *receiver*, was transparent. Through our assessments of single pages we have noticed that we often, ourselves, have had a hard time locating information about the sender, product or intended receiver of a website, which one would normally be able to derive from information located on-site, in the footer, or in an About-page. Therefore, as part of the usability session, we wanted to investigate whether or not participants would have the same issues in regards to the transparency of the communicative situation.

The Survival Kit

On The Survival Kit, information about the sender, product, and intended receiver is located in the top left corner of the index section. This means that information about the entire communicative situation is actually accessible right after the website has been loaded. Additionally, the menu-item also sticks to the screen in a layer, and follows the user as he/she scrolls down the website. The menu-item is marked by a yellow circle in figure 9.2.

Figure 9.2: Agency Survival Kit, location of information about sender (Phoenix the Creative Studio / Agency Survival Kit, ¶ Overtime)

During the usability sessions not all participants were able to locate the sender of the website at first. Some spotted the question-marks in the top left corner pretty quickly, while others spent time looking for information in a footer, since this was normally where they would find such information. This approach of turning to the footer for information about the sender can be seen in the following explanation by Participant TSK 5, to whom it is natural to look to the footer based on prior experience:

> **Participant TSK 5:** "*Nede i bunden plejer der at være* [...] *sådan en footer, hvor der lige står kontaktinformationer, og nogle gange et map over hjemmesiden. Det var der så ikke.*" (TSK 5, task 1, 01:00)

This illustrates the approach taken by many of the participants. After looking for a footer, they went straight to look for a header. Many did not find this to be present on the website, and therefore started to look for clues on the website as to where they would be able to locate information about the sender. This triggered several participants to click the label *Presentation* with the expectation of being presented with information about the sender:

> **Participant TSK 1:** "*Jamen jeg blev lidt forvirret. Fordi jeg trykkede på noget, hvor jeg troede - altså den der 'Presentation' - hvor jeg troede, at der ville komme en oversigt over deres produkter. Og det gjorde der ikke.*" (TSK 1, screen recording review, 17:30)

Not all participants fell into this line of error, since some spotted the menu-item right away, and tried it out. Statements from some participants indicate that the somewhat subtle placement of the menu-item was not the only issue in terms of findability, but also the labelling. Some participants interpreted the label as being a mistake, like a placeholder, and that the website might be unfinished. Furthermore, participants expressed that the label was not representative to the content behind it, but still aroused some curiosity as to what might be behind it:

> **Participant TSK 7:** "*... de her spørgsmålstegn heroppe irriterer mig også grusomt, fordi de forklarer ingenting. De siger bare 'klik på mig', altså.*" (TSK 7, post-task Q&A, 15:00)

Advantages

For some participants, the placement of the menu-item leading to information about the sender was easy to spot. Even though most of the participants spotted the menu-item in the midst of saying that they would look for a footer, they noticed the question-marks and became curious as to what might be behind it. Therefore, even though the labelling was not representative, it aroused their interest and made them click it.

Disadvantages

Obviously many participants had a hard time getting familiar with the communicative situation. Almost all participants started looking for the sender in the bottom - the ones who did not, spotted the question-marks before looking elsewhere. Therefore, both the subtle placement of the menu-item, as well as the unrepresentative labelling, became hindrances for most participants.

Factory Forty

On Factory Forty, participants were fairly quick to name Factory Forty as the sender of the website. When asked where they looked to locate information about the the sender, the participants stated that they looked at either the URL, the page title in the browser, the header in the index ribbon, or under the contact-ribbon:

> **Participant FF 2:** "[...] *Det står ligesom både i deres URL, og det stod også som nærmest et logo oppe i toppen. Så på den måde synes jeg egentligt at det var nemt nok* [...] *Og ellers så står det vel også nede under 'Contact', synes jeg det stod.*" (FF 2, post-task Q&A, 22:14)

This means that participants looked to several places, both in browser-related areas (the page title, URL) and on the website itself (index ribbon, contact ribbon) in order to obtain information about the sender. On the website the name *Factory Forty* is present in all these places making it easy for the participants to state the name of the organisation. When asked about the context of the sender - which service they provided (product) - most participants went to *Philosophy* to find the information. However, some participants went to the *Contact* section at first, before looking at *Philosophy*, as they expected to find information about the purpose under *Contact*.

The communicative situation is not solely about knowing the name of the sender, but also understanding what they do (product), and for whom (receiver), which is why we were interested in examining how well the participants understood the context. The section *Philosophy* is dedicated to inform the user who Factory Forty is, and this is where the participants where supposed to find information to understand the context. Since Philosophy contained information about the "product" and context, it is crucial to the entire purpose of the website. Nevertheless, for Participant FF 8, the design in itself became a cue as to what the "product" of the website was. When asked if the design overshadowed the actual message of the site she stated:

> **Participant FF 8:** "*Det var faktisk lige før, fordi den ser vældig fancy ud og den er vældig fin, men det er jo ikke kun det det handler om. Jeg tror også et eller andet sted at det var det der snød mig, at, okay, den ser meget digital og design-ud, så jeg troede at det var det de var gode til. Ikke at leje kontorer ud.*" (FF 8, post-task Q&A, 34:16)

In this case the text in *Philosophy* did not stand out from the surrounding design of the site, which confused Participant FF 8 at first. She was able to recover from her confusion after a while when she found the information in *Philosophy* on her own.

Advantages

By placing their name in the index ribbon as one of the first things the user sees, many participants quickly noticed Factory Forty as the sender of the website. It was also helpful that the information could be found in browser-related area and not just the page itself. Furthermore, most participants found that the information they were looking for about the service provided by Factory Forty (product) was located under *Philosophy*, meaning that the label was representative to the content.

Disadvantages

Understanding the context of the sender is equally important to knowing just their name in order to understand the message and product of the site. This turned out to be more difficult for the participants, but most of them ended up finding the information on their own. In one case, the design overshadowed the message of the site, hindering the participant to understand the context correctly at first.

Learnability

When investigating learnability we focus on how easy it was for participants to perform basic tasks the first time they encounter the website. (Nielsen, 2012) In relation to this we are interested in examining the entire learning process on both websites: How do the participants develop an understanding of the structure? Which aspects do the participants describe as easy and straightforward, and what seems far-off and unintuitive to them?

The Survival Kit

On The Survival Kit, several participants described the learning curve as being steep from the beginning. The website was described as being very implicit in its way of communicating, since it did not provide an overview of

the content and products. Instead it was necessary for participants to explore the website in order to become familiar with the structure and information - it was not "served" to them in form of clear menu structures and labels as it normally is on traditional websites:

> **Participant TSK 6:** "*Jamen jeg er jo vant til at så får jeg en oversigt herude til venstre, og så kan jeg klikke ind på om det her det er forretningsmands-kittet, eller det her det er outback-kittet - eller et eller andet. Men nu kan jeg så - nu kommer jeg sådan meget tilfældigt ind i nogle forskellige typer kits, og jeg aner ikke hvordan jeg er kommet derind.*" (TSK 6, task 3, 12:10)

As Participant TSK 6 describes, some single page websites do not present the structure in the same way as traditional websites, and this can become a hindrance to getting an overview of the website. As she describes, not being able to get familiar with the structure has influenced her interaction with the website in a way so that she coincidentally and involuntarily enters different sections of the website. This is how she "learns" the structure. Therefore, with this implicit way of informing users, many participants had not learnt the structure and navigation until far into the usability sessions. The main structure and organisation of the website revolves around the three survival kits. As previously explained in section 8.3.2, the three survival kits are divided into three different colour-schemes: Red (Overtime), orange (Power Outage), and yellow (Presentation). In order to display one participant's learning curve, we will look into how and when she came to know this division. Ten to eleven minutes into the usability session, the participant explains that she has not yet gained an understanding of the grouping of the survival kits, but she is able to differentiate them from one another:

> **Moderator:** "*Har du en fornemmelse af hvilket kit, du er inde på nu?*"
> **Participant TSK 6:** "[Laughs] *Det er i hvert fald ikke det samme som før. Det er det jo ikke. Åh... Nej. Fordi jeg synes ikke rigtigt jeg har set nogle navne eller nogen gruppering af de der kits, jeg har ikke fået en oversigt over de kits. Synes jeg.*" (TSK 6, task 3, 10:50)

Three minutes later in the same task she was aware that she was shifting between three different kits, but she was not quite sure how she was doing it, and how she could return to the previous one - but somehow explored her way towards a better understanding of the structure and organisation:

> **Participant TSK 6:** "*Nu blev den gul. Og hvordan skifter jeg nu? Hvordan skifter jeg den til den røde? Det ved jeg faktisk ikke. Det er jeg ikke helt klar over.* [Clicks Power Outage] *Nu skifter*

> *den til den orange.* [Clicks Overtime] *Nu er den rød. Øh... Når jeg klikker der, så er det den, der kommer op.*" (TSK 6, task 3, 13:03)

Four minutes, and three tasks later, Participant TSK 6 exclaims that she has reached a point of understanding how she is able to differentiate the survival kits from looking at the changing colours and content:

> **Participant TSK 6:** "*Nu er jeg kommet dertil hvor jeg har fået overblik, når jeg ser her. Fordi der er de der tre typer kits, og dem kan jeg vælge, og jeg kan se når jeg er inde i et nyt kit, fordi det giver et farveskift også. Og så kan jeg jo se indholdet i kittet* [...] *hvis jeg åbner den* [clicks arrow]." (TSK 6, task 6, 17:15)

Hereby Participant TSK 6 felt familiar with the structure 17 minutes into the usability session. The process up until that moment had involved many epiphanies in regards to navigation and structure on the website. A very important point of this process was when the participant discovered that scrolling manually was possible - up until that moment, the participant had only navigated the website using automatic scroll:

> **Participant TSK 6:** "*Nå - nu finder jeg så ud af at jeg kan scrolle op og ned på de der sider. Som før bare blinkede hen over skærmen når jeg trykkede ind. Jeg synes at det er noget forvirrende.*" (TSK 6, task 3, 11:45)

This did not just happen in one isolated instance - at least two participants had this experience of not knowing that they could scroll manually until far into the usability session. By only using automatic scroll on The Survival Kit, users are not able to access the parts of the website containing images displaying the survival kits being taken into use (displayed in figure 8.24). This section is only spotted momentarily as the automatic scroll takes the user past it. As a result of not knowing what happened when they passed the images in a fast pace, participants described the automatic scroll as a confusing film playing before their eyes.

Advantages

Since the structure of all three survival kits is identical, the learnability becomes more efficient, since it is not necessary to learn three separate structures. Furthermore the colouration of the three survival kits makes it easier for users to decipher which kit they are currently viewing, which minimises confusion and benefits learnability.

Disadvantages

The steep learning curve might very well mean that users leave before getting familiar with the website. If it is too difficult to use, and fails to communicate what it offers, users might leave. It is commonly known that users are impatient and leave when they encounter difficulty (Nielsen, 2012 ¶ Why Usability is Important) - more than often they do not spend much time trying to learn an interface or structure. Therefore, it is a clear disadvantage that the website seems difficult to learn for participants - and the aspect of missing the manual scrolling feature only adds to this, since participants were confused about the film playing before their eyes. In addition, the unfamiliar and implicit structure makes it harder for users to accomplish basic tasks at their first encounter with the website.

Factory Forty

The participants on Factory Forty learnt the structure of the website rather quickly. Some scrolled manually down the site to find the information needed to complete the task, and some clicked the options in the global menu. The labels used in the global menu were also mostly understandable to the participants, even though some stated that they did not expect to find a map of the location under *Spaces*. In a statement from Participant FF 4 we can see that she was able to interpret the content of two sections before she had seen the actual content:

> **Participant FF 4:** "*Umiddelbart når jeg ser menuen i toppen, så ville jeg gøre to ting, nok. De har noget der hedder 'Philosophy' og så 'Services & Rates'.* [Inaudible] *med 'Philosophy' kan jeg finde ud af hvad er egentligt baggrunden for dem, hvad er deres eksistensgrundlag. Og 'Services & Rates', hvad kan jeg egentligt få af dem.*" (FF 4, task 3, 01:51)

Based on this quote we can derive that the labels are indicative to the content they contain. Is is also possible that Participant FF 4 uses experience from other websites in order to interpret the labels. Overall, the participants learnt the global structure quickly, but when they navigated in local areas, the horizontal navigation and modal windows could be confusing to the participants:

> **Participant FF 2:** "*Jeg var måske lidt i tvivl når de der sidebarer der de hoppede op hvordan man lige skulle lukke dem, fordi den ene var der et kryds på og den anden kunne man vist bare trykke ud på skærmen.*" (FF 2, post-task Q&A, 19:16)

Here, Participant FF 2 mentions the plus-icons in the *Spaces* section and the modal window that pops up when they are clicked. He has learnt

that there are two ways to close the modal windows, to which he might use prior experience with modal windows, but he also thinks that two different windows are closed in two different ways, which makes him confused.

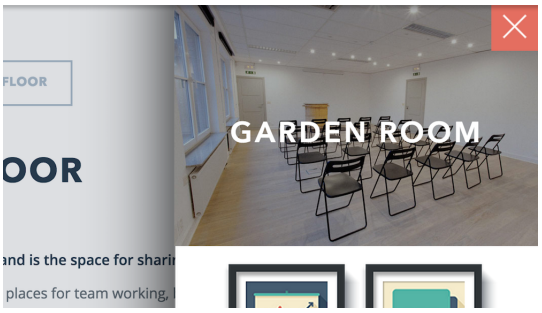

Figure 9.3: Options for closing modal window under Spaces (Factory Forty (factoryforty.be/en) ¶ Spaces)

The modal window can be seen in figure 9.3, and can be closed by either clicking the "X" in the top right corner, or by clicking the white space to the left of the modal window.

Advantages

On Factory Forty, the structure was fairly easy for the participants to learn. The global menu and the labels used for the menu-items were also mostly understandable to participants, who used the menu to navigate as well as manual scrolling. Even though the modal window was confusing, it could be closed in two ways; by clicking in the background of the window, and by clicking the red cross in the corner. By having implemented these two ways of closing, the designers have used features that the user might be familiar with, as many modal windows can be closed by clicking the background. Furthermore, by offering several options to users, you suit more needs.

Disadvantages

Some of the local areas on the site were confusing to participants, mostly the horizontal scrolling, but also the modal windows popping out from the right. The two ways of closing this window is both an advantage and a disadvantage, as it also made the participant confused since he thought that some windows are closed in a different way than others.

Complexity

Complex structures seem unfamiliar and unintuitive to users. Once the structure is understood and revealed, the complexity fades away, and efficiency is

heightened. In order to design towards helping users manage complexity, we must design for the way people behave, not for how we would wish them to behave (Norman, 2010). In this context we payed close attention to participants describing the website as being designed in a way not corresponding with their behaviours. Through this we wish to investigate in what degree the websites come across as complex, which parts of the interface cause issues, and how it affects the general usability and user experience.

The Survival Kit

On The Survival Kit, it was clear that the participants' initial impression of the website was that it was complex. The global navigation, which involved navigating horizontally between the three different survival kits, was both unfamiliar and difficult to some participants, since they were used to navigate vertically. This way of navigating was an issue for the participants since it was the first time they encountered the website, and most of them were not familiar with horizontal navigation. Once the participants had spent some time navigating the website, they were equipped with knowledge about the structure:

> **Participant TSK 4:** "*Alt er jo let når man først lige har siddet og rodet lidt med det, ikke også - når det er en fremmed hjemmeside, så er den ikke let, men knapt så frusterende. Altså, jeg synes den var svær at navigere i. Som førstegangsbesøgende på hjemmesiden, det synes jeg.*" (TSK 4, post-task Q&A, 21:05)

The participant continuously got more experienced with the structure while navigating and became more efficient. Even though some of the participants hinted that the website was not designed to fit within their own frame of understanding, all participants reached a point where they understood the system and structures.

Advantages

The vertical navigation on The Survival Kit was intuitive to users since it corresponded with prior experiences, and therefore also current expectations. This lowered the complexity of navigating the website, as the vertical scroll was designed in accordance to user behaviour and expectation.

Disadvantages

It is problematic that the website is so unfamiliar and unintuitive to the participants. Often it was stated that they felt confused and frustrated with navigating the website because it was so far from what they usually see. Therefore the website came across as complex and the horizontal navigation was an issue for many participants, since it was unfamiliar to them.

Factory Forty

Most participants on Factory Forty stated that the overall structure of the site was logical and somewhat intuitive. However, some participants found the horizontal navigation to be unfamiliar, and specifically *Services & Rates* was confusing to participants. They seemed to understand what kind of content the label covered, but some participants struggled in understanding the labels in the local navigation of the section:

> **Participant FF 2:** "*Så tror jeg at jeg vil vælge 'Digital Factory', det er noget med at producere et eller andet, har jeg lidt en fornemmelse af, men det er det ikke alligevel.*"
> **Moderator:** "*Så prøver du at gå væk.*"
> **Participant FF 2:** "*Ja, så prøver jeg at gå væk.*" (FF 2, task 6, 11.20)

In this case, with Participant FF 2, the labels do not follow his mental model, and he associates the label *Digital Factory* differently from the designers of the site. Since he did not find what he was looking for, he tries to click something else. It was the general behaviour of the participants that if they did not understand the labels, they tried to click them all in order to find out what it contained:

> **Participant FF 7:** "*Jamen der kunne jeg jo også have gået ind og så trykket på den der hedder 'Meeting Room' måske, 'Digital' og 'Coworking', det ved jeg ikke. 'Private Offices'. Der kan jeg måske læse noget. Det er der så ikke. Vi kan prøve at køre til siden og se hvad der står.*" (FF 7, task 6, 07:13)

Participant FF 7, clicking *Private Offices*, also experienced that the design did not follow her mental model. When she realised that she did not know where to find the information she was looking for, she tried using the arrows in order to look through all the content.

Advantages

In the section *Learnability*, a quote from Participant FF 4 showed that she was able to interpret the content behind some of the labels in the global menu. This means that they follow the mental models and previous experiences of users, and this reduces the complexity.

Disadvantages

The disadvantages mentioned here include that the labels used in the local navigation of *Services & Rates* are too difficult for the participants to understand. In this case the participants get confused and try to find the

information elsewhere. If this problem persists, a user might give up and leave the site.

Familiarity

Familiarity is said to describe the relationship between a user and an object or phenomenon which one has considerable experience with. Therefore familiarity involves consulting internal models about how something should work. (Bedford, 2015) In the usability examinations we aimed at investigating if the websites were perceived as familiar/unfamiliar to the participants, how it affected the user experience and whether or not the participants encountered situations where familiarity was an advantage or disadvantage.

The Survival Kit

The main structure of The Survival Kit was unfamiliar to participants, and the overall structure and way of navigating was different from what they were used to. The initial impression from Participant TSK 4 was that the website was difficult to navigate since it seemed to be different from his logic:

> **Participant TSK 4:** "*Jeg synes den er lidt anderledes opbygget end de hjemmesider, jeg er vant til at kigge på.*" (Participant TSK 4, task 1, 03:41)
> **Moderator:** "*Hvordan?*"
> **Participant TSK 4:** "*Jamen jeg synes ikke at det er så nemt. Men det er jo det igen, al begyndelse er jo svær. Jeg synes ikke at den er logisk opbygget, et eller andet sted.*" (TSK 4, task 1, 03:50)

By being different from his logic, Participant TSK 4 refers to the website as defying his expectations of how something should work, and it therefore differs from his internal model of how a website is constructed. This is further elaborated on by Participant TSK 9 who missed having the menu structure to lean on in order to get an overview of the structure and available sections on the website:

> **Participant TSK 9:** "*Jeg synes den første side man kommer ind på* [...] *hvor jeg er vant til at der er en eller anden form for klart emne - altså, der er en klar struktur på siden* [...]" (TSK 9, post-task Q&A, 10:20)

Even though participants were not familiar with the overall navigation, small cues and features in the interface were recognisable and afforded actions familiar to the participants. An example of this can be seen in the

initial impression by Participant TSK 3, who was able to predict the animation of the survival kit opening, which is activated by clicking the downwards pointing arrow:

> **Moderator:** "*Hvad tror du, der sker, hvis du trykker der?* [points at downwards arrow]"
> **Participant TSK 3:** "*Jeg tror at den åbner sig* [Clicks the arrow]. *Og det gjorde den også.*" (TSK 3, task 1, 03:50)

Advantages

During the examinations it was clear that some of the features encountered by the participants were familiar to them, and that this helped them to be efficient and satisfy their main goals by completing the tasks. For example, many participants felt familiar with the local navigation, where the participants would be navigating within the limits of the individual kits, and not between them. They were familiar with navigating vertically, and did not need to use conscious effort nor go through complicated steps in order to complete the tasks in an efficient manner.

Disadvantages

The horizontal navigation was in many ways unfamiliar to participants. Additionally, they found themselves looking for a menu structure to provide an overview, and thus they were not able to draw on past experiences from traditional websites by turning them into current user expectations. This unfamiliarity made it harder for the participants to understand the interface, and how they could move forward on the website in order to complete the task at hand. By basing a user interface on users' behavioural patterns and thought process they become more understanding of the structure and processes, and user expectations and familiarity is prioritised.

Factory Forty

In task 2, we asked the participants to locate the address of Factory Forty, and in task 10 how to contact them. In both cases, all participants went to the *Contact* section to find the information, and many stated that they drew on past experiences when looking for contact information in the bottom of a page:

> **Moderator:** "*Du sagde det plejer at stå allernederst.*"
> **Participant FF 8:** "*Det er jeg i hvert fald vant til. Der er i hvert fald enten allerøverst eller allernederst. Det plejer at stå allernederst.*" (FF 8, task 10, 13:59)

The overall structure of Factory Forty was described as being logical by many of the participants. Participant FF 2 mentioned that the contact information in the bottom ribbon is like a signature, and another stated that index ribbon functioned as a kind of business-card, presenting the company. In this way, the organisation is compared to having a structure like a letter. The presentation of the sender is essential to making the user aware of the purpose, thus making it logical to put in the index ribbon as the first thing the user sees. The contact information in the bottom ribbon works as a signature, and it seems to be a logical placement in the bottom: The user has scrolled through the site and might have come up with some questions or want to contact the sender with other matters. In that case it makes sense that the contact information is in the bottom of the site, so that the user does not have to scroll up. This comparison is supported by the following statement by Participant FF 2 where he mentions that the *Contact* section is like a signature:

> **Moderator:** "*Hvad nu hvis vi sagde at 'Contact' havde været nummer tre på listen?*"
> **Participant FF 2:** "*Ja, det havde måske undret mig lidt, fordi den måde det står på nu, så er det måske lidt ligesom, skal vi sige en underskrift eller... Altså de sætter deres signatur på.*"
> **Moderator:** "*Så du er vant til at se det dernede.*"
> **Participant FF 2:** "*Ja. Eller det giver i hvert fald god mening at det er der nederst.*" (FF 2, post-task Q&A, 23:45)

Many other participants stated that they found the structure to be logical, and this might be because of the letter-like structure. It should be pointed out that even though the overall structure was found to be mostly logical, some participants struggled and got confused when navigating locally in some sections.

Advantages

If users find the structure on a website to be familiar, they are supposedly able to learn the structure more quickly. This was the case on Factory Forty which has a global menu that the participants learnt to use quickly, as they might have found it familiar. The structure of the site, being like a letter, might also have enhanced the familiarity to the participants, as it is something they know from the real world.

Disadvantages

The horizontal navigation in two of the sections of Factory Forty, *Spaces* and *Services & Rates*, was found unfamiliar and somewhat confusing to some of the participants. Confusion may lead to frustration, which might end with

the user leaving the site. As important information might be hidden in the horizontal navigation, it should be easy for the user to decipher where to locate it.

Credibility

When assessing the credibility of a website, users often do it preconsciously by taking in several factors. (Nielsen, 1999) It is common knowledge that many web users are sceptical towards online information (Nielsen, 1997), and if a website is not perceived as credible, it might not be used. Based on this, we wish to investigate which aspects are valued in terms of perceived credibility on single page websites.

The Survival Kit

During the post-task self-reported metrics on the semantic differential scale, the participants were asked to assess the overall credibility of the website. Afterwards, in the Q&A-session, the participants were asked to elaborate on which key factors they focused on when assessing the credibility. To this question there were two overall types of responses from participants on The Survival Kit, and the first type can be summarised through the following statement by Participant TSK 7:

> **Participant TSK 7:** "*Det er at den har - altså siden har et rent og professionelt design. Og man kan se at der er blevet brug tid og energi - og penge på at få gjort alle de her ting præsentable og ligesom få det til at virke. Så hvis det ikke havde været fordi at man skulle henvende sig via e-mail, så havde jeg synes at det var bare - det spillede bare.*" (TSK 7, post-task Q&A, 13:35)

This participant (TSK 7) assessed the website as having high credibility on the basis of aesthetics and quality. To him, the design looks expensive, which indicates that the sender has spent a lot of money on it. Furthermore he describes the design as clean ["*rent*"] and looking professional ["*professionelt*"], which is a comment on the design aesthetics. The only thing in Participant TSK 7's statement, pointing towards the non-credible end of the scale, is related to ordering the product by e-mail. This aspect is elaborated further by Participant TSK 2:

> **Participant TSK 2:** "*Jeg kan godt lide når jeg skal bestille noget, at jeg kan se hvad det koster. Så jeg kan godt lide at jeg kan få en eller anden kurv, måske se om jeg vil have noget andet i kurven, og sådan noget der.* [...] *Hvis jeg skal købe noget på en side, så er det noget, der er ret troværdigt for mig. Og eftersom*

> *det var svært for mig at finde ud af hvem der stod bag, og det virkede som om det var et reklamefirma, som jeg ikke engang vidste noget om* [...] *jeg synes ikke det var så gennemsigtigt hvem det var, der egentlig stod bag den.*" (TSK 2, post-task Q&A, 31:48)

According to Participant TSK 2, the website is affected in a non-credible way by not having embedded a traditional e-payment. When purchasing something over the internet, he feels secure by being able to see the price clearly - and a shopping basket-feature seems trustworthy. Coupled with the sender being non-transparent and unknown to him, the participant assessed the website as being non-credible.

Advantages

The clean and simple design on The Survival Kit was interpreted as being professional and credible. In addition, the design seemed to have been expensive and time-consuming to produce, which further added to the credibility. Therefore, the aesthetics, as well as the overall quality, had an effect on the perceived credibility of the website.

Disadvantages

To many participants the transaction through e-mail became a determining factor when assessing the credibility: When clicking the button labelled *Order your kit* many had expected to be taken to an e-payment system with a shopping basket-feature - a way of handling a transaction which is familiar and trustworthy to them. Therefore, when clicking *Order your kit* opened an e-mail client, the participants reactions clearly showed that they were confused and surprised. Not being able to see the price of the product further added to the non-transparency of the website. Hereby, determining factors of a website's credibility are *transparency* (sender, price), living up to user expectation (what happens when *Order your kit* is clicked), and *familiarity* in the context of transaction (e-payment, shopping basket-feature), both of which were not present on The Survival Kit according to participants.

Factory Forty

In relation to Factory Forty, many participants stated that they determined the credibility based on the pictures and the professional look of the site. To Participant FF 1, the surroundings, people, and ambiance in the pictures influenced her view on Factory Forty's credibility:

> **Participant FF 1:** "*Jamen det ville være billederne jeg kigger på. Jamen jeg kigger på miljøet og hvordan de ser ud og hvad*

> *stemningen er og hvad, hvordan rummene er, hvordan pladsen er. Og især herinde, de rum, for at få en fornemmelse af det ud fra billederne.*" (FF 1, post-task Q&A, 21:19)

Alongside with pictures of real people's faces, Participant FF 4 mentioned that the site looked professional because of the practical information, and because she connects aesthetics of "clean design" with credibility:

> **Participant FF 4:** "*Jeg synes bare at den ser professionel ud. Der er, altså, der er både mail, telefonnummer, adresse, der er nogle ansigter på også, og den har et meget clean design, som jeg synes, som jeg nok forbinder meget med... med troværdighed.*" (FF 4, post-task Q&A, 22.13)

However, it was not only the design and pictures that determined the credibility to all participants. To Participant FF 8, the usability and findability of the site influenced the way she interpreted the credibility of Factory Forty as an organisation:

> **Participant FF 8:** "*Jeg rodede lidt rundt, synes jeg, det var min fornemmelse, at jeg havde lidt svært ved at finde det jeg skulle bruge. Og det er sådan også lidt den fornemmelse jeg har af bureauet bag, at det er lidt noget rod. Så jeg føler ikke at det er et sådan super troværdigt sted at gå hen og leje et kontor.*" (FF 8, post-task Q&A, 27:27)

From this quote we can derive that even though many participants evaluated the credibility based on the aesthetics of a site, some participants also took usability issues into consideration. This means that in order to seem credible, bad usability should be eliminated, and the user should be able to locate information easily.

Advantages

The pictures on the website show working situations with real people in the environment of Factory Forty's facilities. These pictures show an ambiance, according to Participant FF 1, and in that way the aesthetics, alongside the practical information provided on the site, influence the credibility of Factory Forty.

Disadvantages

The usability of Factory Forty influenced the perception of credibility in the case of Participant FF 8. Because she had a difficult time locating the information she was looking for, she also got the impression of the organisation as being "messy", which influenced their credibility in a negative way.

Aesthetics

Aesthetics involve the look and feel of the front end of any graphical user interface (GUI). An aesthetically pleasing user experience can provide effective visual communication. Good usability and following the Gestalt principles is also known to be able to enhance the aesthetic appeal. On the basis of these considerations of aesthetics as a means to effective communication, we wish to investigate in what degree the websites are perceived as aesthetically pleasant, and how it affects the usability. This also involves looking at how easy and pleasant it is to use the features, and how that influences the perceived aesthetics. (Sherwin, 2014)

The Survival Kit

According to Participant TSK 1, the website was pleasant to use because she liked the design and construction of the website. Nevertheless, the participant elaborates that if she had been in another context where it was necessary to recover information from the website, and did not have the time to explore it, the website would have ceased to be pleasant:

> **Participant TSK 1:** "*Nej, det er behageligt fordi den er fed. Altså fordi den er lækkert udformet. Men jeg ville skulle have tid til at gå rundt i den, hvis det er at jeg skal synes at den er behagelig. Hvis jeg hurtigt skulle finde et eller andet, for eksempel en gave - hvis jeg hurtigt skulle finde det, så tror jeg ikke at - ej, så ville den ikke have været behagelig, så ville den have været for forvirrende, sådan lidt irriterende faktisk. Hvis jeg havde tid og jeg sad foran computeren og havde pause, så er den behagelig.*" (TSK 1, post-task Q&A, 37:25)

Thereby the participant claims that the usability on the website is not optimised towards recovery, but rather exploratory behaviour. Furthermore she connects the aesthetically pleasing design to usability, and states that the website would have been confusing and unpleasant to her, if she had not been able to take her time exploring the website. This connection to usability is further elaborated on by Participant TSK 9 in the following statement:

> **Participant TSK 9:** "*Jamen altså, jeg synes det visuelle, når man kommer ned for at kigge på hvad der er i det der kit - survival kit - så synes jeg egentlig at det er vist med store fine billeder og der er også en forklaring på den anden side. Det synes jeg egentlig var - det var meget godt beskrevet. Det var pænt og overskueligt, synes jeg.*" (TSK 9, post-task Q&A, 11:10)

The section of the website containing a visualisation of the content in the survival kit is described as clear and comprehensible. This was visually

pleasing to the participants since the interface was constructed in a simple way which was easy to access and understand. This section of the website was on several occasions praised by participants as being aesthetically pleasing.

Advantages

The aesthetics were described as pleasing by several participants. This roots in the simplistic outline and presentation of content, where the website presents information in a very "implicit" way, using pictures instead of long textual descriptions.

Disadvantages

The website is, according to participants, designed towards exploratory behaviour rather than recovery. This entails participants having to take their time to get familiar with the structure and content before being able to recover information. As mentioned by a participant, the website would cease to be pleasant if users were to handle the website in a more rapid manner which would result in bad usability.

Factory Forty

On Factory Forty, some participants stated that the design was clean and pleasing, and to them it enhanced their perception of the credibility of Factory Forty. In relation to this, they mentioned the pictures and the choice of colour used on the site. Participant FF 5 thought there were too many "fancy" effects in the design, and that too much happened when scrolling the page:

> **Participant FF 5:** "*Jeg synes der er for mange... fancy effekter her til at - til at den er nem og hurtig at bruge. Altså det er ikke fordi der, det er ikke fordi det tager en halv time om at finde et eller andet,* [...] *der foregår for meget synes jeg. Til at den er, jeg synes ikke den er responsive nok.*" (FF 5, post-task Q&A, 34:02)

Participant FF 5 made this statement in the context of being asked if he found it to be a pleasing experience to use the site. To him, the large amount of effects and animations had an influence on the usability of the site, and the aesthetics therefore influenced his overall experience.

Advantages

Many participants thought that the design of Factory Forty was clean and pleasing. To them, it influenced their perception of trust. Not many partic-

ipants stated that they had a negative experience of visiting the site based on bad usability and/or efficiency.

Disadvantages

In relation to Participant FF 5, his overall experience on the site was influenced by a large amount of animations and effects. Since he did not mention this during the examination of the site, but rather during the Q&A afterwards, it might not have influenced his navigation. Nevertheless, his overall impression of the website and aesthetics was that the large amount of effects and animations were distracting and resulted in inefficient use of the website, since it slowed him down.

Efficiency

In order to design a system to support efficiency, it is necessary to understand how users solve tasks, and design the interface accordingly. (Nielsen, 2012) In terms of single page websites, we were interested in investigating how quickly participants were able to perform tasks once the participants have learnt the design, and in what way the website provides the features needed to navigate efficiently.

The Survival Kit

On The Survival Kit, one of the common frustrations seen among participants examining the website was in the context of missing information to get an overview of the structure in order to be efficient in locating the needed information. Many of the participants felt confused about not being able to look at the structure, as it is possible on a traditional website, but had to discover by navigating a somewhat unfamiliar environment. However, in order to look at efficiency it is necessary to look at how easy participants felt it was to recover information and complete tasks *after* they had gotten familiar with the structure. In this context, Participant TSK 1 explains that the website was easy to navigate:

> **Participant TSK 1:** "*Jeg synes egentlig at det var nemt nok. Når man trykker på det, så kommer det jo frem*" (TSK 1, Post-task Q&A, 26:45)

Therefore the navigation on the website was efficient and easy to use, since it was easily accessible and quick. On this note, Participant TSK 4 explains that he thinks the navigation between the kits is inefficient since it automatically scrolls him to the top every time:

> **Moderator:** "*Så du er træt af at du bliver ved med at blive kastet tilbage til toppen?*"
> **Participant TSK 4:** "*Ja, det er jeg egentlig. Jeg synes at det giver et lidt uoverskueligt overblik over hvad man egentlig kan købe. Man er genstand for nogle spildsekunder - noget spildtid for at skulle rode rundt i det.*" (TSK 4, task 2, 06:07)

This statement was made when the participant was looking at content in a survival kit and wanted to compare it to the content in one of the other kits. This led him to press a menu-item in the navigation leading him to the next kit, but was taken to the top of the next kit instead of being taken to the same spot in the other kit (*Objects in this kit*).

Advantages

Once the structure of the website is understood and learnt, the participants felt that they could quickly navigate from one survival kit to another. The website is optimised towards this efficient behaviour since the menu-items are always accessible to the users.

Disadvantages

The automatic scroll taking users to the top every time they navigate between kits became a source of frustration for one participant. He found this to be an inefficient way of navigating since it cost him time and made him lose track.

Factory Forty

The participants navigating Factory Forty both expressed and showed several times that they they could recover information rapidly, since they quickly became familiar with the website's structure, labelling, and navigation. During the examination, some participants remembered that they had already spotted the information when scrolling down the site. Thereby, they were able to locate information quickly and efficiently, because they had seen it before. An example of this can be seen in the following statement by Participant FF 5 who was able to recover opening hours:

> **Participant FF 5:** "*Jeg var henne at kigge efter priserne fordi jeg kan huske den tabel her, der stod et eller andet med hvor tit man kunne komme. Jo jo, lige her.*" (FF 5, task 7, 09:04)

This example shows that a participant could remember spotting the information before. This could be an indication that the amount of information is limited, and therefore memorable, and not overwhelming for the user.

Other statements made during and after the usability sessions can be interpreted as leading in the other direction: That the website is too text-heavy. In the *Philosophy* section on Factory Forty, some participants found that there was a large amount of text to read in order to get familiar with the organisation. Participant FF 4 states that the amount of text might have hindered her understanding of the purpose of Factory Forty:

> **Participant FF 4:** "*Jeg synes virkelig det var svært at finde ud af i starten hvad det lige var de egentligt tilbød. Også det der med deres philosophy den var bare... jeg synes ikke rigtigt jeg kunne bruge det så meget til at starte med. Jeg tror det var fordi der var for meget tekst.*" (FF 4, screen recording review, 12.49)

This aspect is further emphasised by the fact that two out of eight participants used the keyboard shortcut Command + F (accessed by holding down the two keyboard buttons *cmd* and *F* simultaneously) to search in the browser window for information. Participant FF 5 used this command for information retrieval to locate a printer, while Participant FF 8 used it as her main way of searching for information. Additionally, when attempting to solve task 5, which involved locating information about a room to host an event, Participant FF 8 stated that she had searched for the word "event", since she did not want to read or skim the text on the site:

> **Moderator:** "*Og du har simpelthen command-F'et 'event'.*"
> **Participant FF 8:** "*Ja, jeg gad ikke til at skimme-læse det hele.*" (FF 8, task 5, 10:03)

In this way, Participant FF 8 uses the browser search to pinpoint the exact information she needs. However, she found that this method for information retrieval to be inadequate. When we asked her to find opening hours and room size, she did not know what to search for, and the content not currently visible in the ribbons (hidden away by horizontal navigation) was not searchable, and therefore she was forced to look for it manually. In this case, she did not read the text either, but superficially looked for numbers.

Advantages

The structure and relatively small amount of ribbons on Factory Forty made it easy for the participants to recover information they had seen beforehand, when navigating through the site, sometimes when they had been looking for information unrelated to their current task.

Disadvantages

The statements above indicate that large amounts of text can be demotivating for users to read. This could result in the user missing some information

essential to the understanding of the organisation or purpose. In this particular case, Factory Forty would miss the opportunity to communicate their own philosophy in a clear way, which could very well mean that they miss communicating what was the entire purpose of the website. Therefore, even though users have learnt the design and structure of the website, and can perform tasks rather quickly, they work inefficiently because of the textual heavy content. Participant FF 8 tried to approach this problem by using browser-search, but sometimes found it to be inadequate. The horizontal navigation implemented in some ribbons has an effect on the search-ability of the content, since the browser cannot access the content that is hidden away, rendering the search moot.

Expectation

In order for a website to have good usability, it needs to be matched to users' expectations in terms of structure, behaviour, communication, and appearance. Past experiences turn into current expectations, and users act on these. (Bedford, 2015) On the basis of this, we seek to investigate how the participants perceived the website as being consistent, readable, logical, and comfortable. Therefore we wish to investigate where the websites did not match user expectation and how this affected the navigation.

The Survival Kit

As mentioned, user expectation involves labelling (communication) being in accordance with the users' frame of understanding. On The Survival Kit, many participants experienced issues with the menu-item *Presentation*. They primarily turned to the menu-item when looking to get familiar with the communicative situation (sender, product, receiver). Instead of being provided with this information, the screen swiped to the side and displayed another survival kit, resulting in confused rather than informed participants. This can be seen in the following statement by Participant TSK 7, who expected to get an overview of the products available on The Survival Kit:

> **Participant TSK 7:** "*Jeg havde regnet med at jeg var blevet præsenteret for faktisk alle produkterne her på én gang. Så jeg havde lagt mærke til at der var et eller andet herude i siderne, men lige umiddelbart ville jeg forvente at der var en bedre præsentation - altså et eller andet overblik af det.*" (TSK 7, task 2, 03:30)

Connected to this aspect, Participant TSK 1 mentioned an interesting aspect about user expectation to take into account. The complete unfamiliarity with the website and continuous non-compliance with her expectations made the user experience interesting:

> **Participant TSK 1:** "*Ja, meget. Det er nok også medvirkende til, at jeg synes at det var spændende. Fordi at så skal jeg udforske det lidt. Jeg tror, at hvis ikke jeg havde været forvirret, så havde det bare været lidt kedeligt, egentlig.*"
> **Moderator:** "*Så det var fordi det overraskede dig?*"
> **Participant TSK 1:** "*Ja, nemlig. De der overraskelsesmomenter, det synes jeg at det var rigtig fedt.*" (TSK 1, post-task Q&A, 30:10)

According to Participant TSK 1, the constant surprises on the website aroused her interest and curiosity. Therefore, breaking with the user expectations can also, in the mind of the user, retrospectively be comprehended as exploration and positive surprises.

Advantages

Based on the user experience of Participant TSK 1, breaking with user expectation can be an advantage. However, it is possible that the participant perceived the website as being frustrating at first. Therefore, continuously breaking with user expectation is only an advantage if the user proceeds to stay on the website for as long as necessary for him/her to perceive the user experience as being interesting.

Disadvantages

Users spend most of their time on other websites than the ones like The Survival Kit, and therefore they learn practices in terms of labelling, structure, navigation, organisation, categorisation, and search elsewhere. Therefore, when users finally reach the website, they expect objects and features to function according to their frames of understanding, and deviations can make them frustrated and confused, and ultimately cause them to leave. When participants unanimously express during the examinations that objects and structures break with their user expectations, it can become reason for them to leave the website. Specifically these unfamiliar aspects can be found in connection to the labelling (*????* and *Presentation*), navigation (horizontal), structure (unfamiliar and missing an overview), and cursors.

Factory Forty

User expectation, as mentioned, builds on past experiences. In the case of Participant FF 8, the website of Factory Forty lived up to her expectations, but it was not in a positive way. When asked if Factory Forty met her expectations to single pages, she stated:

> **Participant FF 8:** "*Altså, rimelig godt, fordi det er jo en af dem hvor jeg synes der er for meget presset ind. Jeg har ikke*

> *rigtigt nogen idé om sidens opbygning, selvom jeg ved det er en one-page, fordi jeg blev overrasket over da jeg klikkede på... jeg kan ikke huske hvor det var, om det var på kontor-kortet, at der så dukker frem til højre. Det synes jeg, det var træls. Så ja, den levede op til mine forventninger, sådan set.*" (FF 8, post-task Q&A, 21:43)

From this statement we can derive that Participant FF 8 expected to dislike the single page, since she anticipated that there would be too much information crammed into the website. Nevertheless, she was surprised by the modal window in the *Spaces* section, which popped out from the right, and found this to be a frustrating feature. Other expectations among the participants include that of Participant FF 4, who did not expect to find a map in the *Spaces* section:

> **Participant FF 4**: "*Jeg synes først lige da jeg kom ind på den der med 'Spaces' at det var i hvert fald ikke hvad jeg havde forventet man fik oversigtskortet på den der måde* [...] *Lige umiddelbart tror jeg faktisk at jeg var bange for at jeg skulle klikke på dem [the plus-icons] for at få noget, men der blev jeg positivt overrasket også over, jeg kan bare lige scrolle over, så står der jo egentligt hvad det er for en type rum.*" (FF 4, Post-task Q&A, 21:09)

This statement also suggests that the participant was nervous about clicking the icons on the map, since she did not know what action they afforded and therefore did not know what to expect. However, she was surprised in a positive way to see that a modal window opened with useful information about the rooms. Other positive reactions based on user expectations can be seen in the following statement by Participant FF 8:

> **Participant FF 8**: "*Jeg blev glad over at min forventning om at kontaktinformationen stod nede, at det ligesom passede. Den forventning passede, det gjorde mig glad.*" (FF 8, Post-task Q&A, 22:46)

In this statement, we can derive that the participant was pleased that the contact information could be found in the bottom, just as she expected. This placement of contact information therefore corresponded with her user expectation.

Advantages

The website draws on some structures and placements of information also seen on other websites, and therefore these structures are familiar to the

users and correspond with their user expectations. Concretely, the placement of the contact section was familiar to the participants, and therefore they all expected to find it in the bottom. In relation to the *Spaces* section, some participants stated that they did not expect to find a map of Factory Forty, but some found to be a positive surprise.

Disadvantages

During the usability sessions we experienced that participants would become somewhat frustrated or confused when they expected something to happen, or to find information in a specific place, and their expectation was not met. Therefore it was a clear disadvantage when user expectations did not correspond to the structure of Factory Forty. One participant experienced that prejudices against the single page genre were confirmed. Prior to the usability examination, Participant FF 8 expected that Factory Forty would have too much content crammed on the website, and that it would use features and animations that she would dislike. Therefore she was not surprised when she found it to be true.

Signifiers and affordances

On a website, perceived affordances can be seen as minor cues or objects that help users comprehend the interface, layout - or *digital environment*. In this context, signifiers can be seen as symbols affording specific actions, such as arrows, or the like. (Norman, 2010) During the usability examinations we attempted to note every time the participants mentioned that they comprehended and recognised something that afforded action. If the participants were able to anticipate specific sets of actions based on the interface, it is most likely because of perceived affordances in the system. Additionally, in spite of the information on single page websites being presented collectively in one page, some information is still hidden away in ribbons with horizontal navigation. This off-canvas information sometimes is crucial to the entire goal of the website. Therefore, before initiating the usability session, we were also interested in investigating whether or not it would be transparent to most users when an object is clickable.

The Survival Kit

On The Survival Kit, participants very much relied on the cursor as a signifier that something could be clicked. Several participants mentioned this, and the following statement shows that Participant TSK 6 navigates with the cursor turning into a pointing glove as being a signifier of objects affording clicking:

> **Participant TSK 6:** "*Der er en pil. Jeg mangler en lille hånd, som jeg er vant til. Den, der kommer frem når jeg nu kan trykke på noget.*" (TSK 6, task 1, 01:40)

Now that we have established how participants used the traditional cursors as signifiers to interpret whether or not an object was clickable, it is relevant to look at the custom cursors on The Survival Kit and how they were interpreted. In the case of Participant TSK 3, she was browsing the content on the website looking for clues as to what the purpose of the website was, and what products they sold. When she came to the sections with pictures of the survival kits being taken into use, and hovered over a picture, the custom cursor seen in figure 9.4 pointed at a menu-item in the navigation, which the participant interpreted as a hint from the system to click there:

> **Participant TSK 3:** "*Nå, nu peger den - nu siger den at den gerne vil have at jeg skal pege der! Den vil gerne have, at jeg skal gøre et eller andet. Jeg prøver at klikke der.* [clicks on the menu-item in the right side of the screen]" (TSK 3, task 2, 08:36)

Figure 9.4: Agency Survival Kit, cursor pointing at menu-item (Phoenix the Creative Studio / Agency Survival Kit, ¶ Overtime)

On the website the custom cursor of an arrow pointing right can actually be clicked to swipe the images like a slide-show. Therefore the intended interpretation of the arrow is probably that you can click it to see more images appear from the side - but this was not the case for the participant: She did not interpret the arrow as affording clicking, but instead as a signifier functioning as an arrow hinting her to click somewhere else.

Another time where the same participant misinterpreted the interface, was when the layering-effect caused her to interpret two objects as being connected. This can be seen in figure 9.5, where an arrow (which automatically scrolls to the top when clicked) looks connected to the button with the label *Order your kit* (which opens an e-mail client). In this case, the participant wanted to return to the index section of the website, and described the interface as being illogical, as she did not know what action the object signified:

> **Participant TSK 3:** "*Det virker ulogisk, at jeg skal trykke der. For de hænger jo sammen.*" (TSK 3, task 2, 13:55)

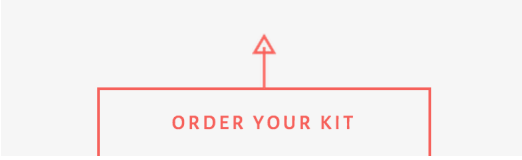

Figure 9.5: Agency Survival Kit, two seperate objects seem connected (Phoenix the Creative Studio / Agency Survival Kit, ¶ Overtime)

This confusion can be seen in the context of the Gestalt principles. According to the principle of continuity, a user's eyes automatically follow the lines of elements if they are aligned, and the user will assume that they belong together. This makes the layering-effect used on The Survival Kit problematic, since the designers have little to no control over how objects align. The misinterpretation can also be seen in connection to the principle of proximity, which states that elements that are placed closely together are perceived as a group or belonging together. Therefore the participant interpreted the objects as interrelated.

Advantages

One of the advantages of using custom cursors is the ability to signify action, that otherwise would be impossible with the use of traditional cursors. An example of successful use can be seen in relation to a somewhat non-traditional custom cursor in the interface. This cursor is visible when navigating within the boundaries of the index ribbon on The Survival Kit, and displays a two-headed arrow pointing to the left and right (seen to the right in figure 8.21 in a previous section). Two of the participants, both ph.d.-students in Computer Science, interpreted the cursor as being a signifier affording the click-and-drag-feature for navigating between the survival kits. After discovering this feature, both participants mentioned having associations to the way of navigating on mobile or tablets. Another example

can be seen with the cursor displayed in the modal window, which is formed as an X (can be viewed in a previous section, figure 8.20). Some participants saw that the cursor had turned into an X and interpreted it as them being able to click anywhere on the screen for the modal window to close. Not all participant noticed this, and in order to suit the needs of all users, the website offers several ways of exiting the modal window, including clicking any of the active menu-items, as well as the question-marks (which was the way the participants entered the modal window).

Disadvantages

While custom cursors can be used in ways that traditional cursors cannot, custom cursors may also be unfamiliar to users, who then might not be able to interpret which actions they afford. Therefore they could be interpreted in the wrong way or cause confusion as to what the signifier affords. Furthermore, we witnessed the custom cursors resulting in errors made by a participant. In one case, the error was made based on a clash between a custom cursor and the layering-effect. In this case the Gestalt principles can explain why the layering-effect is problematic. When users perceive connections in the interface, the layers might cause misunderstandings in relation to proximity or continuity. When embedding freestanding and detached elements in the interface, designers have little to no control over how objects align and how they are perceived in relation to the remaining parts of the interface, which in the end can cause errors or confusion.

Factory Forty

In the index ribbon of Factory Forty, the text "*Scroll down*" (Factory Forty, 2015, ¶ Home) is presented with an arrow pointing downwards. The fact that many participants knew that it was possible to scroll manually may be on account of this label. Meanwhile, other signifiers on Factory Forty did not work equally well. In the modal window in the *Spaces* section, Participant FF 7 thought the icons were clickable:

> **Participant FF 7:** "*Jeg ved ikke hvad de her symboler heroppe de betyder.* [clicks icons]"
> **Moderator:** "*Du ville se om man kunne klikke på dem.*"
> **Participant FF 7:** "*Ja, men det* [...] *kan man ikke.*" (FF 7, task 6, 09:23)

Participant FF 7 was not able to figure out what the icons meant, but interpreted them as clickable even though the cursor did not change from an arrow to a pointing glove. Another feature under the *Spaces* section induced surprise; to Participant FF 5, the arrows placed on either side of the floor plan did not work as he had expected:

> **Participant FF 5:** "*Jeg havde regnet med at den bare ville være cirkulær så jeg kom hen til det her igen, men det skete ikke. Nu når pilen den også er der.*" (FF 5, task 8, 10:36)

Figure 9.6: Active (orange) and inactive (blue) arrow under *Spaces* section (Factory Forty (factoryforty.be/en) ¶ Spaces)

Participant FF 5 thought that he could click the arrows and start an infinite rotation, and therefore rotate between the first and second floor without having to switch arrows. This infinite rotation can be found under *Services & Rates*. The arrow icons are identical to the ones placed under *Spaces*, but in the latter, one of the arrows is a shade lighter than the other, intended to communicate to the user that the arrow is inactive and cannot be clicked. In spite of there being a slight difference in colouration, the participant still interpreted it as affording clicking. In figure 9.6, the active arrow is marked by an orange circle, and the inactive one is marked by a blue circle.

Advantages

The arrow with the "Scroll down" label in the index ribbon might have had a positive influence in the participants' interpretation to scroll manually. In the *Services & Rates* section, the arrows also were an advantage, since they indicated that infinite rotation was possible.

Disadvantages

Despite the fact that the slight difference in colouration should make the two of the arrows in the *Spaces* section seem inactive, they still afforded clicking. The statement from Participant FF 5 suggests that the slight colour difference was not enough to make the arrow seem inactive. Another disadvantage in the *Spaces* section is the icons used in the modal window, that differ with each room. Participant FF 7 did not understand their purpose, and they were perceived as clickable.

10 | Discussion

Now that we have analysed the data from the empirical research, it is relevant to discuss and account for the different aspects discovered in our investigation. On this basis the discussion will involve looking at in what way the think-aloud data differs from the semantic differential assessments. This entails looking at where the think-aloud aspects, laid out in the previous chapter, differ from the semantic differential assessments and why. Furthermore, the suggestion that Conventional and Avantgarde sub-genres are designed to suit two different information behaviours, will be looked into in the end of the discussion. This involves looking through the aspects of user interaction on both websites; how they differed and coincide with the two information behaviours.

10.1 Semantic differentials and think-aloud

Among other things, the Q&A sessions performed during the usability examinations were aimed at the participants elaborating on some of the aspects assessed on the semantic differential scale. These statements were analysed and interpreted in the think-aloud section in the previous chapter, and therefore they have not yet been seen in relation to the data collected on the semantic differential scale. Most of the aspects presented through the think-aloud section are in accordance with the semantic differential results, but specifically two factors can be interpreted as being contradictory to the additional data: *Aesthetics* and *Familiarity*.

Aesthetics

Assessments on the semantic differential scale show that The Survival Kit was perceived as being more aesthetically stimulating than Factory Forty. Seen in the context of other semantic differentials, The Survival Kit is assessed as being more confusing, having worse findability, being less credible, and more complex than Factory Forty. Overall, this can be translated into the following: Factory Forty was assessed as having better usability than The Survival Kit. This is not in accordance with the functionalist approach to aesthetics, where aesthetic value is determined by and therefore reducible to the functionality, and hereby usability, of a website. (Tullis & Albert, 2013, ch. 3) This might result from the unrepresentative keywords (*stimulating* and *boring*) chosen in relation to the assessment of aesthetics, or merely the participants having a different approach to the definition of aesthetics than we do. Nevertheless, The Survival Kit is intended to showcase a

product, while Factory Forty is intended to inform users about the company - this might hint why The Survival Kit was assessed as being more *stimulating* than Factory Forty: Many might say it is simply more beautifully manufactured.

Familiarity

In the semantic differential assessments, the familiarity of The Survival Kit was rated to an average of 2,44, and Factory Forty at 2,12. This means that The Survival Kit was rated as more familiar than Factory Forty, and this is a surprising result when compared to the statements. On Factory Forty, the familiar elements include the global menu, which participants used alongside manual scrolling. The participants were also able to decipher the content based on the labels used in the menu-items. The structure of Factory Forty could be seen as letter-like with a presentation in the top and contact information, like a signature, in the bottom. On The Survival Kit, one of the only familiar elements/features was vertical scrolling. The participants were looking for a menu structure and a way to get an overview of the site, and they were not able to draw on past experiences. In general, the participants examining The Survival Kit found it difficult to understanding the interface of the site, since it did not come across as familiar to them. Therefore, the results from the think-aloud can be seen as contradictory to the semantic differential assessments of familiarity. This might be a result of the participants focusing on the content being placed in one single site when assessing the familiarity, and therefore they might have not focused on the individual elements on the website being familiar or unfamiliar. Another reason could have been that the participants examining The Survival Kit might have been more familiar with single page structures than the ones examining Factory Forty.

10.2 Information behaviours

In section 8.1.1 we suggested that Conventional single pages were connected to Convergent information behaviour, and that the Avantgarde sub-genre coincides with Divergent information behaviour. In order to look at this suggestion, we will take a look at these assumptions about information behaviour in relation to the data analysed in the previous chapter.

Factory Forty (Conventional)

With Convergent behaviour, the user follows an explicit goal, and looks for objects that can help them in locating what they are looking for. During the examinations of Factory Forty, we witnessed the following aspects in the

participants' interaction with the website corresponding with the website being designed towards Convergent information behaviour:

- Participants were fairly quick to determine the communicative situation
- The choice of labelling in the global navigation was indicative and transparent
- Navigating vertically in the global navigation was known to the participants and made their information recovery more efficient
- The website provided help text and many descriptions comprehensible to the participants, providing them with oversight
- Participants quickly learnt the overall structure
- Many elements in the interface were known from traditional websites or other single page websites

Overall, objects in the interface were familiar to users, which enabled them to draw on past experience with either single pages or traditional websites when preconsciously making current user expectations. This enabled participants to recover the information needed rather quickly. Additionally, when navigating the vertical structure on the website, participants repeatedly scrolled past sections, which enabled them to recall seeing information or labels before. This all added to efficient information retrieval, as well as the suggestion that Factory Forty was designed with the aim of information recovery. During the examinations, we too discovered that some aspects can be said to contradict the suggestion about Factory Forty being designed towards information recovery:

- To some, the main message was hindered by parts of the website being too heavy on information
- Horizontal navigation embedded within the ribbons was unfamiliar to participants

The Survival Kit (Avantgarde)

The Survival Kit was a website aimed at representing the Avantgarde subgenre. The website was previously in this thesis suggested to support Divergent rather than Convergent information behaviour. Through the usability sessions, the tasks given to the participants were in fact directed towards Convergent information behaviour, since the participants were given explicit goals. Nevertheless, the usability examinations have displayed the following factors of user interaction corresponding with the site being designed towards Divergent information behaviour:

- Most participants struggled to determine the communicative situation

- The choice of labelling in the global navigation was unfamiliar and non-transparent
- Navigating horizontally in the global navigation was unknown to participants and confused them
- The website did not provide help text and little descriptions, resulting in the website being non-comprehensible and lacking oversight
- Participants took a long time to learn the overall structure
- Few to no elements in the interface were known from traditional websites or other single page websites

Overall, the structure of The Survival Kit was described as being unfamiliar to participants, and this in many ways hindered the participants being able to draw on past experience with either single pages or traditional websites, when preconsciously making current user expectations. Because of this unfamiliarity and untraditional structure, users are not able to retrieve information as efficiently, since the learning curve is much steeper. The statements made by a participant describing the experience of navigating the website as coincidentally accessing information without understanding the structure, further adds to the suggestion that The Survival Kit is designed for exploratory behaviour.

As previously mentioned, whether or not this suggestion about the connection between information behaviour and structural characteristics on single page websites is valid, should be studied further.

11 | Design principles

The usability examinations conducted in order to gain insights into the use of single page websites involved observing actions of participants; where they succeed, and where they have difficulties with the interface. We experienced that six out of seventeen participants were acquainted with the phenomenon single page websites before initiating the usability - that is around 35 %. This means that almost two thirds of the participants mentioned having no prior experience with single page websites. Since there is no such thing as reading a website manual to single pages, new users should encounter them without difficulty, thus being able to comprehend the interface without getting lost, feeling unenlightened, or experience navigational issues. The following nine design principles have been developed on the basis of our usability study with 17 participants examining two single pages, drawing on preliminary research into the phenomenon single page websites.

1. Consider which information behaviour the website should facilitate, and how it can be accomplished
2. The amount of text must correspond to the context of the website
3. Horizontal navigation confuses some users
4. Some users only navigate via automatic scroll
5. Some users will use browser-functionalities
6. Transparency is heightened by placing information about the sender in the header or footer
7. Be consistent with use of signifiers in the interface
8. Visualise the journey during automatic scroll
9. Familiarity can help minimise the user's memory load

1: Consider which information behaviour the website should facilitate, and how it can be accomplished

Preliminary investigations into the single page phenomenon, coupled with the usability examinations, have underlined the importance of accommodating information behaviour. Even though it is possible to accommodate both Convergent and Divergent information behaviour, it is essential to consider whether the goal of the website is aimed at goal-directed or exploratory behaviour. When seen in the context of affordances, which may be intended or unintended by designers of the information spaces, affordances can be embedded in the interface to support information behaviours. On this note, inconsistencies between the user's perceived affordances and designer's intended affordances can occur, and users can therefore interpret the interface

different from the intended. An example of this can be seen on The Survival Kit, where the navigation to some users did not afford manual scrolling, but only via automatic scroll features. Hereby, the user's behaviour on the website can be seen as a product of affordances (amongst other things), and can serve as a means for information behaviour through facilitating explorability or rapid information recovery. In order for affordances to facilitate the intended interaction between the user and the system, it is wise to consider what information behaviour should be accommodated by use of perceived affordances embedded in the interface. Furthermore, the designers should test the interface by including users in order to get insights into any inconsistencies between the intended and perceived affordances.

2: The amount of text must correspond to the context of the website

One of the qualities often mentioned in the context of single pages, is the ability to form an overview of information in a simple manner. During the usability examinations we experienced that participants felt that one of the websites was bordering on being too text-heavy, while the other did not provide enough explicit information. Even though it is impossible to set up an exact figure of what amount of text should be provided on a website, as it is individual to the context, it is important to keep in mind. In this context, the amount of text should be kept short enough for the users wanting to read it, but still provide enough text for the purpose to remain clear. No irrelevant information should be presented in order to maintain an efficient information retrieval. One should also keep in mind that every piece of information competes for the user's attention with already the existing units of information, and hereby the findability of relevant information diminishes. When a website has too much text, some users might not want to read it in order to spend their time on the site efficiently, and so they risk missing essential information that they might find relevant. However, a small amount of text with an unclear message can make users question the relevance of the site, and both scenarios might lead the users to leave the site, as they find it unimportant to them. In summation, the amount of text should correspond to the context of the website, since a website with the purpose of informing the user, such as a campaign, should provide more in-depth information than a website aimed at displaying images, such as an artist's portfolio.

3: Horizontal navigation confuses some users

Many single page websites have embedded both vertical and horizontal navigation. During our usability examination, we witnessed that some participants were inexperienced with horizontal navigation, and therefore it should

be kept in mind that not all users are familiar with this way of navigating and might find it confusing. In order to help the users understand the structure of the site, horizontal navigation should be clearly marked by signifiers and help-text, affording the action of navigating horizontally. These signifiers should be tested as to whether or not they correspond to the users' mental models, since they may not come across as intended.

4: Some users only navigate via automatic scroll

Over the period of examining the two websites, we experienced participants to whom the possibility of navigating manually did not come across, and therefore only navigated via automatic scroll. This was only the case on one of the websites (The Survival Kit), possibly because the index section on the other website (Factory Forty) contains the help-text "*Scroll down*". This opens the possibility of incorporating help-text into the system, since it may be necessary to provide for some users. Additionally, during the usability examinations some sections of the website were only accessible through manual scroll. This resulted in some participants not accessing the sections, since the automatic scroll moved past them. The sections skipped by the automatic scroll contained images, but they might as well have contained important information. Therefore it is crucial to consider how a website would be navigated if the users only moved via automatic scroll, and how the designer can communicate that manual scroll is possible.

5: Some users will use browser-functionalities

In order to achieve useful design, which is both easy and pleasant to use, but also compatible with user behaviour, designers of single page websites should take into account that some users will use browser-functionalities. During our investigations, we have come across three important browser-functionalities embedded in the user behaviour: Using the back-button, the *find on page*-feature, and looking to the browser for information about the sender.

The first functionality involves using the back-button in the browser, which takes the user to the previous page viewed. Sometimes users feel like they made a mistake in choosing an item in the menu, and want to "go back" in the system. Being used to navigating a website with more pages, they use the back-button in the browser, which thereby functions as an *emergency exit* for some users. When participants used this functionality during our usability examinations, they were taken away from the website, which was an error that caused confusion. Therefore, when using single pages, one could implement a clear "emergency exit" in the interface, taking the users back to their starting point (the index section). Otherwise, the designer could code the website to re-assign the back-button event to take the users to the index

section when clicking the back-button in the browser.

One of the other browser-functionalities we witnessed being used during the usability examination was the browser-functionality *find on page* (cmd + F). The browser-search could not access off-canvas sections, such as sections in ribbons hidden by horizontal navigation. Therefore it would be wise to take into account that some users, attempting to retrieve information via browser-search, cannot access these sections, and might miss the information embedded in off-canvas areas.

The last of the browser-related functionalities to consider is related to users deciphering the name of the sender through looking at the URL (web address) and page title. Therefore the information represented these places should be consistent with the communicative situation.

6: Transparency is heightened by placing information about the sender in the header or footer

It is important to maintain transparency on a website in order for the users to know what they are looking at, and who the sender is. During our usability examination, most users expected to find a logo or name in the header and practical information like contact information in the footer. When the site did not provide this information as expected, some participants became confused and frustrated. Therefore, the designers of single pages should keep in mind that placing information about the sender in the header or footer heightens transparency and accommodates the users' way of comprehending a website: Much like a letter, with information about the sender in the top and/or bottom.

7: Be consistent with use of signifiers in the interface

It is always important to keep continuity and convention across an interface, so that users do not have to ponder whether similar objects have the same function. This is both the case with the labelling of items and with visual objects, such as arrows or icons. During the usability examinations, we experienced arrows affording different actions, which confused participants. Therefore we suggest that identical arrows, or other signifiers, are consistently used within the interface, and that the designers set up and follow platform conventions.

8: Visualise the journey during automatic scroll

Automatic scroll on single page websites bring a lot of positive aspects to the navigation, making information-retrieval efficient and providing a key utility to the functionality of the design. Often, when the user clicks a menu-item in the navigation, initiating the automatic scroll, an animation starts and moves the user through the website, thus visualising the journey. During this

journey from the starting point to the destination, a user might spot the information he/she was looking for, and attempt to brake the automatic scroll. This was the case several times during our usability examinations, and every time the participants attempted to stop the scrolling process, the design started lagging and flickering, causing frustration and confusion. Therefore designers should consider that users might change their minds during the scrolling process and contemplate how they, in the best way possible, could support this behaviour. Furthermore, the usability examinations revealed that, for some participants, the fast-paced automatic scroll did not visualise the journey from starting point to destination, but instead was interpreted as being a confusing film playing before their eyes. The automatic scroll should provide the users with the feeling that they are being taken from one place to another, thus making the animated journey transparent to the user. This could be achieved by indicating the travel through the page by using a breadcrumb-like menu indicating the current position throughout the scrolling process, just as it is implemented on Factory Forty.

9: Familiarity can help minimise the user's memory load

When we navigate the web, we all draw on memory to retrieve the information we need. Interfaces that promote recognition with users make it easier for us to remember information about features, functionalities, actions, options, and objects. During the usability examination, we witnessed the participants attempting to rationalise the interface and available actions based on prior experience - for example, if they recognised an arrow pointing downwards, they would press it with the expectation of automatically being taken vertically down the site. It takes less time to learn the design and be able to accomplish basic tasks, if users have encountered them before and are able to derive the meanings and actions from experience and memory. This eases the user's memory load, since they remember information about objects or interface functionality seen before.

12 | Conclusion

This thesis has revolved around developing a framework of design principles through an investigation of the notion of single page websites. In order to investigate this phenomenon, we conducted preliminary research in order to get familiar with the evolution of the World Wide Web and the dissemination of the single page phenomenon. Furthermore, to gain insights into the characteristics, and to find out what constitutes a single page website, we looked into the anatomy, technology, and features associated with single pages, and gained insights into their current context and use. Additionally, this provided us with knowledge about how information architecture is utilised by designers of single pages. On the basis of this knowledge, we created a sub-genre division consisting of two genres: Conventional and Avantgarde. After getting familiar with the structure and anatomy, we were interested in examining the user interaction on examples from both sub-genres - also to gain insights into how information architecture is utilised by *users*. This was done in a usability lab with 17 participants with the aim of investigating how users navigate and interact with the websites. By collecting quantitative data in the form of UX metrics, and meaning categorising the think-aloud data from the usability sessions, we were able to gain insights into the experience, interaction, and opinions of the participants. Hereby, we gained knowledge about how usability and user experience in the context of single page websites can be characterised. Based on the challenges and useful elements/features found in the interface while investigating two websites representing each sub-genre, and preliminary research, we developed a framework of design principles for single page websites taking into account how users perceive and interact with the websites.

13 | Reflections

When seen in retrospect, it could have been beneficial to have urged the participants to support their semantic differential assessments with subjective comments as to what is attributable to their placements on the scale. The Q&A session following the self-reported metrics was aimed at exhausting the aspects assessed in the semantic differentials, but we have experienced that the statements made during the Q&A are not always in accordance with the individual participant's semantic differential assessments. Therefore it is difficult to reflect on what might have caused them to make the assessments they did. Furthermore, when an assessment is not accompanied by a subjective statement, and is placed exactly in the middle of the scale (4), then it is difficult to read something into the assessments: Was the experience actually placed in the middle? Did the experience change during the session, which has caused him/her to place the "average" of the experience? Or is the participant just not sure? If we had chosen to make the scale with 6 dots instead of 7, we would have eliminated the ability to place an assessment exactly in the middle, and the participants would hereby have been forced to make up their minds as to which of the opposites they lean mostly towards.

13.1 Sources of error

During the usability sessions the participants were able to choose between using an external mouse or the integrated mouse-pad on the Macbook Pro. These different ways of navigating by mouse might have influenced the entire experience of navigating the websites. This could have resulted in us recording two different data sets; one with the mouse-pad, and one with the external mouse. During the usability examination, some participants mentioned that switching from the external mouse to the mouse-pad changed their whole experience of navigating the site. This aspect is relevant to take into consideration in the context of sources of error.

Another source of error can be seen in relation to our acquaintance with the people participating in our usability study, since all of the participants were known to either one of us. By knowing the moderator, the participant might have felt more comfortable in the test-situation. This might have had an influence on the way the participant performs the tasks, since focus could have shifted from completing the tasks in the right way, to just completing the tasks. On the other hand, the familiarity with the moderator might have affected the test results in a negative way by making the scenery too relaxed, diminishing the importance of completing the tasks. The familiarity

might also have influenced the statements, since the participants could have expressed themselves in a way only understood fully by the moderator, being acquainted with the participant. Furthermore, the moderator in the test room did not know all the participants, since some were acquaintances of the person sitting in the observation room, and this might have resulted in a different context for some participants. In order to ensure a comfortable atmosphere during the sessions, we supplied the room with coffee and a bowl of candy.

During the process of writing this thesis, we discovered the two subgenres of single pages, and went on to suggest that the two genres were characterised by being designed towards supporting two different information behaviours. Nonetheless, the Avantgarde website, The Survival Kit, which was suggested as being designed towards supporting Divergent information behaviour, was examined convergently with a pre-defined set of tasks. In this context it is relevant to consider how the website could have been examined in a more divergent manner: If the examination had been carried out with participants exploring the website without being bound to pre-defined tasks, but instead were asked to explore the website and think aloud, the website would have been examined divergently. Hereby the moderator would have been able to experience the participants' own sequence of understanding and deciphering of the structure.

Since we did not transcribe the entire audio-recordings from the usability examinations, it is relevant to reflect on how this may have affected the investigation. Concretely, we did not perform the meaning categorisation with any pre-defined categories, but nonetheless, the categories were developed in the process of transcribing, and therefore the first meaning categorisation was the only truly open categorisation. Therefore, by not transcribing the recordings in their entirety, we may have had a narrow outlook on which parts of the recordings were relevant, which can have influenced the entire study.

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World Wide Web Consortium (2015). W3C, *Facts about W3C*. Accessed May 20 at: www.w3.org/Consortium/facts#history

Other

ThoughtStream manual (2010). The MindPlace Company. Accessed May 20 at: www.estressado.com/produtos/manuais/_manualts.pdf

A | Appendix

Manuscript

The following pages contain the manuscript used during the usability examination, and consists of the following:

1. Ask participant to fill out questionnaire
2. Present participant to the context
3. Pre-task questions
4. Usability session with 10 questions
5. Screen recording review
6. Ask participant to fill out post-task self-reported metrics
7. Post-task Q&A with 23 questions

Hav computeren sat op og hav sidens URL klar i et browser-vindue.

Underskriv kontrakten.

1) Spørgeskema

Før vi går i gang med usability undersøgelsen, vil vi gerne hvis du kan besvare dette spørgeskema omkring dine internetvaner. Der er kun 13 spørgsmål, og det tager cirka 3 minutter.

I denne undersøgelse vil du være **anonym,** og dit navn i din besvarelse er derfor kun for os.

2) Præsentation

Du får en **sensor på hånden**, der skal måle din hud. Udslagene vil kunne ses på en graf, og vi overvåger på denne måde dine udslag. Efter selve usability-delen vil Signe komme ind og gennemgå øjeblikke i din undersøgelse med dig, og så skal I tale om hvad der skete - det kan være fordi du var frustreret, overrasket, glad, eller bare fordi du bevægede din hånd lidt.

Du skal medvirke i en usability undersøgelse, hvor du så vidt muligt skal **tænke højt** og reflektere højt over hvorfor du vælger at trykke hvor du gør. Du skal så vidt muligt gøre opmærksom på, **hvornår du ville have givet op** hvis du sad derhjemme og skulle finde oplysningerne.

Jeg vil give dig en række opgaver, og din eneste opgave er bare at lokalisere disse ting jeg beder dig om på en hjemmeside - der er ingen rigtige eller forkerte løsninger.

Derefter kommer Signe ind og viser dig skærmoptagelsen og spørger om nogle spørgsmål.

Så har jeg et lille spørgeskema mere - og derefter nogle opklarende spørgsmål.

- *Aktivér sensor, skærm-optagelse og lydoptagelse*

3) Spørgerunde 1

Kender du begrebet ‘Single page’-hjemmesider?
Hvilken type hjemmesider associerer du med single page?
Hvordan vil du beskrive single page med ét eller flere ord?

4) Undersøgelse

1. Tryk på “Enter”

2. Har du set denne hjemmeside før?

FACTORY FORTY:

1. Hvem er afsenderen af hjemmesiden?
2. Hvad er afsenderens adresse?
3. Hvad er Factory Forty?
4. Du er interesseret i at finde ud af hvad det koster at leje et kontor i Factory Forty. Hvad er prisen?
5. Du leder efter et sted at holde et event. Du er interesseret i at finde ud af hvad størrelsen på et rum er. Hvor finder du denne information henne?
6. Du er interesseret i at finde ud af om du har adgang til printer-udstyr i bygningen, og hvor det er placeret. Hvor finder du denne information henne?
7. Du er interesseret i at finde ud af hvornår du kan komme og gå i hverdagene hvis du lejer et kontor. Hvad er åbningstiderne i bygningen?
8. Du er interesseret i at finde ud af om du har adgang til et udendørsareal som medlem af Factory Forty. Hvor finder du denne information henne?
9. Hvor mange medlemmer har de hos Factory Forty?
10. Hvordan kommer du i kontakt med Factory Forty?

THE SURVIVAL KIT:

1. Hvem er afsenderen af hjemmesiden?
2. Hvad kan man købe på hjemmesiden?
3. Hvor mange survival kits er der?
4. Hvad er formålet med det survival kit, der hedder Overtime?
5. Hvad indeholder det?
6. Hvad er formålet med det survival kit, der hedder Presentation?
7. Hvad indeholder det?
8. Hvad er formålet med det survival kit, der hedder Power Outage?
9. Hvad indeholder det?
10. Hvordan køber du et survival kit og hvad koster det?

5) Sensor-data

Afbryd sensor og skærmoptagelse.

Signe kommer ind og spørger til de enkelte øjeblikke med udsving.

Signe går ind og gemmer formdata på USB-stik og navngiver den med sigende navn.

6) Spørgerunde 2

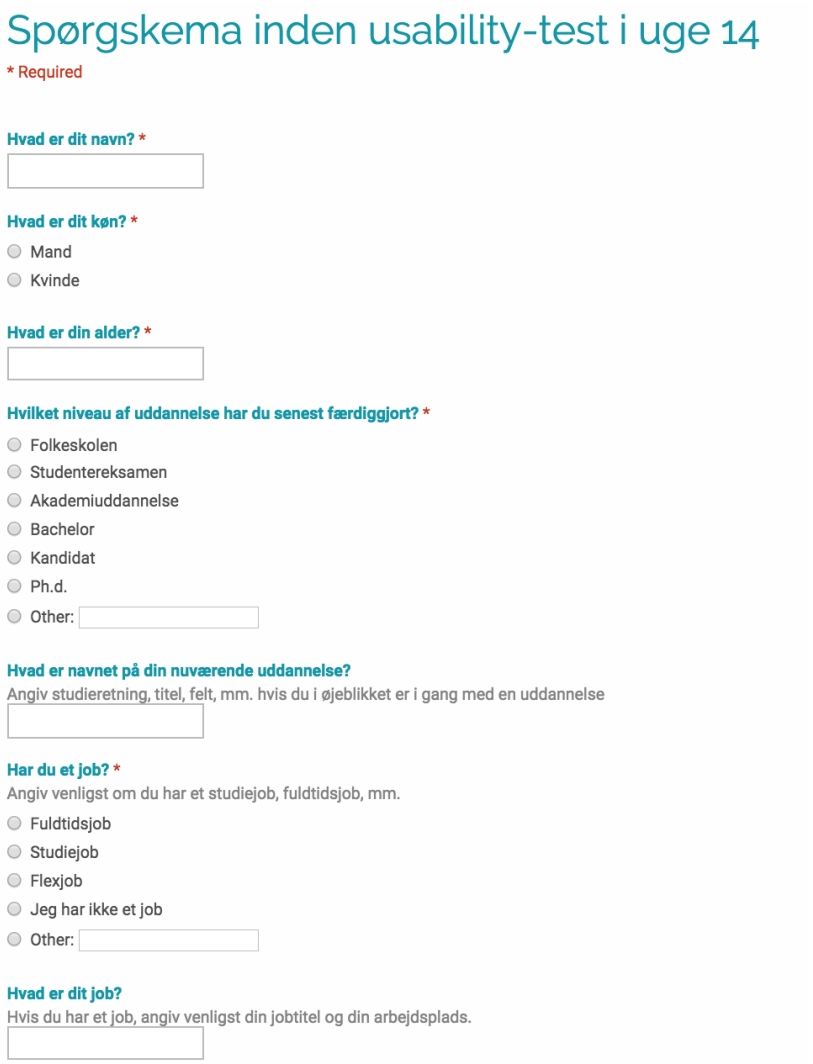
Giv deltageren **spørgeskema og instrukserne**: “Udfyld dette så godt du kan på baggrund af din oplevelse med hjemmesiden. Hvis du har spørgsmål til spørgeskemaet, eller der er noget du ikke forstår, så sig til.”

1. Hvor godt synes du denne hjemmeside repræsenterer din opfattelse af en single page?
2. Var der dele af hjemmesiden, du synes der var svære at navigere?
3. Var der dele af hjemmesiden, du synes der var lette at navigere?
4. Følte du, at du havde flere måder at navigere rundt på siden?
5. Var du i stand til at finde ud af din position på siden?
6. Følte du på noget tidspunkt, at du var faret vild?
7. Følte du dig på noget tidspunkt forvirret?
8. Hvor hurtigt fandt du ud af hvordan hjemmesidens struktur var opbygget?
9. Var der nogen steder på siden, du følte at du manglede instrukser?
10. Var der nogle elementer på siden, som du regnede med havde en anden funktion end de faktisk havde?
11. Hvilke elementer på siden lå til grund for din vurdering af sidens troværdighed? Hvad kiggede du på?
12. Vil du beskrive det som en behagelig oplevelse af besøge siden? Hvorfor (ikke)?
13. Følte du at du lærte at bruge hjemmesiden hurtigt? Var det nemt at lære?
14. Hvad synes du er mest frustrerende ved single pages?
15. Hvad kan du bedst lide ved single pages?
16. Hvilke features/funktionaliteter kan du (ikke) leve uden på en single page?
17. Hvordan påvirkede sidens ydeevne dit overordnede indtryk af siden - og i hvilken retning?
18. Hvis du kunne ændre en ting ved single pages, hvad ville det være, og hvorfor?
19. Var det nemt at finde ud af hvem der er afsender/modtager af hjemmesiden?
20. Kunne du nemt gennemskue hvad formålet med siden var?
21. Hvor på siden fandt du hovedsageligt informationer om afsenderen? Havde du forventet at finde denne information andetsteds?
22. Syntes du at designet overskyggede den egentlige pointe/mål?
23. Andet du har lyst til at dele?

B | Appendix

Questionnaire from usability examinations

The following questionnaire was aimed at getting insights into the participants' profiles, and was filled out by all participants before beginning the usability session.



Spørgskema inden usability-test i uge 14

* Required

Hvad er dit navn? *

Hvad er dit køn? *

- Mand
- Kvinde

Hvad er din alder? *

Hvilket niveau af uddannelse har du senest færdiggjort? *

- Folkeskolen
- Studentereksamen
- Akademiuddannelse
- Bachelor
- Kandidat
- Ph.d.
- Other:

Hvad er navnet på din nuværende uddannelse?

Angiv studieretning, titel, felt, mm. hvis du i øjeblikket er i gang med en uddannelse

Har du et job? *

Angiv venligst om du har et studiejob, fuldtidsjob, mm.

- Fuldtidsjob
- Studiejob
- Flexjob
- Jeg har ikke et job
- Other:

Hvad er dit job?

Hvis du har et job, angiv venligst din jobtitel og din arbejdsplads.

Figure B.1: Questionnaire

C | Appendix

Contract

The contract below was handed out for the participant to signs, and functions as a consent letter.

Kontrakt for usability-undersøgelse

Vi vil gerne have din tilladelse til at optage denne undersøgelse (lyd og skærmbillede), så vi nøje kan gennemgå eventuelle problemer på et senere tidspunkt. Du vil derfor ikke blive videooptaget. Derudover vil vi monitorere sensorisk data fra din hånd. Denne data vil blive brugt til at opfange eventuelle problematiske områder i din brugeroplevelse.

Du vil fremgå som anonym i det færdige speciale, og dit navn vil derfor ikke figurere noget sted. Vi vil i stedet tage din personlige profil i brug til at repræsentere bestemte brugergrupper.

Du har til enhver tid ret til at afslutte prøven uanset årsag.

Mange tak for hjælpen!

_____ _____

Underskrift dato

Figure C.1: Consent letter

D | Appendix

Quantitative research: 100 websites

This appendix contains data from the qualitative research.

The following pages will contain all data collected in our quantitative research aimed at characterising and categorising the context of 100 single page websites located on Awwwards.

A **Avantgarde**
M **Mix/Combination**
C **Conventional**

Entertainment

A RISE AND SHINE -
http://riveimmersive.com/rise-and-shine/ no menu, short story, music

A NEW YORK SUMMER -
http://johnjacob.ca/newyork/
fullscreen parallax, off-canvas menu (left), narrative

M HISTORY OF INTERIOR DESIGN
https://www.harveywatersofteners.co.uk/history-interior-design
fullscreen, parallax, dotted menu to right

A PABLO THE FLAMINGO -
http://pablotheflamingo.com
fullscreen, little to none interaction, music

A THE MANTRA PASSWORD -
http://mantrapassword.com/
fullscreen, parallax, unexpected things popped out

Personal portfolios/websites

M THIS WAS MY BEST -
http://thiswasmybest.com/
fullscreen, parallax, dotted menu to right, slow

C ERIC HUGUENIN -
http://eric-huguenin.com/
fullscreen, parallax, off-canvas menu (left)

C MATT BARNES -
http://mattbarnesenterprises.com
fullscreen, off-canvas menu (left), objects come in from the sides

C ROB HOPE -
http://hitdelete.com
fullscreen, off-canvas menu (left), external links, only 1 section

C RYAN BARLOW -
http://ryanbarlow.com
parallax background, no menu

A JACOB GRUBBE -
http://www.jacobgrubbe.com
no menu, you have to type to see the content

A ØYVOND SÆTRE PHOTOGRAPHY -
http://oyvindsatre.no

fullscreen, horizontal navigation, about-site looks like off-canvas menu (right)

M DANIEL PORTUGE - http://www.danielportuga.com/voltaportuga/
no ribbons, dotted menu to the right (with icons)

M Melanie Daveid - http://melaniedaveid.com/
ribbons, division in the middle, sub-ribbons in ribbons can be activated

M ANTHONY ISAAC - http://anthonyisaac.com
fullscreen, off-canvas menu, ribbons, horizontal and vertical navigation

C TOBIAS HAEUSLER - http://tobiashaeusler.de
sticky top menu, parallax objects appear

A COLIN AND DEWI'S WEDDING - http://colinanddewi.com
very long, no menu

M DEEP SONI, DIGITAL DESIGNER - http://deepsoni.me
framed, objects appear, starts with animation, no ribbons

Environmental/community-related causes

A ECOFOLIO (recycling) **-** http://www.recyclons-nos-papiers.fr
fullscreen, music, slow, dotted menu to the right

A OPEN YOUR HEART - http://www.open-your-heart.ca
fullscreen, parallax, unexpected features appeared (acceptance on/off), no menu

C MISSION - GIVE 0.7 - http://give.zeropointseven.org/mission
sticky top menu

A THIS STORY IS ABOUT LIFE - http://www.foodisforeating.org/
parallax, dotted menu to the left (with icons), very long

M LIVE TO CHANGE THE WORLD - http://change-the-world.unltd.org.uC
sticky top menu, very long, no ribbons, many things to read

Product showroom

M VIDEO MAPPING LOOPS **-**

http://videomappingloops.com/
parallax, fullscreen ribbons, slow, dotted menu to the left

C BRIO - http://brio.media/en/
parallax, parallax objects, ribbons, content appears

A HAPPY NEW YEAR -
http://new-year.pernod-ricard.com/
parallax, fullscreen, mouse-movement, modal windows

A OH MY GIFT -
http://www.ohmygift.ch
fullscreen, room with clickable objects, no menu

M PORSCHEVOLUTION -
http://porschevolution.com/
fullscreen, static effect on content when scrolling

C LISTEN TO YOUR CITY -
http://electrichybrid.volvobuses.com/
parallax, non-sticky menu at top, ribbons

M THINK OR SWIM -
http://portfolio.ervinandsmith.com/tda-thinkorswim-sharing/
no ribbons, dotted menu (right), sticky top menu, first layer is scroll-activated video, text-heavy

A LA PIÉCE -
http://www.lapiece.com/
parallax objects, sticky top menu, no ribbons

A TEYE -
http://teye.denkwerk.com
fullscreen, off-canvas menu (right), non-clickable dotted menu (right), many different features

A PURA PASSATA -
http://purapassata.derica.it
fullscreen parallax, iconic menu (right), scroll-activated video

C PERONDA CERÁMICAS -
http://peronda.peronda.com
sticky top menu, tiles, ribbons, auto-play video

C ESSENTIAL ICONS -
http://www.essential-icons.com
framed website, no ribbons, progress-bar at bottom, changing background

A THE SURVIVAL KIT -
http://agencysurvivalkit.com/

parallax, ribbon-ish, custom cursor

M 234 MONO SPEAKER & HEADPHONE AMPLIFIER - http://www.234mono.com
horizontal dotted menu but vertical scroll, objects appear, no ribbons, hover-effect on dotted menu

C YOU'RE INVITED TO BE PART OF …… - http://10thwhiskey.com/
parallax, ribbons, some content and objects appear, first menu option is external link

Campaigns
M RED BULL KUMITE **-** http://www.redbullkumite.com/
fullscreen, infinite, parallax (NOTE: this website has changed since before)

A YEAR IN HASHTAGS - http://yearinreview.hshtags.com
fullscreen, horizontal scroll, vertical scroll in hashtags, horizontal scroll-bar in bottom

M RELEASE THE RENEGADE - https://releasetherenegade.de/
auto-play video, parallax, sticky top-menu but info about current position, unexpected animations

C DRUPAL 8 HIVEMIND - https://drupal8release.zensations.at
ribbons, moving background, mouse-movement

M DRIVE LIVE - http://www.citroendrivelive.hr/
extendable ribbons, left menu

C SMART FLOWS - http://www.smart-flows.com/tokyo/
ribbon-ish footer and header

M LIQUID INT. MOBILE PREFERENCE - https://www.liquidint.com/mobility/
dotted menu (right), objects appear

A MOVEMENT OF DATA - http://www.akita.co.uk/movement-of-data/
fullscreen parallax, horizontal navigation, scroll-based animations, narrative

A AIR SOCIAL - http://air-social.com

parallax fullscreen, scroll-based animations, start at bottom, dotted menu (right)

A LET'S MAKE HISTORY - http://marquonslhistoire.com/en/semifinals/
scroll-based animations, music, like a video that the user controls, animations jumping out

Web design bureaus / digital agencies

M BAD ASSEMBLY **-** http://www.badassembly.com
fullscreen, tiles, off-canvas menu (right), some fullscreen ribbons have horizontal navigation - makes it seem exploratory

C WEBSTO - http://www.websto.ca/
sticky top menu, ribbons

C EXTRA L'AGANCE - http://2015.extralagence.com
parallax, dotted menu (left), unconventional ribbons

C LA BOÎTE Á MALICE - https://welcome.laboiteamalice.ch/#en-image
fullscreen with automated scroll, ribbons, animations, dotted menu (right)

A MENE & MONEY - http://www.menemoney.com.br/
parallax, scroll-based animations, off-canvas menu (top), tiles

M WHY GDC - http://joingdcmb.ca
parallax, menu with numbers appears on the right, ribbon-ish structure

C ARTOOL - DIGITAL DESIGN COMPANY - http://artool.me/
fullscreen, sticky top menu, dotted menu (right)

C HI THERE, WE ARE CK - http://creativitykills.co/
parallax, objects appear, sticky top menu, ribbons

C DESIGN MODO, QUARDS - http://designmodo.com/qards/
fullscreen, dotted menu (left)

C YAY GRAPHIC DESIGN STUDIO - http://www.collectif-yay.com/en/
parallax, ribbons, off-canvas menu (right), dotted menu (right)

M STUDIO KRAFTWERK -
http://studiokraftwerk.com
mouse-activated background, dotted menu (right) - this website is kind of scary (because of the background)

A DANGEROUS ROBOT -
http://www.dangerousrobot.com/
mouse-activated background, very hard to navigate using scroll, narrative, objects appear

C RESANOVA -
http://www.resanova.fr
fullscreen, dotted menu (left), ribbons

C ADVERIS -
http://www.adveris.fr
mouse-activated background, left iconic menu

C PERVOLO -
http://pervolo.com/en/
parallax, ribbons, sticky top menu, slow

C ERTL DESIGN -
http://www.ertl-design.co.uk
ribbons, tiles, no menu

C LIQUID INTERACTIVE DIGITAL MARKETING AGENCY -
https://www.liquidint.com
sticky top menu, video background

C WE ARE YUNIC -
http://designarethemes.net/themes/html/yunik/
parallax, sticky top menu, tiles, objects appear

C KNAPSACK CREATIVE -
http://www.knapsackcreative.com
parallax, sticky top menu, ribbons

C CREATIVE WEB DESIGN AGENCY -
http://www.creativewebdesignideas.com
parallax, difficult scroll, non-sticky top menu, fullscreen

C GARDEN WEB AND MOBILE -
http://gardenestudio.com.br/en
parallax, ribbon-ish, sticky top menu

Other companies/organisations
A MIX EVENT MUSIC AGENCY -
http://www.mix-event.com
parallax, objects appear, left menu, animations

C FACTORY FORTY -
https://www.factoryforty.be/en/
parallax, ribbons, sticky top menu

M SEVEN TYPES OF MOTORCYCLE RIDER -
http://www.mcaleicester.co.uk/if-the-lid-fits/
fullscreen, ribbons, slow

C SEIM -
http://seim-mc.com/
ribbons, sticky top menu

C A JOB BOARD FOR STARTUPPERS -
http://www.iwantmystartup.com/
ribbons with external links, framed website

C KERRIS CREATION -
http://kerriscreation.com/
parallax, fullscreen, menu disappears off-canvas

C CORPORATE DIGITAL SOLUTIONS -
http://nyt.craftedny.com/
sticky top menu, ribbons

C MORE THAN A HOTEL, YOUR HOME -
http://en.lapetitemaisonfavart.com/
parallax, ribbons, sticky top menu

C THE MOBILE COMPANY -
http://themobilecompany.com
ribbon-ish, non-sticky top menu

C WELCOME -
http://www.photolab.gr/
parallax, long loading screen

C THE FERNWAY -
http://thefernway.com
ribbons, no menu

C HARVEY VICE -
https://www.harveyvice.com/
sticky top menu (with off-canvas), ribbons

C KUTIKAI -
http://www.kutikai.com/
fullscreen parallax , sticky top menu, ribbons

A PROFLEET NEDIR? -
http://www.profleet.com.tr/

parallax, fullscreen, animations, you scroll through animations like videos, sticky top menu

C KABER TECHNOLOGIEA - http://kabertech.com
parallax, off-canvas menu, sticky top menu, ribbons

C SAVSE SMOOTHIES - http://savsesmoothies.com/
objects appear, dotted menu (right), ribbons, non-sticky top menu

C GUSTAVE CAFÉ - http://www.gustavecafe.fr
parallax, custom cursor, sticky top menu, ribbons

C MESÓN - http://restomeson.com/en/
parallax, ribbons, sticky top menu

Clothing and fashion

C THE KORNER - http://thekorner.fr/
fullscreen, left menu, tiles

C MCGARRY & SONS - http://mcgarrynsons.com
parallax , menu minimises on left side, sections numbered in menu, custom cursor

M FCBOTIGA MEGASTORE - http://www.fcbmegastore.com/
fullscreen, parallax, dotted menu (right), off-canvas menu, content below last dot behaves differently

A WOODSLY SUMMER LOOKBOOK - http://woodsly.com/lookbooks/summer-2014
parallax, mouse-movement, scroll-activated movements in different directions, no menu, many different features

M 2014 COLLECTION - http://maillots.tribord.com/
parallax, dotted menu (left), objects appear, ribbon-ish

Music

A NOW LOADING - http://donottouch.org/
fullscreen, interactive, modal vindow

C JULIE GAVRILOVA - http://julia-music.ru
parallax background, sticky top menu

C DONGURI MUSIC -
http://www.don-guri.com/music/
sticky top menu, many animations

C MAJA AND THE JACKS -
http://majaandthejacks.com/
dotted menu (right), off-canvas menu (left), fullscreen, some effects were unexpected

C DREAMING WITH JEFF **-**
http://www.dreamingwithjeff.com
objects appear, ribbon-ish footer and header

Website templates
C WE CREATE DIGITAL EXPERIENCE -
http://demo.pixelthrone.com/
ribbons, no menu

C WEBDESIGN: SHORE -
http://www.highgradelab.com/shore-full-screen-slider/
parallax backgrounds, some objects appear, ribbons

C WEBDESIGN: PHEONIX -
http://phoenix.artbreezestudios.com/preview/index.html
parallax, objects appear, tiles, ribbons

E | Appendix

Semantic differential assessment

The following sheet contains the questions asked in relation to the post-task self-reported metrics included in the usability examination.

1) Angiv hvor let eller svært det var at finde de ting, du ledte efter

Svær	o	o	o	o	o	o	o	Let

2) Angiv i hvilken grad du fandt hjemmesiden forvirrende eller overskuelig

Forvirrende	o	o	o	o	o	o	o	Overskuelig

3) Angiv hvor troværdig du fandt hjemmesiden

Utroværdig	o	o	o	o	o	o	o	Troværdig

4) Angiv hvorvidt du fandt den overordnede navigation simpel eller kompleks

Kompleks	o	o	o	o	o	o	o	Simpel

5) Angiv hvor bekendt eller ubekendt sidens opbygning var for dig inden du begyndte

Ubekendt	o	o	o	o	o	o	o	Bekendt

6) Hvad synes du om det æstetiske udtryk - var designet stimulerende eller kedeligt?

Kedeligt	o	o	o	o	o	o	o	Stimulerende

7) Hvor langsom eller hurtig synes du selv du var til at finde de ting, du ledte efter på siden?

Langsom	o	o	o	o	o	o	o	Hurtig

8) Hvor frustrerende/tilfredsstillende føler du overordnet at det var at navigere på siden?

Frustrerende	o	o	o	o	o	o	o	Tilfredsstillende

9) Hvordan var din overordnede oplevelse af designets flow?

Hakkende/ laggende	o	o	o	o	o	o	o	Jævnt/ problemfrit

F | Appendix

Semantic differential data

This section contains all data from the semantic differential responses. The scale has been numerated from left to right with the numbers 1-7, and all responses made as post-task self-reported metrics from the examinations of The Survival Kit and Factory Forty can be found in the tables below.

	Q. 1	Q. 2	Q. 3	Q. 4	Q. 5	Q. 6	Q. 7	Q. 8	Q. 9
FF 1	4	3	5	6	1	6	5	5	4
FF 2	6	6	6	7	1	4	6	6	5
FF 3	3	6	5	6	3	6	4	6	5
FF 4	5	6	7	7	4	7	6	6	7
FF 5	6	3	6	5	1	6	5	3	2
FF 6	2	4	6	6	1	7	2	4	7
FF 7	2	2	4	3	1	4	2	3	6
FF 8	2	2	3	2	5	4	2	2	2

Table F.1: Semantic differential scale responses - Factory Forty

	Q. 1	Q. 2	Q. 3	Q. 4	Q. 5	Q. 6	Q. 7	Q. 8	Q. 9
TSK 1	3	2	5	5	1	7	6	7	7
TSK 2	3	4	3	3	4	3	3	3	6
TSK 3	4	4	4	4	1	7	3	6	6
TSK 4	2	2	4	2	2	6	1	2	4
TSK 5	5	5	7	2	3	6	3	3	4
TSK 6	1	2	4	4	1	6	1	2	7
TSK 7	4	3	6	7	6	6	5	6	4
TSK 8	5	6	5	6	3	6	6	4	6
TSK 9	2	1	2	2	1	4	2	2	3

Table F.2: Semantic differential scale responses - The Survival Kit

G | Appendix

Task completion times

This appendix contains all task completion times from the usability examinations of both The Survival Kit and Factory Forty.

	Question 1: Hvem er afsenderen?	**Question 2:** Hvad kan man købe?	**Question 3:** Hvor mange kits er der?	**Questions 4-9:** Formål og indhold i kits	**Question 10:** Pris og hvordan køber man?
TSK 1	00:25	02:05	02:20	05:40	03:55
TSK 2	03:20	00:10	00:40	02:24	01:20
TSK 3	00:35	17:35	-	10:40	01:00
TSK 4	02:30	04:45	01:10	07:20	01:20
TSK 5	01:50	00:10	00:20	04:10	00:35
TSK 6	06:40	01:55	04:45	05:25	02:35
TSK 7	00:25	03:10	00:10	01:10	01:30
TSK 8	00:50	00:50	02:40	01:15	00:50
MEDIAN	01:20	02:00	01:10	04:47:50	01:20
SUM (MIN)	16:35	30m 40s	13:05	38m 4s	13:05
SUM (DEC)	16,58	30,67	13,08	38,07	13,08
AVG (DEC)	2,07	3,83	1,87	4,75	1,63
AVG (MIN)	**02:04**	**03:50**	**01:52**	**04:45**	**01:38**
				Collected average:	14:09
	Gave up				
	Got help				

Figure G.1: Task completion times from The Survival Kit

	Question 1 Hvem er afsenderen af hjemmesiden?	Question 2 Hvad er afsenderens adresse?	Question 3 Hvad er Factory Forty?	Question 4 Hvad er prisen på at leje et kontor?	Question 5 Hvor finder du information om størrelse på event-rum?	Question 6 Hvor finder du information om printer-udstyr?	Question 7 Hvad er åbningstiderne i bygningen?	Question 8 Hvor finder du information om adgang til udendørsareal?	Question 9 Hvor mange medlemmer har de hos Factory Forty?	Question 10 Hvordan kommer du i kontakt med Factory Forty?	
Participant FF 1	00:12	00:19	02:04	00:39	00:57	02:35	03:17	00:22	00:35	00:05	
Participant FF 2	00:08	00:21	01:19	00:46	00:52	01:04	00:20	00:15	00:10	00:20	
Participant FF 3	00:10	01:19	-	-	-	02:29	01:15	00:07	00:35	-	
Participant FF 4	0:51	00:16	02:59	00:13	02:25	-	00:32	00:29	00:29	00:41	
Participant FF 5	00:25	00:13	01:44	01:17	01:34	01:07	01:24	00:43	00:16	00:20	
Participant FF 6	02:44	00:30	00:08	00:24	00:19	3:43	00:40	01:51	01:47	00:31	
Participant FF 7	00:13	00:26	02:30	00:25	01:25	03:21	01:45	00:17	00:12	00:16	
Participant FF 8	00:07	-	01:40	00:51	03:17	00:12	01:24	01:20	00:10	00:14	
MEDIAN:	00:12	00:21	01:44	00:39	01:25	02:29	01:19	00:22	00:22	00:20	
MEAN	00:36	00:29	02:17	00:39	01:32	02:04	01:19	00:40	00:31	00:21	
	Got help	Gave up									

Figure G.2: Task completion times from Factory Forty

H | Appendix

Audio recordings on CD: