QUICK AND EASY WEB USABILITY

How Web Designers see Usability and
what kinds of Tools they use to Improve it

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ABSTRACT

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The purpose of the thesis was to find out what web designers think about usability and what kind of tools they use to improve it in their everyday work. For the background, the terms of web design and usability were clarified and set. Web design was written open by using W3C's and WaSP's material as a background. Usability was approached in wider manner. The theoretical background of the thesis relies mainly on theories of Nielsen, Lazar and Garrett. Combining these authors, term usability was divided in smaller entities of user needs, task orientation, web usability (site usability, page usability, interactions, content usability, loading times, accessibility and responsivity) and user testing. The theories were complemented and supported researching multiple well acknowledged sources and authors.

After the theory was constructed, eight different web designers were interviewed for the thesis. The main research questions were 1) what are the general thoughts about usability, 2) what usability related challenges web designers face in their work, 3) what tools they use to improve usability, 4) do they perform testing, and 5) how do they ensure universal usability and accessibility. The interviews used method of open ended questions and they were mainly performed unsynchronized by email.

The interviews were transcribed, coded and categorized many times by using research questions and interview questions as themes. They were analyzed by using theming and qualification methods. The results suggest that web designers consider usability aspects and have set of tools that they use in their everyday work. The answers differ depending on what kind of tasks web designers have in the team. In general the themes of the findings resemble the theoretical frames used in this study. Similar words and terms such as intuitive, understanding the user needs were mentioned often. Web designers related related usability with navigation, interactions and content. The tools they used were interviewing users, sketching and prototyping. Light human evaluation was considered common way to test a site. Accessibility tools and techniques were used less. However, most of the interviewees brought up terms and keywords that indicate that they understand what the topic ment.

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Key words: web design, usability, web usability, accessibility

CONTENTS

GLOSSARY or ABBREVIATIONS AND TERMS (choose one or other)

TAMK	Tampere University of Applied Sciences
cr	credit
W3C	World Wide Web Cosortium
WaSP	Web Standards Project
HTML	HyperText Markup Language
XHTML	eXtensible Hypertext Markup Language
HTML5	HyperText Markup Language, fifth revision
XML	eXtensible Markup Language
RSS	Really Simple Syndication / Rich Site Summary
Ajax	Acynchronous JavaScript and XML
CSS	Cascading Style Sheet
UX	User Experiences

1. INTRODUCTION

As a medium, web has come a long way from a collection of static documents to communities of people contributing and creating content. Web has evolved from ”read-only” to ”read-and-write” and to even ”execute”. Nowadays we are using web sites and applications no only with our home- and laptop computers but also with other many devices.

In most cases, people use websites with a goal in their mind. To be able to serve the user need, a web site needs to be user friendly and usable. Usability has been an issue for a long time in web design, and that fact has not changed. Even though user experience has become an important part of web design, it is argued that still many sites go public without designers really thinking about usability issues or standards or running any kind of usability testing.

The purpose of the thesis is to research and analyze how web designer think about usability and how they improve it in their everyday work. For the research, eight web designers were interviewed about their opinions and experiences in the field of usability design. Theoretical background consists of explaining the terms web design, usability and web usability. The concept of web design was described through usability and web design standards using Jeffrey Zeldman's and Ethan Marcotte's "Designing With Web Standards: 3rd edition" as a main source. Usability on the other hand, is a broader term and more challenging to describe. To open the concept of usability and web usability, Jakob Nielsen's "Designing Web Usability", Jonathan Lazar's "Web Usability – A user-centric design approach" and Jesse James Garrett's "Elements of User Experience: 2nd edition" work as a guidelines to describe these elements. At the end the thesis interviews were transcripted, themed, the findings were listed and then compared with the theoretical framework to create a set of thoughts and tools used in everyday web design.

2. WEB DESIGN

What makes web different from an other mediums we use? Web behaves like a chameleon. Unlike other mediums, it can act like other mediums, text, video, radio etc. Besides that, web is inherently participatory, not just interactive. Many websites encourages us to create content by different ways. It is also immersive. Web design process gives way more room for iteration than most of the other design work. (Rose, 2011, 17-18.)

Web as a platform a gives designer the possibility to go forward and backward more easily, to add and to strip design even after numerous amount of redesign phases. Unlike printed design, once something is printed, it cannot be unprinted. (Butler, 2012, 20.) McCracken sums that web is permanent work in progress (McCracken, 2007, 15). This chapter is briefly summing up the development of world wide web especially from usability point of view and observing the basic standard professionals often use in their work.

2.1. History of web and web design

Internet started as a communication plan to control distant objects for military purposes during the 50's. DARPA (Advantage Research Project Agency), one important predecessor of today´s internet, was US reaction to Soviet Union's space invasion. (Butler, 2012, 135.) Nowadays, web is a vast growing collection of hyperlinked documents and applications created by numerous different authors. These documents are stored at web services and can be accessed by browser applications which provide interface that allows us to interact with those documents and applications. (Mayhew, 2003, 3-4.) The web has been the way of creating and organizing the information of the world into an "electronic library". The fact that web has created a lot of technology and industry around itself proves the success of it. (Butler, 2012, 140-141.)

"The WWW (World Wide Web) project merges the techniques of information retrieval and hypertext to make an easy but powerful global information system. The project is based on philosophy that much academic information should be freely available to anyone. It aims to allow information sharing within internationally dispersed teams and the dissemination of information by support groups" (Berners-Lee, 1991)

Internet has developed a lot from those days. Early years of the internet, web 1.0 was considered "read-only web" where users had very limited ways to interact with the content and sites were more static. After that, Web 2.0 introduced more broad use of the medium where users were able to contribute to the sites by creating content. This was considered read write web by Berners-Lee, one of the founders of the web. Web 2.0 was not really a new technology. It was a set of techniques which allowed new ways of designing and producing websites. Techniques such as Ajax (Asynchronous JavaScript and XML) made it possible to bring application like services on web browser by for example updating content without refreshing the browser. (Berlind, 2006; Getting, 2007; Wallace, 2012.)

2.2. Web design with web standards

There have been numerous things influencing the internet and designing web through it's history. When it comes to web design standardization and browser development, there are few very influential factors. These are WaSP (Web Standards Project) and W3C (World Wide Web Consortium) web design standards.

Besides static nature of websites and lack of user interactivity, web 1.0 was full of unstandardized techniques and practices. In the early days of web, the competition between companies developing browsers (mainly Netscape and Microsoft) escalated to the so called browser wars. During this time, companies fought from designers offering different features and all browsers used slightly different programming languages. This led to terrible practices where designers had to usually design two separate sites for different browsers or limit the site to work with only one browser, denying access with the other. Besides limiting out group of users, these practices made websites prizey to build. W3C was founded in 1994 by Tim Berners-Lee to standardise the protocols and

techniques used in web. Standards were crafted to bring sense to previously so random world of web designing and development. 1) They make content easy to find for people and search engines, 2) they separate structural, appearance and functional elements which makes sites easier to develop, test, redesign and tweak, 3) they make sites easier to access for different browsers and devices and 4) they also assure that sites developed according to these standards work even when technology develops. These standards were developed to fix old ways of web development which were incomplete, incompetent and even hazardous which brought accessibility and usability of the sites down, not only for user with disabilities but for all web users. (The History of the Web. 2011; Zeldman & Marcotte, 2010, Prelude, 15-16, 28-32, 59, 86-87.)

However W3C was not forcing the standards to be used, they rather crafted them as recommendations. WaSP is a coalition of web developers and designers launched in 1998 whose aim was to persuade browser developers to support these W3C web standards. These demands marked the path for the web development today. Web standards project made different browser developing companies work together to create better internet for all professionals and users. With Web standards, the professionals can build sites that are easy to access and high in usability without having to sacrifice too much from visual design. After standardization, one version of the website was enough (with small adjustments) for most browsers and devices. Web standard project has also influenced different web professional tools and their creators, by pursuing them to implement good standardised practises to their programs, for example Abode Dreamweaver development has been influenced by WaSP's improvement ideas. (The History of the Web. 2011; Zeldman & Marcotte, 2010, Predule , 16, 31, 50, 86-87, 91.)

Standard should not be how ever seen as a dogma in design process. According to Zeldman & Marcotte (2010), there is no right way to design a website and no right way to incorporate standards into designing workflow (Zeldman & Marcotte, 2010, 5). Web standards are a continuum of the ever changing web, not an inflexible group of rules and guidelines. They work as a roadmap to help to build rational, sophisticated and cost effective websites for all the user with different needs and ways to access. (Zeldman & Marcotte, 2010, preface, 6-7, 44-46.)

One of the key practices is how divide the different elements in web. Website are commonly broken in three different components (See figure 1), structure (HTML, XHTML and XML), presentation CSS (Cascading Style Sheet) and behaviour JavaScript and DOM) (Document Object Model).

Structure - Markup language
HTML, HTML5, XML

Presentation - Styling
CSS, CSS2, CSS3

Behaviour
DOM, JavaScript, Ajax

Separate files

Separate files
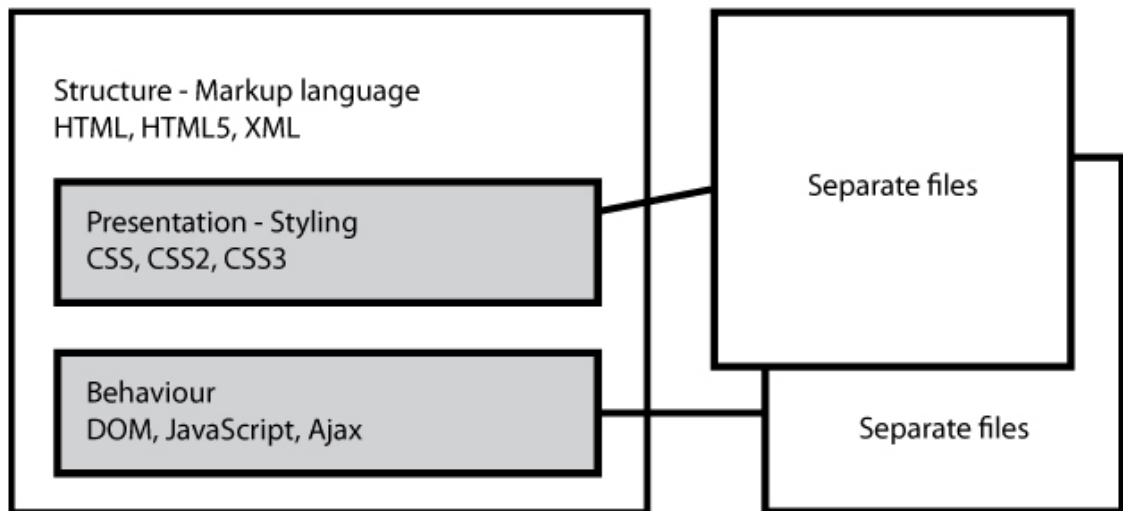
FIGURE 1: Structure of a web page with CSS and JavaScript files (Hirzel, 2013, Modified)

2.2.1. Structure

HTML (HyperText Markup Language), XHTML (eXtensible Hypertext Markup Language) and XML (Extensible Markup Language) work as a structure for the site. They work as wrappers for the content clearing the hierarchy of the site. HTML is structured markup language. It is meant for structural use, not for designing appearance like CSS. HTML contains all the data of the website that includes, for example, headings, paragraphs, lists and so on. It can also contain embedded data like images and videos. When authored correctly, it is completely portable. So besides browser, it works with screen readers and other devices build to read HTML. (Zeldman & Marcotte, 2010, preface, 34, 44-46.) HTML5 takes this semantic a bit further by giving it more structure and getting rid of pseudo-semantic solutions which are still reality in web design (Zeldman & Marcotte, 2010, 88). Semantic structure means that HTML5 elements (header, footer, section, article etc.) have meaningful labeling system that is more describing (Pilgram, 2011.)

XML is a content format which makes it possible to transfer data beyond web to any program that reads XML format and display it in the structure (HTML). It is tag based content structure which is highly standardized, extensible and transformable. It is seamless way for data exchange between different applications and programs that understand XML language. (Zeldman & Marcotte, 2010, 71-75.) For example, RSS (Really Simple Syndication) is a XML based vocabulary which informs the subscriber about changes on the website and the nature of the change. Ajax is a JavaScript based method of requesting for XML data without forcing the browser to reload the website. (Zeldman & Marcotte, 2010, 77-80.)

2.2.2. Appearance

CSS, CSS2 and CSS3 are style languages. With CSS, designers control attributes like typography, color, size and so on. Because style is separated from the content, users and professionals can change them without changing other, appearance may change but the written code does not. These different style sheets make sure that website is accessible by restyling the site for different purposes, devices or for example printing. (Zeldman & Marcotte, 2010, 47, 53-55.)

2.2.3. Behaviour

Behaviour elements such as JavaScript, enable different functionalities and effects to work crossbrowser and with all the devices. Standardized object model (the W3C DOM) makes sure that designers do not need to write browser specific scripts. (Zeldman & Marcotte, 2010, 47.) DOM is an interface which lets scripting (behaviour element) to change and update content and structure of the website as an animation for example (Le Hégaret, 2009).

3. USABILITY

Usability is important attribute of applications and web user interfaces. If users find it too hard to understand website, they might leave. If a customer cannot find a product, they might not buy it. If the content or function cannot be found, it means the same thing that it does not exist. If a user has to spend too much time figuring out the action, it takes focus away from actual task performance. Browsing through web site should be intuitive and not involve too much thinking. (Friedman, 2012a, 10; Krug, 2006, 11, Lazar, 2006, 104; Nielsen, 2012.)

Brooke (1996) sums up usability as general quality of appropriateness to a purpose of any particular artifact. Usability does not exist in absolute sense. When talking about usability, one must always refer it to the context. (Brooke, 1996.) According to Jakob Nielsen (2012), usability is qualitative attribute that tells us how easy something is to use. It is formed by five different attributes: learnability, efficiency, memorability, errors and satisfaction. These components form overall experience of usability and usefulness. (Nielsen, 2012.)

3.1. Usability principles, guidelines and standards

There are lot of guidelines and sets of principles of good usability practices in general and for specifically web usability. This chapter introduces some of these principles which are often used by professionals to ensure high usability. Some sets are more technical while other stay on abstract, emotional or aesthetic level. The first sets of rules created did not focus on web design. They were common acknowledgements about user interfaces, user experience, usability and user-centric design in general.

One well acknowledge set of rules began to craft during the founding of W3C in 1994. W3C provided WACG (Web content accessibility guidelines) 1.0 in 1994 and 2.0 in 2008. These guidelines contains rules about perceivability, operability, understandability and robust aspect of content. These rules are highly technical and apply on coding part and usability of the code itself. They also contain rules about usage of animations, multimedia, applets and plugins, hypertext tables. These rules are highly related to

universal usability and good practices to improve accessibility. (W3C, 2008; McGrath, 2011.)

These guidelines affected the birth of usability ISO standards. In 1999 and 2000, two different ISO certificate proposal and SFIA (skills Framework for the Information Age) rulers were created and stated as professional competencies for usability design, and to improve and apply high usability. (UPA, 2000.) Since these rulers can not be absolute due to the context relatedness of the usability as a concept, ISO standards suggest that measurements of usability should at least cover effectiveness, efficiency and satisfaction (Brooke, 1996). The ISO standards are grouped in five different categories. 1) Plan and manage the human-centered design process, 2) Understand and specify user and organisational requirements and context of use, 3) Produce design solutions, 4) Evaluate designs against usability requirements and 5) Demonstrate professional skills. (UPA, 2000.)

One of the first set of usability rules developed for interface design was Jakob Nielsen's ”**10 Heuristics for User Interface Design”**. The set was originally developed by Nielsen & Molich in 1990 and was given a name **heuristic evaluation**. The list of heuristics contains issues about how system should prevent errors and help user to understand and recover from them, how design should support the usability in aesthetics, how the system user should feel like being in contol and so on. (Nielsen, 1995.)

10 Heuristics for User Interface Design by Jakob Nielsen (Nielsen, 1995):
1. Visibility of system status
2. Match between system and the real world
3. User control and freedom
4. Consistency and standards
5. Error prevention
6. Recognition rather than recall
7. Flexibility and efficiency of use
8. Aesthetic and minimalist design
9. Help users recognize, diagnose, and recover from errors
10. Help and documentation

Later on, Nielsen introduced more web design oriented usability point of views. ”**Ten mistakes in web design”** includes common and crucial mistakes designers make when designing websites. Mistakes mention bad search functionality, use of external file formats (like pdf's), common problems with type colors and fixed sizes, book-like content design, lack of visual knowledge or the whole style of the website is referring to advertisement and so on. (Nielsen, 2011.)

Other early set of rules created for usability was Arnold Lund´s (1997) **Expert Rating of Usability Maxims**. This list of 34 different usability rules was published on Ergonomics of design journal. In the article Lund made a list of good heuristics which would drive designers towards good design with high usability. The set contains multiple points about understanding the users and the task they need to perform. It also contained more detailed principles about features and appearances; Things that look the same, should act the same, every action should have reaction and provide user with a good way to leave and start all over again for example. (Watley, 2009.) Another older set of principles is **Shneiderman's 8 Golden Rules of Interface Design**. This set was created to better user interface design for applications. (Lazar, 2006, 209.)

Shneiderman's 8 Golden Rules of Interface Design (Lazar, 2006, 209) :
1) Strive for consistency (repetitive elements style of pages is similar)
2) Universal usability
3) Offer informative feedback
4) Dialogs to yield closure
5) Prevent errors
6) Easy reversal of actions
7) Support of internal locus of controls and
8) Reduce short term memory load.

Usability has always been a really close with other user-centric term, UX (User eXperience). Garrett (2011) introduced an element based design model to improve UX of product. His method also applies to other services and products than web. He divides the design process into five different plains. This design model works as a guideline for abstract design related questions and how to organize the development process. It does not answer to specific technical questions. These planes are strategy (user needs and site objectives), scope (functions and content), structure (information architecture and interactions), skeleton (interface, information and navigation) and surface (sensory). Even

though the planes refer highly to different states of project, it is sometimes hard to state where one plane starts and other begins, and quite often they go parallel. (Garrett, 2000; Garrett, 2011, 19-22, 31.)

To build high level of web usability and overall user experience of web site, emotional trickers cannot be undermined. Web site should not cause negative emotions for the user. Negative emotions are sure to drop the level of usability and increase frustration. All content and structure of the web site should serve these emotions and give user what they need as soon as possible. Good emotions build credibility. Shell Greenier (2012) introduces four steps to improve emotion based design. 1) Building awareness through all of your content/layout elements to the user. 2) Attraction keeps user focus on the web site and makes sure they do not leave too soon. Creating a relationship of trust with the user is essential at this point. 3) Investment is a phase where user adopts web site idea and the trust is achieved. At this phase user starts to give something back to the system (subscribing, signing in etc). 4) Adaptation means that users not only contribute the system by completing their tasks, but also adopted website idea so deep that they start to market it. This usually happens with application or websites that people start to use in daily bases. (Greenier, 2012, 15-25.) It is important to add emotional triggers to your design and layers of different kinds of meaning. More emotion are better than less. (Maeda, 2006, 64.)

Different marketing principles like AIDA model, from 1920 have been also used as usability guideline. AIDA comes from words **Attraction, Interest, Desire and Action**. After attraction people often ask for more information, which should lead to attraction and then finally make user take action by for example clicking somewhere. This is quite close to the principles of achieving good usability. (Friedman, 2012b, 26-29.)

Many designers have created and applied a set of rules of their own to guide their work to improve usability. One set by Leigh Howells (2012) contains evaluation of the layers like task orientation, navigation and information architecture, forms and data entry, trust and credibility, quality of content, search, error tolerance, feedback and help, page layout, aesthetic aspects and accessibility. (Howells, 2012, 59-60.)

As seen, there are great number of rules and principles that can be used while designing usability for a web site. Even though the oldest ones state back in late 90's and early 2000, they are still used as a foundation for the studies and principles of usability. I have chosen following theoretical frameworks and books to describe main elements of usability. They are Jakob Nielsen's "Designing Web Usability", Jonathan Lazar's "Web Usability – User-centric design approach" and Jesse James Garrett's "The Elements Of User Experience - 2nd Edition".

3.2. User-centric design and user needs

Usability can be specified and ensured in many ways. Important thing is to understand users, the needs and tasks they have and situations where they use the product or service. (Brooke, 1996.) User centric design is to take user into account in every step of the design process (Garrett, 2011, 17). A development team must know what users want from the product. The need should not been too specific or wide in the first phases of the development process, it is more important to understand the nature of problem that is tried to be solved. (Garrett, 2011, 36, 38.) The main focus of web usability is to create websites that meet the user needs, are easy to use and decrease user frustration. Even small things increase this frustration (download time, confusing terminology to name few). Efforts of bringing end user closer to the design process usually has a positive outcome on usability. (Lazar, 2006, 3-4.)

Thinking about usability in design process is something development teams cannot overlook nowadays and most of the enterprises and companies do recognize that. Web sites need to be easy to use and easy to learn. Nielsen (2000) states that humanity must overcome technical aspect in design process. (Nielsen, 2000, 380-390.)

3.2.1 User needs

Every website is meant to serve a purpose and/or have a mission, whether it is a e-commercial or educational. It is a mistake for a company to launch a web site just so that "they are online." A company might lose clients because of poor design and the fact that

they have nothing to write about. If there is no need for website, then it should not be built. (Lazar, 2006, 34-36.) In too many cases, development team refuses to realize that the website they are developing is not for them. Sometimes a development team just blatantly ignores usability aspects for their own or their boss' pleasure. (Butler, 2012, 49; Nielsen, 2000, 13.) Many times design process fails because it is based on aesthetics or functional features, not on user needs. Sometimes the problem can be that the reason of design process is purely technical and user needs have not been determined at all. Many applications and techniques are built and designed for our devices, not for us users. (Butler, 2012, 147-148; Garrett, 2011, 7.)

Steve Krug (2006) debates that quite often design teams make a mistake by undermining the user's point of view by stating that user's think the same way as development team or that there is an average user type. There is no simple way to justify design decisions on web design process. There are how ever ways to better the usability of a website by integrating good design practices. (Krug, 2006, 128-129.) When website offers users content that they need and supports them to perform their tasks, it fills it's purpose and people will use it. (Lazar, 2006, 9-10, 13.)

When building a web site, designers have to bare in mind that design process should be fueled by fully understanding the needs of those who will use the site. This is achieved by knowing your user and studying them. There is never a perfect way to design something that would work for all kind of users. When user needs are taken into consideration, design outcome will be a website that is functional, easy to use, appropriate, visually appealing and suitable for as many users as possible. (Lazar, 2006, Prelude, 30.)

There are many ways to improve user involvement by bring them closer to the design process. Participatory design means a process where user involves in designing itself. This provides good way to understand user more deeply, but at the same time this kind of design process can be highly time consuming. Participatory design was developed for factory workers to prevent dis-empowering them while developing new tools and techniques for their work processes. There are quite a lot of ways for users to participate design process. These methods can bring second layer for understanding the experience

of the use of product or service by the actual user. (Lazar, 2006, 92-93; UX Think, 2010.)

Web development team has to collect user requirements to understand how the user population behaves and uses internet, what is the content/service they want and need and is it usable for them. What do the user population use web for, what browser are they using, how fast are the connection, are they using smartphones, tablets or laptops, which other sites they using daily and so on. (Lazar, 2006, 3, 9-10, 13, 92-93.) By studying users and their needs, development team can break out from their own viewpoint and design for users. User segmentation is one way to find out what kinds of service/product users need or already use. (Garrett, 2011, 42-43.)

User interviews are a way of collecting information. Interviews can be performed by 1-on-1 method or by forming focus groups where a group of potential users sit down to talk about the product. Interviews, both 1-on-1 and focus group, can be also performed from distance electronically. Lazar (2006) refers in his book to the study made by Hoffer, George, and Valacich which shows that focus group interviews create more synergy than 1-on-1 interviews. On the other hand, some participants may be more dominant than others or they might have some kind of relationship outside the group which reflects on their behaviour. (Lazar, 2006, 77, 89-91.) Garrett (2011) divides inquiries to contextual and task analyses. Contextual is a toolkit to study the behaviour when task analyses focuses on specific tasks and steps to perform it. (Garrett, 2011, 47.)

The benefits of user-centric methods and usability designing are sometimes very hard to measure. In most cases it is more cost effective to use good design practices from the start than fix major usability problems after the site has been implemented. A team should find out how they can measure success level of design goals and usability. (Lazar, 2006, 3, 20, 34-36.) Garrett (2011) states that sometimes success metrics can be used to evaluate usability because these metrics relate to a product itself and how it is used. The number of visits and problem related phone calls can be indicate good usability. (Garrett, 2011, 39-41.)

3.2.2. Task orientation and user flow

An effective way to improve user-centric thinking is to do a task definition for the website. Development team has to understand what kind of tasks the users need to perform on the site and what kind of purpose the web site serves. This question should be asked before starting to design anything. Development of all the different web projects follow different kinds of paths depending on the purpose of the web site (weather it is an e-commercial website, community etc.). All of these website have different purpose and they serve different goal. (Lazar, 2006, Prelude, 3, 13, 24, 30.)

Garrett (2011) says that if users have a negative experience, they might not come back. Good UX is a key to customer loyalty. If users cannot complete their tasks, they might feel dumb and frustrated even though the fault is often in the design, not in the user. (Garrett, 2011, 10, 13.) Interface design should always help and support the users with their goal and task, not make it harder. Usability and usefulness are governed by how well they perform and function and how intuitive and easy they are to work with. (Fadeyev, 2012, 104-105; Friedman, 2012a, 8-10.)

One way to come up with mission for a website is make a list of things users would like to do with it. These list can be made by each member of the web development team. Overlapping tells about similar ideas. It is also good to decide the most important task on the website. (Krug, 2010, 51-53.) However, websites do not need to serve just one purpose and be targeted for just one user group. Some websites might have multiple user groups and all these groups have different tasks to complete on the same site. Good examples are university websites where the user groups and their goals differ. Professors, students and applicants all need to perform different tasks on the same platform. (Lazar, 2006, 38-39.) It is important to remember the (project scope) focus point of the site so the site does not try to be something that its not. Sometimes web sites have too many features and become too complicated to use. Some of the features might not even serve any purpose. (Lazar, 2006, 33.)

Do not overwhelm people with too many features. When it comes to applications, studies show that 80% of the people use 20% of the features. This same principle works with web sites. Besides being useless, those unnecessary features distract users from

their real goals. If the feature does not help the user to perform the main tasks, then it's not necessary. If the amount features cannot be reduced, then you can hid the less important ones. This can be made by categorizing and using hierarchy. (Tate, 2012, 39-41.)

Steve Krug (2010) refers to Antoine de Saint-Exupery well in his book when saying "Good designer know that he/she has achieved perfection not when there is nothing to add, but when theres nothing left to take away" (Steve Krug, 2010, 117). Maeda (2006) states that lot of choices makes decision making more complicated. Working with fewer objects and functions makes users life simplier. (Maeda, 2006, 2, 12.)

Instead of starting with design the content hierarchy or page layout, designers should start from design the user flow, the experience. User flow is a normal flow of actions the users needs to take to complete their tasks. Creating a user flow helps to organize content and features. Without being able to observe the actual usage, the flow is an just assumption and might be far away from truthful user experience. Mapping out how different users end up on the site and how they perform tasks are very relative information for creating successful user experience. To create user funnel, designers must know where the users come from, where they land on the website and can they perform their tasks. Even more important how ever, is to find out the factors which make users go on, which are the things that build trust between web site and user. (Butler, 2012, 63; Lazar, 2006, 3, 9-10, 13, 92-93; Loganecker, 2012, 70-77.)

A clear framework also makes all the designed features to work towards strategic object of the product. Stating the framework and building requirements also helps web development team to speak the same language. The whole development team should be heard when designing the requirements. (Garrett, 2011, 59-60, 66-67.) The team should also find ways to measure usability and tasks performance. One way to evaluate the UX is counting the conversion rate. This rate tells how often people take the 2nd step to create relationship with the service or a product. This can be counted from subscriptions for a newsletter etc. (Garrett, 2011, 13.)

One way to understand all usergroups and their activities is to create user profiles, web personas and scenarios. Scenarios help development team to understand how users want

and will interact with the product. Usability scenarios the help developers to understand potential functionality, highlight possible problems, and bring miscommunication to attention. Making a task into scenario often helps people to relate and motivated to the task better. (Krug, 2010, 51-53; Lazar, 2006, 38-39, 95.) Butler (2012) says creating web personas is an effective way to test possible hypothesis of customer behaviour. Without these solutions, the designers might fall into trap of just guessing how users actually interact with the site. Web personas are stories around possible scenario of users, their needs and behaviour on the site. It is more effective to create a few detailed, reality based personas than huge amount of them. Stories can be crafted by interviewing regular clients and user of the website. This is a way to learn from your users. (Butler, 2012, 50, 52-54.) Garrett (2011) writes that scenarios and profiles make the example users more real and relatable. When creating a persona, team gives example user attributes like name, age and occupation as well as real life situation where the designed product is used. These personas can follow the the product through all of the project. They make development team keep users in mind all the time during the project. (Garrett, 2011, 49-50.)

3.3. Web usability

In many ways, the process of designing usability for web site follows the same steps as any other user-centric design process or general UX design. There are lot of similarities when it comes to designing usability for applications and interfaces and websites. How ever, designing web usability there are some specific areas which have to be considered during the design process.

Nielsen (2000) states that there can be many different mistakes made when designing for web on different level. Business model may see website the same way as a brochure, project management sees it as normal corporate business, information architecture of the website imitates company structure, page design may lean on coolness and internal need and not for the users and content authoring is made the same way as everywhere else without understanding the nature of web. (Nielsen, 2000, 15.) Nielsen (2000) makes a note that there are seven key factors that make people to return to the website, these seven things form a words HOME RUN: High quality of content, Often updated,

Minimal download time, Easy to use, Relevant to users' needs, Unique to the online medium and Net-centric corporate culture. (Nielsen, 2000, 380-390.)

There are a few things that make web interface design different from application interface design. According to Lazar (2006) unlike with applications, people will not read a manual for how to use a certain website. Good web design must adapt the idea of "walk-up-and-usability". Users must learn to use web site successfully in a short time without any prior training or documentation. Web sites should be self-evident and easy to understand. Anything that makes a user puzzle over what things are and how they work take a time and effort away from real task performing. (Lazar, 2006, 7; Krug, 2006, 19; Nielsen, 2012.) According to Friedman (2012), people behave on the web like customers in a store. They go around, scan through and click/run for the first thing they think will get them closer to their goal. They seek for something clickable. They do not go for optimal solution, they settle with something they think works, they dwell their way through the web. (Friedman, 2012a, 6.)

During a web project, development team should make quality assurance that are used for evaluate the project outcome. How ever, team should bury in mind that a website is always a work in progress. (Butler, 2012, 40-41.) There is no bug free software (Zeldman & Marcotte, 2010, preface, 7). The design of a website is hardly ever final, even though it goes online and public at some point. Early design process should focus on the big picture instead of pixel precis layout design. Design is also altered by the content which has been input to the system if the website works interactively. Butler (2012) encourages designers to think website design only works as a frame for future content that is yet to come. (Butler, 2012, 35-36.)

3.3.1. Content usability

In general, web is all about the content. In fact, all web is, is content. (Butler, 2012, 106.) On the web, people are goal driven which makes it more important to give straight information than well-crafted text. Well designed and delivered content increases usability. (Nielsen, 2000, 160.) The content of the website is the most important thing and the reason for visit and revisit. Designers should know what kind of content users

wants and are used to consume. It is very different to create content for a 10-year-old than to an adult person. Content credibility is also important issue. There are different ways to improve credibility such as using different certifications. (Lazar, 2006, 153.)

Even though numerous communication and information researchers have been studying content credibility, there is no clear definition of it yet. In many cases credibility is linked with trustworthiness and expertise. It is not a synonym with quality. Credibility is seen as a factor which defines wheather users end up using the content or not. (Hilligoss, B. & Rieh, S. Y. 2008. 1468-1469; Lazar, 2006, 153.) Studies show that in many cases web users make their evaluation about credibility of a web content very fast. The evaluation is also made in superficial manner by looks of the website. (Metzger, Flanagin & Medders, 2010, 416.) BJ Fogg provided a set of heuristic rules in 2003 that has been seen increasing credibility of web site.

Seven design heuristics for establishing that a website is trustworthy and credible by BJ Fogg et (Lazar, 2006, 153):

1) convey of the real world
2) usability
3) markers of experience
4) trustworthiness
5) tailor of user experience
6) avoiding commercial elements and
7) avoiding amateurism.

People appreciate quality and credibility in content. That is one main reasons they come keep coming back. (Friedman, 2012a, 6.) Content strategies can help web a development team to build highly consistent content and keep the quality of the content high. Goals, plans and guidelines help to produce content, but are not the content as themselves. (Butler, 2012, 115.) Nielsen (2000) states that rather than splashing web ads everywhere, companies should focus on their own websites and their appearance, to really find their own target group. Behind this is an idea that it is not important how many people see you, it is about how many people react. That tells about effective design and good usability. (Nielsen, 2000, 367.)

Content determination is important and should not be based only on web development teams assumptions. Therefore, an exploratory study should be executed before hand. Lazard (2006) introduces different methods for this: 1) Ask about what kind of questions end users usually come up with when they ask about the web site and it's content or 2) Finding out what kind of mental models users use while structuring the data and present data according to those findings. Other option for content determination is benchmark similar web sites and their content. By benchmarking, a development team gets valuable information about what users are used to when it comes to user interfaces and content , what kinds of features they find good and what are they interested in. (Lazar, 2006, 64-65, 67-68.)

User's do not read the content on the web, they scan it through. Krug (2006) states three main reasons for this. 1) We are in a hurry and performing a task, 2) we know that we don't need to read all of the content and 3) we have learned to this with similar content mediums like newspapers and magazines. That is why we should design content that can be found by scanning. (Krug, 2006, 22-23.) Content should be written to draw the users´ attention. Nielsen (2000) advices to write 50% less content on web than for a printed publication (Nielsen, 2000, 104-111). Bullet points are shown to be good way to highlight important content and make the text easy to separate and scan. They have shown to improve readability by 124%. (Nielsen, 2000, 104-111.) Users are more impatient on web, 79% only scan when just a few read all the text. They might feel unproductive if they have to read all the text without proceeding in their task. Text is also harder to be read on screen. Many studies and research show that reading from the screen is slower than from a printed medium. (Christensen, 2013; Dillon, 1992; Nielsen, 2000, 104-111.)

Meaningful and understandable language is better than clever. When content is presented effectively, user do not need to guess what the message is. (Friedman, 2012a, 18-19.) Even though the text on web should be easy to understand, it does not mean it has to be too plain. Mifsud (2012) encourages to make a dialog between the web site and user. This can be seen in designing web forms for example. It is good to realize that filling the form (interaction in general) should resemble a conversation between system and the user. (Mifsud, 2012, 114-117.)

Search is an important feature on web and web usability. Therefore information should be also created so, that it is easy to read and find by the search engines. SEO means Search Engine Optimization. Search engines´ purpose is to find the perfect website for the users´ needs. To optimize the content of the page and the information architecture for the search engines, developers have to understand how these engines work. They work on 1) finding keywords (and how often they are repeated) from the websites and 2) rank the pages by counting incoming links to the website. Search engines look from the contents, tags, easy to read URL's and titles, but also the metadata that the site has (this data is hidden). The second method is to rank the sites by the influence they have on the web. (Butler, 2012, 80-86.) By using Web standards, web professionals make sites not only more accessible, but they also benefit from SEO. By right title naming and authoring, the web site can be made easier to find. (Zeldman, 2010, 63.) Search engines are important tools to increase the traffic of the site and accessibility, but the content is primarily created for people, not for the search engines. Farming content (making search engine optimized content) only helps getting more clicks, not to deliver right content to the people. It is also seen to decrease equality of the content in the web. (Butler, 2012, 88, 111-112; Freebase, 2010; Schroeder, 2011.)

3.3.2. Site Usability – Information hierarchy, labeling and navigation

Conceptual site design involves answering to questions such as what content will be actually needed, how is it organized and labeled, how navigation will be provided on the website and how will the page layout appear and so on. This phase of the project is where information architecture is created. (Lazar, 2006, 103-104.) When the information architecture is well planned and logical, the content itself, site structure and navigation of the site have a better chance to become truly user friendly. (Nielsen, 2000, 260.) Well though about information hierarchy is efficient and effective (Garrett, 2011, 89).

There are components that are seen as the most essential for information hierarchy. 1) Organization of schemes and structures which tell about how information is categorized, 2) Labeling system which tells about the way how the information is represented, 3) Navigation system which tells about user's way to move through information and 4)

Search where the focus is for how the user looks for information. (Usability.gov, 2013a.)

Creating information architecture is organizing the content in a way which will help users to navigate their way to perform their tasks. To understand how to create sustainable information hierarchy, the development team has to understand context and content of the information, the user behaviour and the complex relations of these elements. Rosenfeld and Morville (2006) referred to these unique and complex dependencies as an information ecology. (Morville & Rosenfeld, 2006, 24, 26; Usability.gov, 2013a.) Well designed information hierarchy gives room for constant change in the information. Web sites are living entities and effective information hierarchy should support this growth. (Garrett, 2011, 91.) There are many ways to organize information. Every site and it's content has to be analyzed first before organizing. According to Garrett (2011), basic unit of information is a node. These nodes can indicate one page, part of the page or even a single element on the page depending on a size of the site, amount of content and how it is structured. Nodes can be grouped in many ways. Information structure can be based on hierarchy, matrix, organic or sequences, as seen in figure 2. (Garrett, 2011, 92-95.)
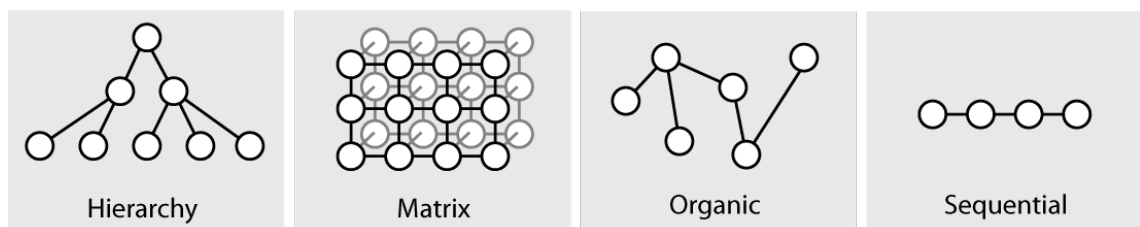
FIGURE 2: Information structures (Garrett, 2011, 93-95, Modified)

Site hierarchy can be deep and narrow or shallow and broad. Lazar states (2006) that less levels there are and less pages user has to visit, the less lost and less frustrated the user is. (Lazar, 2006, 109.) On the other hand, it has been studied that users are not frustrated by the amount of clicks/steps they have to make to get to the content they are looking for. Porter (2003) studied that the amount of clicks does not correlate straight to the frustration level of the user (Porter, 2003). More important is if the steps make sense and are the users able to find the task related information or not. The logic of the information architecture and the confidence of user are more important. Successful task performing is the important question, not the amount of the clicks. (Garrett, 2011, 91; Hamill, 2009; Porter, 2003.)

Card sorting is a method that can be used to make user involve during this phase of design process. In this method, user organizes different information cards in categories so that it makes sense for users. These mental models help users and developers understand the information, structure and label it according to those models. This is a helpful method to also build user friendly navigation systems. (Garrett, 2011, 49; Lazar, 2006, 94; UX Think, 2010.)

In some cases, major usability problems are not technical, but occur because of invalid terminology and language. Users do not understand the language of labels and descriptions the site is using. Terminology can be invalid in general (typos etc) or websites user population might use different terminology from the one that is used on the website. Therefore labeling is an important part of site usability. Its advisable to use common and well known terminology and phrases to avoid user frustration. (Garrett, 2011, 98-99; Lazar, 2006, 55; Krug, 2010, 54.)

One way to improve labeling of the information is to create thesauruses. Garrett (2011) describes these thesauruses as a cluster of terms (unlike simple approved list). These clusters also include a relationship level of these terms and tags that are used on the website. The other way to give information more depth is to give them metadata attributes which means giving information about information. By using these methods of labeling development team has more possibilities for organizing the data as well as creating seamless navigation systems. (Garrett, 2011, 99-100.)

Loganeecker (2012) states in his article that when designing a website with good user flow, designers should keep the user task in mind so they would not simply design separate pages, but to design the whole web experience. (Loganecker. 2012, 78-79.) Site architecture and navigations are like a map that helps the user to find the content they need. According to Lazard (2006), the development team should decide what content is mandatory, desirable and optional. When content is described and labeled, it can be organized to the site itself (what web pages are needed etc). Illustrating the navigation might help to organize content effectively and logically. By illustrating the navigation, the web development team gets also information about the path users takes to get to the content they are looking for. (Lazar, 2006, 104-106, 108-109.) According to Butler (2012), listing the content areas as site map can work as an outline for the website and

pages it may contain. Because of the the static nature of the sitemap, it can only be a starting point of the content design process. (Butler, 2012, 62.)

One of the most important user experience tools that gives users change to interact with the website is navigation system. This is why it should communicate the information architecture as well as possible. (Butler, 2012, 74.) Navigation should be always designed after the information architecture and site structure. Navigation's most important task is to describe the content and to tell how users find the things they are looking for. If site structure does not work, then most likely navigation does not work either. Navigation should tell the user where they are, where they have been and where they can go. Navigation should always show two levels of information, relative to all of the web and relative to the site itself. (Nielsen, 2000, 188-189, 198.) Content should also be organized so that user can jump around the page without 'getting lost'. Therefore good identification is needed. (Lazar, 2006, 153.)

When building the navigation, Krug (2006) advises designers to remember that users will not select the most optimal choice, they find their way through by trying. In many cases, users are satisfied to the first possible solution instead of studying the site through before clicking anything. People tend to build a fast mental model of what is going to happen in their minds, and if there are no problems they go with that solution. The reasons for this kind of behaviour are hurry, lack of option in sight and/or there is no penalty of clicking wrong. That is why intuitivity is a key factor in navigation design. (Friedman, 2012a, 7-8; Krug, 2006, 25.)

Conventions are important factor to support intuitivity. Using universal and familiar elements helps users adapt unfamiliar websites. (Garrett, 2011, 83-84.) Studies show that people understand website's structure if the layout and elements are clear even though the language of the site is foreign. Consistency increases clarity of the design. (Friedman, 2012a, 22-24; Friedman, 2012b, 38-41.) Designers should always be careful if they make decision to break these conventions. That does not mean designers should always stick to them. It is not wrong to break them if the website maintains an understandable conceptual model for the users. (Garrett, 2011, 84.) Maeda (2006) states that there should be a good balance of familiar and new when designing something. For user (one who experiences the product or design) familiar makes can make navigating

easier but also boring. They can be safely lost sometimes. Being lost might feel like an adventure and being able to find out where they are can give them pleasure of finding out and learning. If things are too easy to achieve, simple things come boring. (Maeda, 2006, 60-61.) We can always debate if the web site should be any challenging or not.

Lazar (2006) states that all the pages of a website should contain similar navigation elements to aid and keep constancy. Navigation should be easy to spot and it should draw attention. Navigation should be visible always when user lands on any page of specific website. (Lazar, 2006, 115.) Navigation should not only tell the user how to navigate but also tell them where they are. Most important information the navigation of a website gives to the user according to Krug (2006) are, 1) what the site is, (site ID, logo, etc), 2) what the page is, 3) what are the main sections on this site, 4) what are users navigational options now, 5) where they are in the scheme of things and 6) how they can search. (Krug, 2006, 85.)

There are different ways to design navigation on the website. Audience splitting navigation is where content navigation is based on different user groups and their tasks and needs. (Lazar, 2006, 116.) Organization based navigation works when the users are close to the organization when outsiders are probably frustrated with it. (Lazar, 2006, 119.) Nielsen (2000) and Lazar (2006) both advice designers that when using metaphors from real life to build the navigation, they should be very careful. All the users might not get metaphoric design elements which leads to poor usability (language is incorrect and the sites are not scannable for normal user or screen readers). When using metaphors, designers should think if they are really logical. Metaphor based sites might limit out people who do not understand the context. If for example the site is structured like a baseball stadium, a user that does not understand the game, might not understand how to use the web site. How ever, some elements like a shopping cart or trash bin have become something that many people understand nowadays. (Lazar, 2006, 117; Nielsen, 2000, 180-188.)

Multiple solutions for navigation can be used simultaniously. It is a good practice to make multiple paths for user, but always be aware of unnecessary redundancy. Too much visual noise might distract user from the task and make it harder to find and understand the core-data, the most important information on the page. (Merwe, 2012,

90-92.) It is hard to show every navigational element in the user interface. In many cases, less is more. When using a limited amount of navigational tools, user will not get overwhelmed and it is easier to stay focused on the taks. Therefore it is important to find ways to limit the amount of navigational elements by summarization, filtering, truncation or using examples. (Fadeyev, 2012, 62-64; Nielsen, 2000, 22.) Different visual tricks also help to clear navigation. Tabbed navigation for example helps user to understand hierarchy of the content better and follow relations of the content more efficiently. (Fadeyev, 2012, 99.)

Using search as a navigation is not contradicting the other ways of navigating. These things can exist in parallel, but only when they are designed simultaneously and not separately. (Lazar, 2006, 124.) When the content is designed well and usable, it is also easier to find by search functions and also engines. Make titles to refer straight to the content etc to improve searchability. (Nielsen, 2000, 124.)

Homepage is also a very important part that communicates the structure and content of the whole site. Homepage should tell people what the site is about, what it offers to the user and why users should use this website. (Krug, 2006, 98-99.) Home page design should answer users question in "what can this website do for me" and user should remember at least some information from the site, for example the logo. (Nielsen, 2000, 168.) As the user navigates deeper and gets closer to achieving the goal, the subpage template should be more focused on the specific purpose it servers and have fewer interaction elements. Too busy subpages may distract user from the goal. (Loganecker. 2012, 78-79.) When it comes to design of subpages, Butler (2012) states that the number of option should be limited down to make sure that users are able to perform their tasks. (Butler, 2012, 75.)

3.3.3. User Interaction design

"Every action should have reaction" was one of the Lund's usability maxims from 1997 (Watley, 2009). Designing interaction between user and the service is predicting user behaviour and designing system to respond to that behaviour. Often it does not matter how these interactions actually work as long they behave consistently and usability comes from predictiveness and intuition. It is safe to use conceptual interaction models

that are already known for the user, and therefore they can adopt unfamiliar sites quicker by making assumptions and using familiar mental models. (Garrett, 2011, 80-84.)

According to Garrett (2011), an important aspect of interaction design is how systems cope with different errors (Garrett, 2011, 86). There are three different goals in system design related to errors: 1) minimizing the root of the error, 2) making reverse easy for users and 3) making it easy to discover and correct them. (Lazar & Huang, 2003, 168.) Giving user clear feedback about actions and errors increases usability. Making error messages user friendly and understandable is a huge leap toward universal usability and making sure that not only tech-savvy users understand them. Shneiderman's 8 golden rules of interface design state that warning messages should be positive and offer suggestions on how to respond. (Lazar, 2006, 209-212; Lazar & Huang, 2003, 168-169.) Lazar's & Huang's (2003) study show that comprehensive and positive error messages increase user satisfaction by making the users understand the situation better and being more confident. (Lazar & Huang, 2003, 181-182.) Fadeyev (2012) advices to use plain text and colors to highlight warnings and errors for user. A website can also have success messages to strengthen the feel of right choice for the user. (Fadeyev, 2012, 97-98; Mifsud, 2012, 127-128.) If designer cannot ensure effective communication between the user and the system, Garrett (2011) states that next best option is to create system which does not allow errors and mistakes at all, or errors are almost impossible to make (Garrett, 2011. 87-88).

When it comes to user input, the system should not ask for unnecessary information from the user. Logging in, signing in and subscribing should not take too long for the user. (Friedman, 2012a, 14.) If there is a need for lot of question, they should be grouped logically (Mifsud, 2012, 114-117). Subscribing and singing up should be made as easy as possible. All optional information that users have to give to the website slows them down and worst, makes him/her leave the task. All the web form filling situations should be made as simple and quick as possible. (Fadeyev, 2012, 103-104.)

The language of features, error and feedback should not be too generic. Mifsud (2012) states that different functionalities should be explained clearly so that user does not have to think too much before clicking and proceeding. Explaining things out make users

more confident about their choices (for example during registration etc). (Mifsud, 2012, 126-127.) When building an effective linking and navigation system, Nielsen (2000) advices to use other kind of statements and link names than "click here". Link names should tell about the content of the link for a few reasons, 1) People who use site scanning devices/applications because of disability and 2) The lack of information in "click here"-titled links. (Nielsen, 2000, 55.)

The development team should avoid hiding crucial information in plug-ins, videos and suchs as optional configurations. Some users might not have the needed plugins which would make them miss important information. If plugins are necessary and there is no way around this, they should be easy to find and install, free and that target population is already familiar with this kind of technique. (Lazar, 2006, 60, 139-140.)

3.3.4. Page Usability – Interface and visual elements

After information hierarchy, navigation elements and user interactions have found their form, it is time to build the interface of the site. Building a skeleton of the page is usually the first step, the step where user starts to see the structure. Page schematic/wireframe is a way to illustrate this state effectively. It is a layout phase where the elements are already in their place but detailed graphics are still missing. Its a detailed document of how the vision of the website is fulfilled. (Garrett, 2011, 108-109.) Garrett (2011) states that wireframes are an important place where information architecture and visual design merge. It is a hybrid of visual design, information structure and interface design with all the navigational and interaction elements that are needed on the website. (Garrett, 2011, 130-131.) Wireframes are often used as plan how to build the website graphically. Even though it may feel unnecessary to bring design related work in early state of the design, Butler (2012) writes that it can help the team to introduce design vice question in to the project from the early state. (Butler, 2012, 35-36.)

Krug (2006) states that important aspects to improve usability of a webpage with graphical elements are, 1) creating visual hierarchy, 2) taking advantage of conventions, 3) breaking layout to clear defined areas, 4) making clickable things obvious and 5)

minimizing noise, making sure important content stands out from the busy-ness and the background noise. (Krug, 2006, 31-39.)

Complex structures are usually harder to read. A lot of noise on the web site makes important content disappear. Design should be easy to figure out. The usage of simple elements with enough space makes the content easier to divide and to read. (Friedman. 2012A, 19-21.) Nielsen (2000) states that when it comes to graphical elements of the website, simplicity is important. Users do not usually come to the site to see the graphics, they are there to perform tasks or because of the content. (Nielsen, 2000, 97.) Effective web design does not have to be pretty and cute with lots of colors. It is about making the website clear and intuitive so that the users understand it and can perform the task they need to. Visual elements should empower usability, not dispower it. (Friedman, 2012b, 43.) Although a shiny cover does not guaranteen good usability, high quality of graphical elements is seen important since users make their opinion about credibility very fast and highly based on visual appearance. (Hilligoss, B. & Rieh, S. Y. 2008. 1468-1469; Lazar, 2006, 153; Metzger, Flanagin & Medders, 2010, 416.) Amateurish appearance usually rises frustration level and weakens the overall user experience (Steve Krug, 2006, 165).

Lazar (2006) states that usage of too many graphic elements can be overwhelming. Glitter graphics that fill all the web page usually distract users and decrease web site's usability in significant amount. It is also debated by cognitive theories that human can process 7 +/- 2 items of data at the time. For example, backgrounds and pattern usage should be quite calm so that they would not steal attention from the content and mislead users. A random layout might also frustrate user so by using grids, better goal completion and constancy are usually achieved. (Lazar, 2006, 138, 143-145.) Maintaining uniformity of the elements of site and it's pages make design communicate better and prevents user confusion (Garrett, 2011, 141). Grids are often used to force balance on web layout and maintain the uniformity (Friedman, 2012b, 32-37, 43; Garrett, 2011, 141). Maeda (2006) also sees that by using grouping and blurred grouping can be used to make complex visual structures more simple and usable. Blurred grouping means blending in things so that they do not stand out as a group of separate things, they appear as one object. (Maeda, 2006, 20-21.)

Edward Tufte's Data-Ink principle deals with a question of creating visually appealing and usable design. Even though Tufte worked mainly with data visualization, his principles are also used in web design. According to Tufle, design should have as little variation in the elements as possible. This means to emphasize only those things which are important. All the rest can fall in the background or if possible, be erased. Every site has to have a "focus point". This point is an element without the user could not proceed performing the task. To find this element, the designer have to think that even if all the rest of the elements of the website disappeared, the user would still be able to see forward and proceed with the task. Core-data is made shine through the rest of the content by killing or muting unnecessary elements and visual noise. A designer must critically evaluate all the visual elements to see which ones are core-data and which ones he can erase. (Merwe, 2012, 80-84, 90; Tate, 2012, 42.) Website's homepages should use anchors, fixed points that users can use for scanning content. Using different elements lead the users focus points which then will help them to perform their task. (Friedman, 2012a, 6, 14.)

A powerful way to add usability is to kill the noise around the content by using either contrast or white space (Tate, 2012, 41-42). Contrast between elements is a good way to improve hierarchy (Fadeyev, 2012, 47-48). One aspect of increasing clear hierarchy is to create a balance between elements on the web site making them easier to notice and read. This balance can be achieved by symmetrical or asymmetrical way. Balance is one of the key principles in overall desing. (Friedman, 2012b, 32-37, 43.) White space is the space between elements in a composition. Macro white space refers to space between major content elements. Micro white space is a space between (for example) list elements making them stand out separately as individual objects but still grouped together. (Boulton, 2007.) It works also as explanation of the relationship of elements by either separating them or bringing them together (Fadeyev, 2012, 51-53).

Information can be illustrated in many ways. It can be either graphical as a chart or text. The development team has to always think what is the best way of present the information. Textual elements – as stated earlier – should be designed for scanning instead of reading because people behave differently with a web page than with a book. Also when dealing with visual symbols and designers should always think what is the most effective way to present information. (Garrett, 2011, 124-126.) Using well known

and recognizable elements from the web is not a bad thing. Generally users benefit from this since it makes whole web experience more consistent. (Tate, 2012, 43-45.)

Typography is an important part of visual design and it speaks a lot about corporate identity. When choosing typeface, it is also important to make the text readable. Garrett (2011) states that the high usage of plain and simple fonts happens because human eyes get tired and lost in the text if the font has too many details and are more ornately styled. Usually a small selection of fonts is seen better than a wide one. (Garrett, 2011, 147.) When using colors, the designer must realize that there are certain cultural associations we make; Red color is warm and blue is cold etc. Designers should always think who they are designing for (culture and population). As in graphic design in general, textual elements should be easy to recognize from the background. The color should not be the only thing that tells about the content since some of the users might have color blindness. There should be also supporting ways to explain the content ither than color. There are some already existing practices that need to be take under consideration while designing typography. For example, underlined blue text is normally taken as a link so when making an exception, there has to be a well thought reason for it. (Lazar, 2006, 146, 148; Nielsen, 2000, 64.) Decision with visual elements is not only a question of aesthetics. Choice of fonts and colors should always communicate together with overall brand identity (Garrett, 2011, 137).

When using animation (and moving images), designers have to remember that moving object often steal the attention of user and often distract them from the original task (Lazar, 2006, 141). This is all because of the primitive nature of human brain, it is a survival instinct. There are good reasons to use animations when indicating a change, showing continuity or drawing attention to something that is important. Animation can be used but not too often. (Nielsen, 2000, 143-148.) Other point of limiting the use of animations comes from the way we read the web. In many cases blinking object on a website reminds users of commercial ads and banners. (Friedman, 2012c, 144.) Nowadays because of the technical development, a website needs to pinpoint immediate changes in the content to the user when they have happened. Animation can be used to ensure that user will notice the change in content. (Fadeyev, 2012, 81-83.) Animations can also be used to maintain user flow in navigation and bridging through necessary pauses in the interface. They are not only "eye candy" but also a way to improve

usability when used right. (Weber, 2010.) In addition from marketing purposes, they can be used for example guide users through more complex websites if necessary (Fadeyev, 2012, 78-80). Guiding the users through their tasks decreases frustration and less errors occur. A highly usable website will encourage people to use it automatically. Guides can help users to make relevant choices according to their tasks. Websites can offer users tutorial videos if they are needed, even though this practice is more common with applications. (Shepard, 2012, 5-14.)

Asking people to use and evaluate site and it's elements is a way to get information about visual attractiveness and how well graphical elements communicate websites message. However, there are more scientific and accurate ways of finding out what elements users see and how do their eyes move during the use of a website. Eye-tracking is as effective way to evaluate visual design. It gives valuable information if the content areas are in good balance and if the user's eyes are drawn to important elements on the site. Movement of eyes does not happen by accident. In many cases, it comes from instinctive level. By this method, designers can find out if user's attention is drawn towards the right elements on a page. (Garrett, 2011, 137-139.)

3.3.5. Universal usability – Accessability

Designing accessibility is to consider the universal usability rules and take diversity of users' needs, circumstances and specialities into account while designing. Following these rules and guidelines during the design process makes a website more accessible to the maximum amount of people. Universal usability means that anyone anywhere can access the site despite the medium used (device, browser, etc) and users based factors (age, disability, location, etc). Nowadays especially older people and people with disabilities are a well recognized user group in web. When designing for them, is good to consider certain guidelines. These guidelines consist of font sizes, colors, styles etc. (Horton, 2006; Lazar, 2006, 160-163.)

Understanding user groups demographic and technical backgrounds, age, occupation, genre, time spent online daily, devices used, etc is important for a development team not only because of user-centric design principles, but also to make sure that no group of

people is discriminated and retained the access to a website. User groups' domain knowledge gives us a lot information about users. Domain information means information about the subject user might have about subject issue. (Lazar, 2006, 52-55, 61.)

Language and cultural aspects are important to think about when designing. Most of the sites are accessible from all over the world and in many cases (depending of the target group) websites should be design for international usage. Nielsen (2000) advises to always consider web as an international medium when designing. Using gestures or images that are highly cultural and hard to understand by people from different cultures may lower down the usability. The use of metaphors that are either cultural or understandable for only small group of users may harm the usability. If site is multilingual, usually it is better practice to use names of the languages than flags since flags state for nationality. (Nielsen, 2000, 310, 325.)

There are lot of different things to reconsider when designing fully accessible site for all the users with different disabilities. This should become as a responsibility for designers while designing websites. It would be a good practice to include even few users with disability (for example colorblind) to participate user testing to make sure of universal usability. (Nielsen, 2000, 310.)

There needs to be a good balance of visual attractivity and alternative interaction for users suffering from disabilities. Site navigation should follow the basic principle of having textual elements for further navigation. Applets and graphical navigations might not be clear for users with disabilities and screen reading devices might not be able to read them. Frame/container names should follow the rule of naming things correctly by referring to the real content inside them. There are many different standards and rules which help designer to create accessible web sites for all the users with different disabilities. (Lazar, 2006, 6, 138, 168-169.) Usability standards such as WAI-ARIA (Accessible Rich Internet Application suite) are there to define ways that make web content and applications more accessible to users with disabilities. It helps with both dynamic content and advance user interface controls development. (Henry, 2006.)

There are numerous different standards and guidelines which help designers to better accessibility for special user groups. U.S National Library of Medicine has published a checklist of things which are good to take into account when designing for senior citizens. The checklist contains notes about typefaces and color usage, how to present information and navigation clearer and easier for aging users. (Hodes & Lindberg, 2002.) W3C has developed a checklist which is created to ensure high web accessibility to as many users and usergroups as possible. This checklist contains points which are highly technical and consider the coding part of the website, for example giving images alternative information, organizing documents so that they can be read without style sheets, ensuring that site works even though applets and other programmatic objects are turned off and so on. (Chisholm, Vanderheiden, Jacobs, 1999; Lazar, 2006, 164-165.) Many different organizations and institutions as well as countries have their own regulations to achieve high accessibility in web. One example is 2000 established eEurope act which targets on high accessibility in public services inside European Union countries. (Suosituksia verkkopalveluiden saavutettavuudesta. 2008.) The development of web techniques is clearly moving to this direction. HTML5 with its semantic labeling system in the programming language makes the code appear more logical when they are read with screen reader devices. (Andersen, 2010.)

3.3.6. Multiple devices – Responsive and adaptive design

Multiple browsers and devices used for web experience make designing a website more complex than a designing a magazine layout. People read websites with different devices and browser. That is why websites should be designed to work with as many browsers and as many devices as possible. Many things may appear and behave differently with different browsers, monitor sizes, controlling devices etc. The design should be resolution and platform free. Users may also want to use plugins that change styling of elements (font sizes and families etc) because of disability or just for preference. Website graphics should be flexible. (Nielsen, 2000, 27-29.)

Responsive design means designing websites so that the layout responses to the device screen size and user's behaviour. In pratice, it can be seen as flexible images, grids and making all the elements on the layout fluid so that one design works with multiple

devices. It is not all about resolution, though. It is also a new way of thinking about designing. (Knight, 2011.) These is a difference between responsive and adaptive design. Responsive design is fluid, responding to the changes in the behaviour and screen size immediately. Adaptive design detects device used for browsing and loading device specific codes. The difference is barely visible for client, but more technical. (Williams, 2013.) Figure X explains how responsive design is seen on different devices.
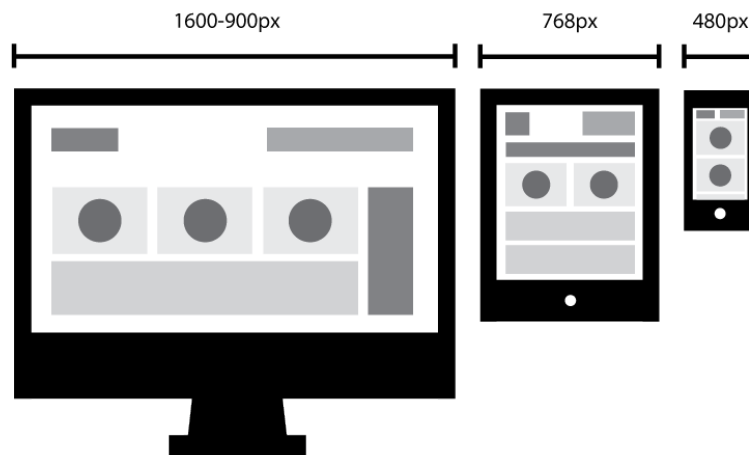
FIGURE 3. Responsive design (Pennignton, 2012, Modified; Williams, 2013, Modified)

Designing for cross platform usage cannot be overlooked nowadays in webdesign. The numbers of the users and usage of different mobile devices for web browsing make that clear. (Ahonen, 2011.) Ethan Marcotte (2010) stated that mobile usage of web will outpace laptop usage in three to five years (Marcotte. 2010). Mobile web is not a new thing, it is same old content but through different screen. It is, how ever, making people think the content different way because of the new features that have come along with the new technology. Butler (2012) states that the way web is designed, experienced and consumed is changing through the technology. It also comes to question that some websites may lack usability since they are not adapting to the new technology and therefore are not popular anymore. (Butler, 2012, 120-121.) However, websites should not be designed for latest browser only. Some users might be in situation where they cannot update their browsers as often as they should (Lazar, 2006, 172.)

Lazar (2006) says that reaching usability with many devices does not mean that the layout has to appear exactly the same, pixel precis design with every device. The goal is to make the web site accessible for as many users, devices and platforms as possible.

Designers must understand that there is a huge number of variables that affect web site experience and that all these variables affect usability. (Lazar, 2006, 62.) Website appearance can be modified for some extent like making it lighter for old browser which would decrease the download time and ensure better usability. Nowadays users are getting used to different appearances of the same site on different devices and on different browsers. (Zeldman & Marcotte, 2010, 65-66.) All the experiences of a website with different devices should, however, stay seamless. This makes the experience more consistent. Frameworks, style templates and and different responsive and adaptive techniques improves this. (Butler, 2012, 129-130.)

W3C (World Wide Web Consortium) has created a standard for writing HTML language to ensure high level of usability. These standards also make websites work on most of the platforms in a similar way. W3C also delivers different debugging systems that offer solution to make sure code is written effectively and follows good practices. (Lazar, 2006, 172, 202.) Creative use of HTML and CSS ables web professionals to create websites that work on different devices without creating multiple versions (Zeldman & Marcotte, 2010, preface, 53). The use of style sheets maintain continuous styles and ensures easy readability of the HTML code. Some users might have applications overrunning the original code. Nilsen (2000) states that a web site with high usability works even without stylesheets. (Nielsen, 2000, 81-83.)

Nielsen (2000) advises designers to keep multiple browsers on their computers to test the site and the layout. Even keeping the older versions of the browsers is advisable. Nielsen states that designers should give up the WYSIWYG (what you see is what you get) programs because on the web, everything looks always different. That is not a bug, it is a feature. (Nielsen, 2000, 36, 82, 180.) Web sites should be tested with as many platforms and controlling systems as possible to make sure of high level of usability (Lazar, 2006, 9; Nielsen, 2000, 36, 82, 180).

3.3.7. Download Times

In 2000, Nielsen stated that download speed was the number one concern for many web users. Many human computer interaction researches show that a speedy response was

very important when it came to good user experience. In many studies people who had been testing the sites really appreciated fast loading and response times. According to Lazar (2006), Shubin's studies showed that there was a huge risk of user forgetting the task they had before entering the web site if the download time was too long. (Lazar, 2006, 137; Nielsen, 2000, 46-47.) Still after more than 10 years ago, Nielsen (2010) made similar foundings. The test users made notices like "sloggy" and "slow" when browsing a website with slow download speed. This affected in the way they described the website and the brand. According to Nielsen's eye-tracking studies users viewed sites very differently when browsing with different speed. Nowadays complex data structures and applets are more common to slow down the browsing speed than big images. (Nielsen, 2010.)

Download speed is still an important factor of user experience and usability. Faster techniques have not changed the facts of human 1) limitations (to be able to remember their tasks if they have to wait) and 2) aspirations (that we want to be in control of things). (Nielsen, 2010.) Maeda (2006) also states that nowadays, our patience for waiting for something is reduced. The users also relate long waiting times with inefficiency. Nobody really wants to wait for too long to perform a task. In most cases waiting is experienced as frustrating. (Maeda, 2006, 23, 31.)

If the users have to wait for the content because of the size or the complexity of the data, experience of waiting can be made less frustrating by small things. Maeda states (2006) that by introducing progress bar, Apple made the waiting time much more humane for the user. When the user is able to see the progress time feels shorter and waiting is less frustrating. A frozen computer screen is like a frozen watch, and that torturous experience can be made easier by using for example progress bars. (Maeda, 2006, 27-29.)

3.4. Usability testing

There are no perfect solutions for how to perform testing. Jonathan Lazar (2006) divides usability testings in expert based testing, automated testing and user based testing. These tests do not contradict each other and they can all be performed for the same

project. Lazar (2006) states that user based testing should happen after expert based and automated testing if multiple methods are used. There is usually no situation where too much usability testing is done. (Lazar, 2006, 206-207, 214.)

Before starting testing, the development team should decide what kind of data they are collecting and how. Information gained from testing can be qualitative or quantitative, formal or informal, depending on the method. Unfortunately many designers do not spend any time watching users using the sites or testing it. By performing test continuously, designers can find out what are the main and common usability problems. (Krug, 2010, 14-17, 104-105; Lazar, 2006, 213-215, 220-221.)

Using and testing should start as soon as possible, as soon there is some functionality so the site can be ran (Butler, 2012, 44). Testing can start even earlier. The development team can test even ideas, sketches or drawings, they do not need to have a working website. Testing can already start with competitive sites in the benchmarking phase. By competitive analyze, the development team can find out how competitive sites work and how users use them. The development team can also test an old version of the website to see which of the features work well and are worth keeping. (Lazard, 2006, 67-68; Nielsen, 2012.) Even hypothesis can be tested by evaluating. It is useful to test a prototyping state of a web project. These tests give information about, for example, the website's terminology, does it work well and does the website lead users to the content they were either looking for or expected to find. (Krug, 2010, 31-34, 36; Krug, 2006, 22-23; Lazar, 2006, 206-207.)

3.4.1. Heuristic expert based testing

All users make heuristic reviews and evaluations about websites while using them. Though we all make them, we usually fall into pits of snap judgement which are irrelevant when it comes to usability. (Howells, 2012, 55-56, 69.) What makes expert based reviews different from average user's opinion?

There are many different sets of usability rules and principles that can be used in heuristic evaluation. After a set of principles is chosen, the reviewer states questions that

he askes during the evaluation. These questions could be more theoretical/abstract like "is there a good balance of content density and whitespace", or more technical like "does the site layout work well with low resolutions". Some of these guidelines and sets of principles (Shneiderman's, Nielsen's, Lund's and ISO standard) used in heuretic expert evaluation were introduced in the chapter 3.1. Usability designers evaluate websites layer by layer by using guidelines and reflecting standards with evaluated website. These sets of principles help them to organize their own observations and make the approach to the site and testing structural. Findings are made about problems in overall usability, not problems related in task completion. Experts usually report about bigger violations of usability and web design standards like font-color choices, missing links or problems with terminology. Other good reason to use an expert's evaluation is to get outside view for design. (Howells, 2012, 55-56, 69 ; Lazar, 2006, 207-212.)

Development team may also run a heuristic evaluation of technical usability. These kinds of tests will not tell about the taks performance or frustration level of user. Instead they ensures that the website works, all the links are correct, images have fallback (alternative) data, resizing the browser window does not break the layout, all browsers display all the important elements right and so on. They can also test more abstract things like navigation by mirroring the flow chart of the site to actual navigation. Using standardized practices garanties high usability and low error rate. (Brannan, 2010, 160-163, 166-170.)

3.4.2. Automated testing

Automated usability testing is where software goes through the website and evaluates it on the already existing set of design principles and usability guidelines. This kind of testing is similar to the expert based one. Automated usability testings does not give feedback about problems related to task performing. It gives feedback about the use of usability standards and guidelines. They tell the designers if the website is violating them. These tests are as good as the guidelines they use. (Lazar, 2006, 227-228.) Two often used automated tests are 'W3C's Markup Validation Service' and 'W3C's CSS Validation Service'. These kinds of tests comes handy when the HMTL and CSS files become too big or complex to go through manually. (Brannan, 2010, 167-170.)

3.4.3. User Testing

Krug (2006) states that unlike many other ways of to get user feedback about the product or a service (like focus group testing), usability testing is done not to find out what users want, need or like. Usability testing answers to the questions "does users understand the product" and "can they use it." (Krug, 2006, 132-133.) In most cases, user testing is refers to a situation where a product or a service is evaluated by using it. During the test, the user performs tasks with the product or service while being observed. Most of these situations are recorded so that observers and supervisors can make notes and gather data, find usability problems and evaluate user satisfaction and frustration levels. (Usability.gov, 2013b.)

User testing is a way to get real insight of the user experience from someone outside the project. These user tests are not about evaluating visual appearance, they are about situations of usage, task performing and successfulness, although the tests can also include questions about what kind of message homepage communicates. The reason of doing usability testing is that they always give development team information about usage and usability of a website. User testings usually reveal information which was very hard to come by and figure out before the testing. (Butler, 2012, 56-58; Krug 2010, 14-17.)

Krug (2006) and Lazar (2006) both say that in most cases however, the reality is that usability tests are made as cost effective as possible, finding only main problems as cheaply as possible – if there is any testing (Krug, 2006, 133-135; Lazar, 2006, 206-207). In many cases websites go online without testing because of different excuses. The lack of proper facilities, money or time are usually not the real problems; the problem is the idea of actually performing the test and the lack of knowledge how to do it. Usability testing can be light and does not have to require a lot of effort. Even very light testings with only a few users can already reveal major usability problems. Any kind of usability testing is better than none. (Krug, 2006, 133-138.)

Krug (2006) encourages web development teams to perform "do it yourself usability testings" which follows the "talk-aloud" method. Even though these kinds of testings may feel informal and unscientific they give valuable qualitative information from

everyday user situation since every site has problems and these problems tend to be easy to find for someone who is not engaged with the web site development. Watching and evaluating users using a website makes better designers. (Krug, 2010, 14-17, 104-105.) Test facilitator try to encourage users to explain their actions, reasons for choices and how certain and comfortable they are while performing the tasks etc. The users should be encouraged to talk as much as possible. Every kind of information about thoughts, insights, questions, doubts and feelings gives a valuable information for the facilitators and observers test. (Krug 2010, 63-64, 81; Lazar, 2006, 221.)

Other method of performing user testings is 'coaching method' where facilitator aids the test user along the way. This method is regarded biased since the user's should not be helped while task performing, the situation should remind an everyday user situation. By helping the user to perform the task, the test facilitator contaminates the result. (Lazar, 2006, 222; Nielsen, 2012.) Even though it is advised not to participate in any way during the testing, the facilitator can make minor question to clarify user actions. Question that go deeper should be left for after testing. The neutrality of the facilitator is high priority so the result from the testing would be as truthful as possible. (Krug, 2010, 78; Lazar, 2006, 225.)

Tasks that are used in user testing should be determined in advance before the testing itself. They should also be common enough so the user understands them. All the instructions for performing the tasks should be given the same way. The tasks should also be specific, for example "try to find out what kind of information they have about condition A", not "look for information in general." The tasks should rely on normal usage of the website. When using made up tasks the user does not relate to, they may lack emotional factor. This can lead to false reactions and lack of use of domain knowledge, which can lead to false data. It is also advisable to ask supportive questions to find out more about user performance. Asking if the users are comfortable while performing tasks or did the site behave well are good follow up questions. (Lazar, 2006, 219, 348-349; Krug, 2006, 144-145.)

A test person can be almost any one. Most of regular users are able to pick out major usability problems. In some cases, domain knowledge of users should be considered before recruiting test users. (Lazar, 2006, 213-215, 332.) Testing participants should

always be recruited from outside of the project. They can even be friends or family members if there is no real budget for testing. Weinberg's law is that developer cannot test his own product. The same goes with designers. The point of user testing, as well as the expert testing, is to get an outside opinion about project outcome. A designer involved does not have a fresh or unbiased view of the project. (Brannan, 2010, 164-165; Friedman, 2012a, 25; Krug, 2010, 27.) Anonymity may encourage the test users to be more open when answering questions (Lazar, 2006, 96).

Usability testing is ideally made with as many people and as frequently as possible in a lab environment built for the purpose. Krug (2010) argues in his book that instead of wide testing that happens once during the design process, websites should be tested more frequently. Testing can be light. An important thing is to perform these tests continuously, and take action after testing to fix the usability problems. (Krug, 2010, 43.) Testing should be an iterative process. That means after each test, there should be a problem fixing phase, then another test and so on. This way design will focus on usability and be user-centric. (Friedman, 2012a, 24; Krug, 2010, 43; Steve Krug, 2006, 133-138.)

Usability testing can be performed outside usability lab with free or cheap to purchase equipments. The tests can be ran anywhere where there is a way to get privacy. A test could be ran at work place or even remotely. In most cases, test user is performing the test in one room with the facilitator while observers follow the situation from another. Usability testings should always be recorded so that facilitators and observers will not have to spend all the time making notes. (Krug, 2006, 65, 95; Lazar, 2006, 213-215, 218-225, 332.) Facilitator of the test gives the user tasks and follows the performance next to them. Krug (2010) states that most important feature of facilitator is to be neutral and that they dont interrupt the user. Observers' (from another room) role is to watch and learn, make a list of main usability problems and come up with follow up questions for the participant after testing (figure 3). (Krug, 2010, 82, 93; Krug, 2006, 143.)
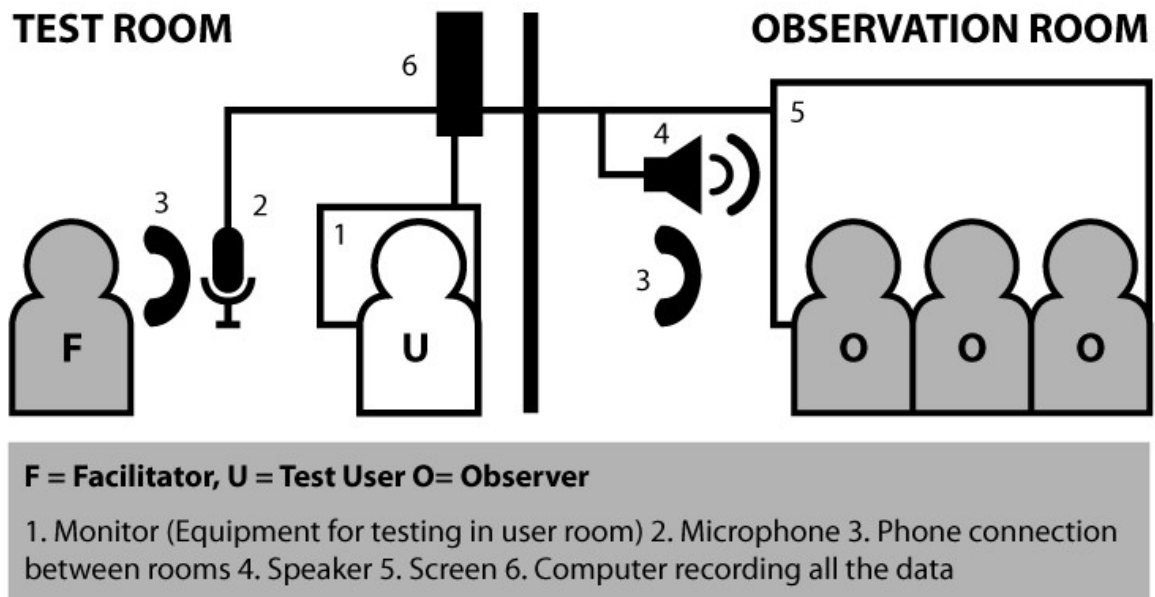
FIGURE 4. User test situation (Krug, 2010, modified)

Talk-aloud user tests can be done remotely by using for example a phone. This way tests can be performed internationally. An other way is to give a task to the test user and ask them to reply by writing a short report about their experiences. (Nielsen, 2000, 336-341.) As well as product/service, the test situation itself should be tested after planing. By doing a pilot, the development team still has time to make needed changes to your research if it does not answer the research question. (Lazar, 2006, 80.)

Even though most of the information gained from user tests is qualitative, the development team can also measure time of task performing, amount of clicks or even human physiological factors like heart rate, blood pressure etc while testing. Survey is another way to collect quantitative data from user, in nature of satisfaction report etc. Data from surveys is often seen more shallow even though the quantity is bigger. Surveys can be executed in person, on paper or online, there's no need for a moderator's presence. (Lazar, 2006, 220-223, 332.) SUS (System Usability Scale) is a "quick and dirty" way to find out about system usability by a survey. It has become the industry standard of testing websites, application etc. SUS contains 10 questions in which user answers on a Likert scale. Questions vary from asking if users though the system was complex, easy to use, or did they feel confident. SUS aims to find out how users felt about the website, not to pinpoint specific problems in usability. (Brooke, 1996; Sauro, 2011.)

One way of testing and evaluating a website is to create A/B testings. The core of this test is to find which one from two options works better in real life. For example, the developers can split traffic coming to a website in two showing them separate versions. The development team then evaluates which option works better according to the metrics that were decided before. Even though all the testings are unique, in most cases more specific elements like call to action buttons, headings and forms are evaluated instead of finding out overall user experience of a website. (Chopra, 2010.)

3.4.4. After testing

Butler (2012) states, that after usability testings, the web development team should de-cide what are the major usability problems, label them by the importance and give es-timation of time that it takes to fix them. The whole development team should be there to analyse the material from user testing situations. This makes brainstorming between the team members possible. There is no single right way to find out which the main us-ability problems are; it usually comes down to time and money. (Butler, 2012, 60 ; Laz-ar, 2006, 229-230.) Krug (2006) says that after user testings, one way to find out the most important usability problems is when all members of the team go through the material and reports from the tests and list down the problems they think affect the usability the most. From those lists, the development team can find if their observations were overlapping and which problems occur the most. In most cases it is better to find the most important problems and solve at least them. (Krug, 2006, 104-106.)

"If it ain't broken, don't fix it" is a precis saying when it comes to question of redesigning. It is always a big question when to start the development life cycle again and when to just tweak some of the problems that occurred on the way. Lazar (2006) illustrates web design project life cycle well in his book (See figure 5) (Lazar, 2006, 17). Redesigning website for a fresh look is usually a bad idea. There are number of important things to consider when redesigning; have the usergroups, mission, goals, information structure and layout stayed the same and can the team work with previous documentation model. (Lazar, 2006, 44-45, 265-266.) An afficient way to avoid starting the project again is to ensure some good organizational practices. A good way to improve usability and high UX of the web project is to make sure that the development

team members have good and logical job descriptions and roles in the team. Using the help of usability specialist can benefit the project since they have the more time to focus on usability and user experience issues and they also pose a deeper understanding of the issue. Effective documentation which is based on mutual, detailed and describable language benefits the whole team as well. (Garrett, 2011, 52-54, 153-154.)
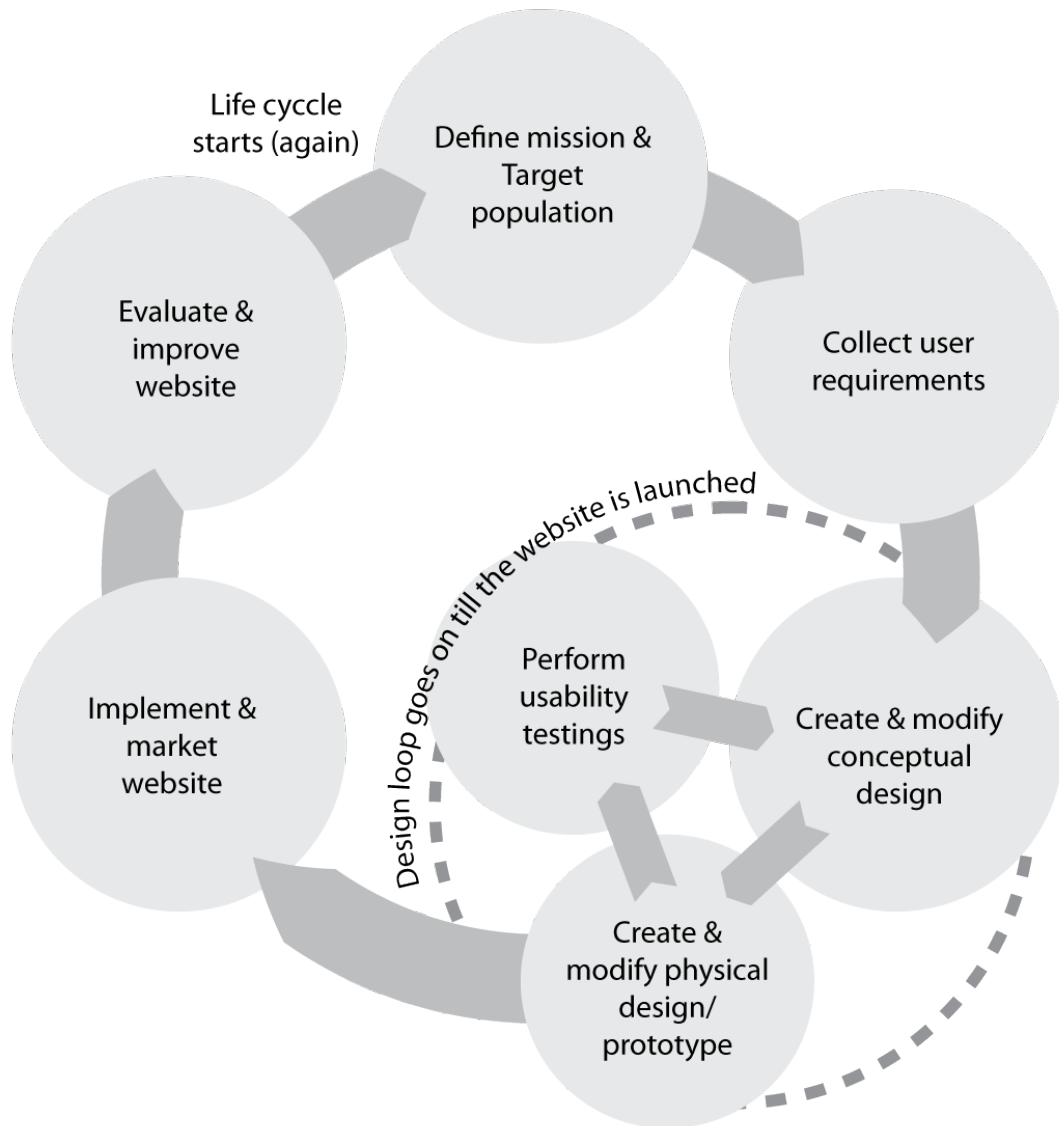
FIGURE 5. Web project life cyccle (Lazar, 2006, 17, Modified)

Much too often bugs stay unfixed and development team wants to wait for redesign phase. Krug (2010) says that development team should be able to tweak the site continuously. Major usability problems should be fixed as soon as possible and not to wait till redesign. If they are left there without fixing, they keep causing people problems decreasing usability and overall user experience. (Krug, 2010, 112.) When it comes to choosing from redesign and continuous improvement, Gerry MacGovern (2011) gives a

few good reason to choose continuous improvement. 1) Development team does not just test the site as a whole, they keep testing all the aspects of it, links, headings, buttons and images, 2) They can test content easier, since reactions are seen almost immediately and 3) Because redesigning a website hardly ever bring more value comparing to the continuous improvements. (MacGovern, 2011.)

It is very hard to estimate the trends and the way web is going to evolve. However, it is important that web designers keep on continuously asking if their websites still up to date and determinate if they meet the needs of the user. It is good practice to have periodic evaluations. A user survey is one way of performing them. There are numerous methods and guidelines for these surveys. Information quality survey by Zhang, Keeling and Pavur (2000) is a method where user evaluates the homepage of the web site by different criterias suchs as navigation, layout, graphics etc. One way to collect information about usability problems is to make follow up calls for people who complain about site to get in depth information. (Lazar, 2006, 252-259.)

In his article "Applying Agile Principles to Design" Luke Clum (2013) states that Agile development model is beneficial way of working. According to Clum (2013), this method is reactive, values individuals and interactions over processes and tools, encourage development team to dive in to the project and increase client collaborations instead of just working for contract. Agile development model increases testing, prevents from big redesign and increases creativity. (Clum, 2013.) Scrum is one of the most heavily used agile technique. It consists of many different aspects of organizing working and managing a project. Common for scrum method is that a design is done in sprints and the team uses clear backlog for all the assignments that need to be done. (Csaba, 2013.) Sprint method means that working development cycles of the whole project are relatively short (Neeman, 2009). According to Dimmick (2012), besides using sprint method, project spikes are a good way to open and solve bigger design related question. Spikes are phases where the whole team takes a short time to focus on the one or few particular problems. (Dimmick, 2012.)

4. RESEARCH PLAN

4.1. Research problems and questions

Kananen (2011) advises students to take broad approach to the research problem from the start so they will not end up in dead end situation with their topic. It is always easier to cut things down at later phases of the research then add something completely new. (Kananen, 2011, 17.) By studying the subject widely and finding out what a phenomenon means , researchers are able to determine their questions better (Hakala, 2000, 91).

A broad focus point was chosen to determine the research problem and the questions for this thesis. A decision was made in the beginning of the project and was later cemented to guide the process of the research. Influencing factors and reasons were the nature of the phenomenon of usability. There are many factors and aspects that influence different approaches to usability, the term is contextual and the theory base is wide. There is also lot of discussion about the phenomenon in general. The research problem of the thesis was set to find out what does usability mean to web designers and what kind of methods they use to improve usability of their work. The goal of the thesis was to find out what kinds of "quick and easy" methods of usability web designers and developers use.

Research problem were narrow down to a few more abstract and a few more concrete research questions:

1. What do web designers think usability is?
   1. What are their general thoughts about it, and what are the most important aspects of it?
   2. What are the common usability related problems and issues they face in their work?
2. What improves usability in general and web usability in specific?
   1. What techniques and tools they use to improve web usability?
   2. Do they perform user testings? How?
   3. How are they ensuring universal usability and accessibility?

The interview was targeted mainly for web designers, graphic designers and web developers. The most important thing, however was that the interviewees were mainly connected in multiple phases of web projects and not specialized in just one task. These phases were planning, concepting, wireframing, prototyping, designing and programming (front-end) websites: Front-end refers to programming mainly with HTML, HTML5, CSS and jQuery coding languages. The reason for this kind of limitation lays in the goal of getting "quick and easy usability" answers from people that are also not too engaged with usability issues. Companies that had too vague job descriptions, no names mentioned on their websites or the number of their employees was too big were mostly left out. The guiding hypothesis was that people who do not know too much about scientific approach of the subject and have to execute different tasks during one web project bring up interesting point of views and use wider and unspecific range of methods to improve their work.

4.2. Research methodology

4.2.1. Qualitative research

The approach to the research problem was qualitative. The goal of the thesis was to find out opinions and experiences of people involved in usability in their daily work, answering the questions of what, why and how. The qualitative method was better to get answers which describe the phenomenon. In qualitative research, research questions usually contain descriptive elements. Qualitative research gives more tools to open up a story behind phenomenon than quantitative which is more accurate and statistic. Qualitative method gives keys to find out how study subjects view the world and the phenomenon. (Kananen, 2011, 32, 41-42; Patton, 2002, 348.) Data from qualitative research is descriptive and contains words and sentences instead of numeric data. (Kananen, 2011, 28-31.) Qualitative research has been criticized often because of the wide range and complexity of terminology and methodology. Kananen (2008) says that many researchers use parallel terms to describe different things. This causes lot of uncertainty in the research field. The qualitative study is always in the process of development itself. (Kananen, 2008, 86-87.)

Patton (2002) states that the analyze phase should be considered while planning the qualitative research. All these phases of the research come very close together or might happen simultaneously. In many cases a researcher starts the analyzing phase already during the data collection. (Patton, 2002, 455.) Hakala (2000) advises students to think about the data they might get from the research before starting to collect it. Planning the whole research project well and making assumptions about the nature of the data helps to make right choices of methods during the planning. Poorly performed data collection will affect the analyse phase. (Hakala, 2000, 94-95.) Kananen (2011) states that with the qualitative method, the researcher can move back and forth more flexible because of the nature of the method and research data. Qualitative methods give room for continues analysis and makes it easier to take the focus back to areas which still need answers. If the researchers feels that some questions are still not answered and the full story has not been told, they can ask follow-up questions from study subjects to reveal the whole story. The researcher is able to analyze this kind of data on the run. (Kananen, 2011, 29, 42.43, 50.)

The main focus of the thesis was to find the stories about what the professional web designers think about usability and what kind of methods they use to improve it. In the case of this study, the goal was to get explanatory answers. Qualitative interview is a good way to gather data that is explanatory in nature and contains stories (Kananen, 2011, 42; Patton, 2002, 341).

4.2.2. Planning the research interviews

To find the answers for the research questions, a researcher has to come up with questions that lead the way to the answers, not to ask the examinees the research questions as they are. To find out the right pattern of questions, a researcher must decide what kind of interview technique to use. (Kananen, 2008, 73.) Patton (2002) divides interview techniques in informal conversation, general interview guided approach and standardised open-ended interview. Informal conversation is very flexible and based on spontaneous reactions. This methods gives a lot of freedom to the interviewer but systematic information collection might take more time at the end. (Patton, 2002, 342-343.) Guide approach and standardised open-ended interviews are more formal and

themed. Guide approach uses themed checklists about subjects that need to be mentioned where in standardised open-end question all interviewees are asked exactly the same questions in the same way. With standardised interview the questions have to be well prepared. This way analyzing of the research data and comparing the cases is easier. (Patton, 2002,342-344, 346.) These methods can also be combined. It is quite normal to use standardized method in the early state of the interview and then leave more room for open conversation at the end for follow-up questions. (Patton, 2002, 347-348.)

The themes of questions that are asked during the interview should contain all the components of the phenomenon that is studied. Kananen (2011) advices interviews to start with broader questions at the beginning, then later on moving towards more detailed ones. Proceeding too quickly may cause interviewees to answer too vaguely. It is important that question are open ended to gain data that answers to questions of what, why and how. Leaving ends open researchers avoid answered that only contain few words and no real experiences of examinees. (Kananen, 2011, 54-56.) Many interviewers may think that just by leaving out the response options at the end makes the question open-ended. Truly open-ended questions give the interviewees possibility to find the most salient way for their persona to give truly describing answers. It is important to make an interviewee to talk about phenomenon descriptively, not only to answer the question. (Patton, 2002, 353-354.) Patton (2002) divides data received from the research into six categories: Background, behaviour, experience, knowledge, opinion, feeling and sensory based data. Researchers should know the nature of the data they from each question. (Patton, 2002, 348-351.) Asking singular and clear questions is important in order to get valid data. This way interviewers know that both interviewer and the interviewee are talking about same subject and which question interviewee is answering. (Patton, 2002, 360-362.) The researcher should avoid being biased when planning and performing the interview. That could lead to unethical study approach, invalid data and lack of reliability of the study. (Kananen, 2011, 54-56.)

The nature of usability is wide in the theoretical range. The goal of the thesis was to get web designers to describe their relationship with usability and describe their experiences and personal opinions about the phenomenon itself and the tools and techniques they use. This is the main reason to settle with qualitative research methods. Interview

techniques for the study as standardized open-ended technique with possibility of follow up questions. The study questions are divided in background, experience and opinion based questions

To find out right and efficient ways to carry out this research, different kinds of preparation methods were made. Besides studying different usability theories to create wide and valid theory base, two pilot interviews were performed to ensure that the interview technique and the questions asked were as valid as possible. The pilot study was made face-to-face, where interviewer and interviewee were at the same place. These interviews were recorded and then later written open and analyzed in superficial manner. Both of the interviews followed same themes but were performed a bit differently. The changes in performing the interview were made to find the best questions gain experience. The first pilot contained conversational elements when the second followed guided interview technique. These methods were chosen to get interviewees to speak spontaneously about the subject. Face-to-face synchronized interviews are the most common way of interviewing and the method is said to make interviewees´ answer more spontaneous (Opdenakker, 2006). This was thought to be advantage and benefit the results. However, after the pilots, final interviews were decided to be performed in asynchronized method using email.

Email interviews are often criticized because they lack clues from normal social conversation. The interviewer and the interviewee do not have an embodied social relationship which can be seen as lack of trust and also make the interviewee to ignore the questions that were asked, which leads to untruthfull answers. (James & Busher, 2006, 416-417; Opdenakker, 2006.) However, there are lot of factors that encourage to use asyncronized method (email, messengers, etc.) for interviews. The asyncronized method gives interviewees time to think about the narratives they write making them richer and also to reflect their experiences about the phenomenon better. Asynchronized method also gives the interviewees the possibility to write and think about their answers when they have more time and place is best for them. Other factors like failure of the recording etc. will not affect the outcome when using this method. (James & Busher, 2006, 415-416; Opdenakker, 2006.)

The main reason to perform the interview via email was to get interviewees to really think about the phenomenon and tell their own stories about it. During the pilots, it was noticeable that the phenomenon is so broad and abstract that interviewees did not know how to approach questions. The interview questions were planned on purpose in manner that would not help or lead the interviewees too much which would make results biased. Spontaneous situation made it hard for the interviewees to tell the story and describe their experiences about the phenomenon. More accurate and well thought answers were considered more important than spontaneous responses after performing the pilot interviews. Other reasons that led to email technique were the fact that it is less work load when writing the interviews open and the bad quality of the recordings during pilot interviews (some parts were impossible to understand). Physical distance of interviewees, the challenge of organizing time for face-to-face interviews with web designers, to ensure all the interviewees are answering in the same questions minimizing the personal effect of interviewer in the process and the incompetence of the author the thesis as an interviewer also affected in the decision of using email technique.

After these preparations, final questions were formed and decided. These were the following questions made to the interviewees, Figure 6 explains their relationship to the research questions and the nature of data that is asked:

Interview questions:

1. What kind of company do you work for, what are the key services and what is the size of the company?
2. Describe different tasks you have during the web project; Creating concepts, designing, programming, etc.
3. How long have you been in this field of business?
4. What does web usability mean to you in general?
5. What in your opinion makes a website usable? Give an example of a website.
6. How have you brought end users closer to the design process?
7. If so, what kind of impact did it have on the project?
8. Do you use a set of usability principles or rules when you design? What are these rules? If not, what would be three most important usability aspects for you when designing?

9. What kind of project models are best for you to ensure good usability in your design?

10. What technical tools do you use to ensure usability in your design?

11. What measurements and evaluation methods do you use to measure the level of usability?

12. Do you read about usability issues? How often, and what sources do you use?

13. Have you done any usability testing? What did you think about the testing and what kind of impact did it have on your design?

14. Give an example of a project where there was an issue with usability. If there was a major problem, how did you solve it?

15. Have you ever worked with a usability designer or a UX designer? Did it change your way of working and how?

16. How do you take the accessibility of special user groups into account when designing websites?
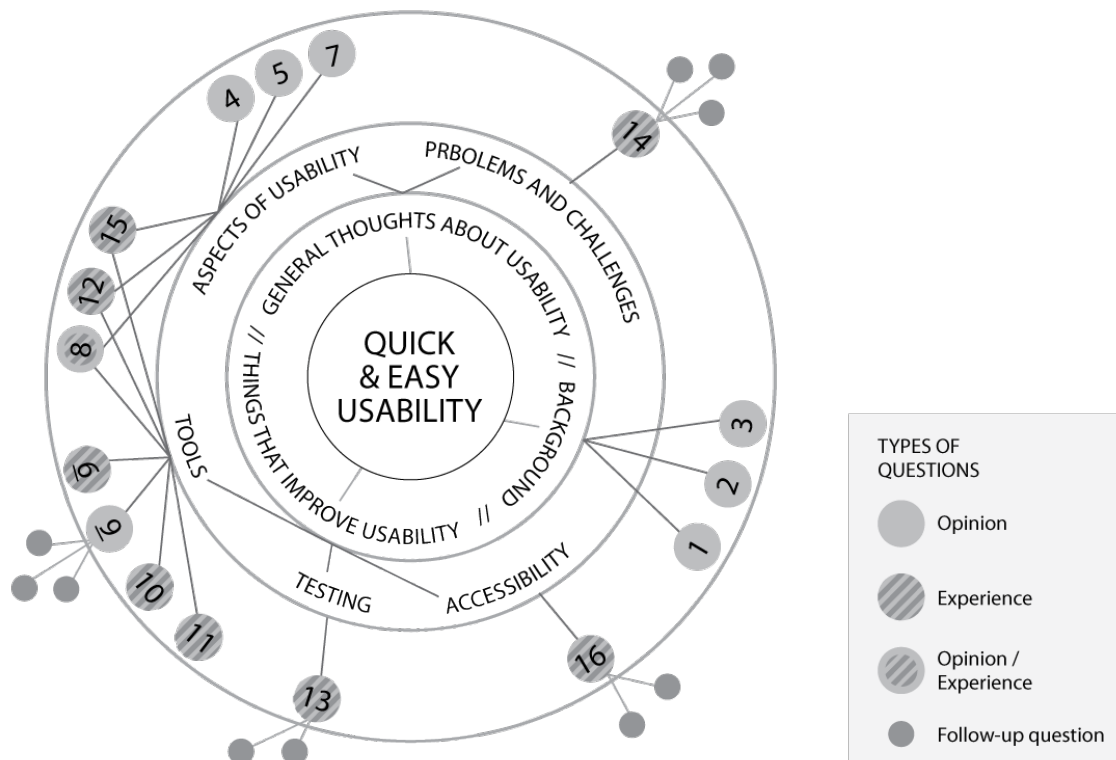

FIGURE 6: Relation of research problem, research questions and interview structure

4.2.3. Performing the interviews

The amount of the examinees or interviewees needed in qualitative research is not determined strictly. Kananen (2011) states that it is a good practice to pay attention if the answers start to repeat themselves and the new interviewees are not bringing anything new to the study. Usually a sufficient number is 12-15. (Kananen, 2011, 53.)

Companies and professionals for the interview were found by asking from people who already work in the field or study designing, using different search engines and portfolio databases and searching promotional pages on Facebook. 30 emails were sent to different companies to request participation (See Appendix 1) for the study. Seven of these companies/freelancers answered the request. The questions were sent to them by email (Appendix 2). Interviewees were given one month to answer the questions. During the first month of collecting the research data, only five of the participants answered the questions. 16 new emails were sent to new companies and designers asking for participation. Three more companies volunteered to answer after this. One of these interviews was performed face to face. The interview followed the same structure as the email interviews. It was done in Finnish, but main terms were set and agreed before interview with the interviewee. This interview was recorded and later transcripted in proposition manner. At the end, 47 requests were sent and from that eight companies or designers participated the study.

After the research data was gathered, it was transcripted. Kananen (2008) divides transcripting in categories of word precis transcripting, universal language transcripting and propositional transcripting. Word precis transcripting means writing out all the interviews word by word, also taking gestures and non-vocal communication in account. Universal language means taking spoken language out and written out transcripts down to general language. Propositional transcripting is where the goal is to find the core messages from the interview and writing them open. (Kananen, 2008, 80-81.) Since the most of the answers came from email interviews, it was logical to use propositional transcript as a method. The same method was used for the face to face interview.

5. RESULTS

5.1. Research data analyzing

Analyzing data in qualitative research means coding, transcripting and modifying data to a form where it is easier to be understood. These steps usually happen before the actual analysis. The meaning of this phase is to form an entity and structure of the phenomenon from a huge amount of raw data. (Kananen, 2008, 88.) These methods are not meant to simplify or strip information out of the research data. Instead, their function is to create entities out of shattered information units and build new information entities from them. (Eskola, Suoranta, 1998, 138; Kananen, 2008, 89.) Analyzing data from qualitative study is often tricky. There are many different methods that are used and new methods are being created all the time. The methods are spread depending on the the field of science. In many cases the methods appear parallel. (Eskola, Suoranta, 1998, 161-162.) Analyzing data with qualitative research material is about understanding the phenomenon deeply (Kananen, 2011, 65-66).

Before starting the analysis, Kananen (2008) states that the researchers have to code (transcript) the data in a meaningful way. Transcripted data is easier to read and makes analysis possible. To do this in an effective manner, a researcher must study the research material well. By knowing the material, the researcher can create cognitive maps and simplifications. This is normal and a human way of thinking. (Kananen, 2008, 88-89.) Researcher can use themes that describe bigger entities in the answers and use these to categorize the research material. What is different with a quantitative research is that, in most cases, these themes and codes are not created before the research. Instead, the research material determines how to code the frames from the material. (Eskola, Suoranta, 1998, 154-156.)

When the coding is done, Eskola and Suoranta (1998) write that the material can be organized and reorganized again and again. There is no right answer to the amount of these codes and themes or the way they should be organized. There are always new possibilities and point of views how to analyze the data again. It is a good practice to organize and reorganize data again and again to gain multiple point of views. (Eskola &

Suonperä, 1998, 156-158.) Each researcher makes their own coding system in their own way. The background of the researchers, their opinions and attitudes all affect the study. Researcher reflects the research data to his own knowledge and experiences. (Kananen, 2008, 89, 96-97.)

In this research project, background the material had a big impact during the coding phase. The answers were coded first so that each question was dealt with separately. Here similar terms and phenomenon a were grouped together, then separated into smaller categories, merged and the reorganized again so they created entities. The labels of these codes were close to the background information. A similar method was used when dealing with all of the research material. All the answers were written open despite the question they were answering. This time the research problem and the questions had more effect on the way the codes and themes were formed. All the answers to the questions asked from interviewees were written open in a propositional manner. Theming method was used in this analysing process. The amount of same or similar terms and phrases was also counted, but not presented in a detailed manner. Kananen (2008) says that in theming, all the answers from the interview are then categorized under bigger groups and are described in detailed manner. Quantification is a part of this method. It is a method where the researchers look for frequencies of nominators. In the simplest way it is counting the amount of key words. These words and terms are used as themes and are the base for categorizing. (Kananen, 2008, 91.)

5.2. Results reflected to each questions

During this chapter, the results from the interview are presented by how interviewees answered to each questions. Possible follow up questions and answers to them are transcripted in the these questions depending which they relate with. Transcripts to each interview question are presented in a themed manner with aid of quantification in the 3rd Appendix.

The first three questions were created to find out the background of the interviewees. When asking about the company they worked for, four of the participants mentioned their own one man company. Three worked in a company that had more than 10 employees. Two mentioned that they were part of a co-operation. In most cases, services of the companies were said to be web development and design, online services or marketing. Other ones mentioned were business model designing and customer experiences, advertisement, marketing, campaigning, communication, designing and building application and producing management services. When asking about the tasks and assignment, the most frequent answers were designing, wireframing and coding (considering CSS, HTML, JavaScript and PHP). Some of the interviewees described their assignment in more detail than others. Other assignments were building concepts and content, service structures, facilitating workshops, building information architectures, designing UX and testing (Figure 6). Three of the interviewees described their work close to usability or UX designing. All of them had more than one kind of assignment in the company they worked for. When asking about the period of time in the field, four stated more than eight years, three less than five.
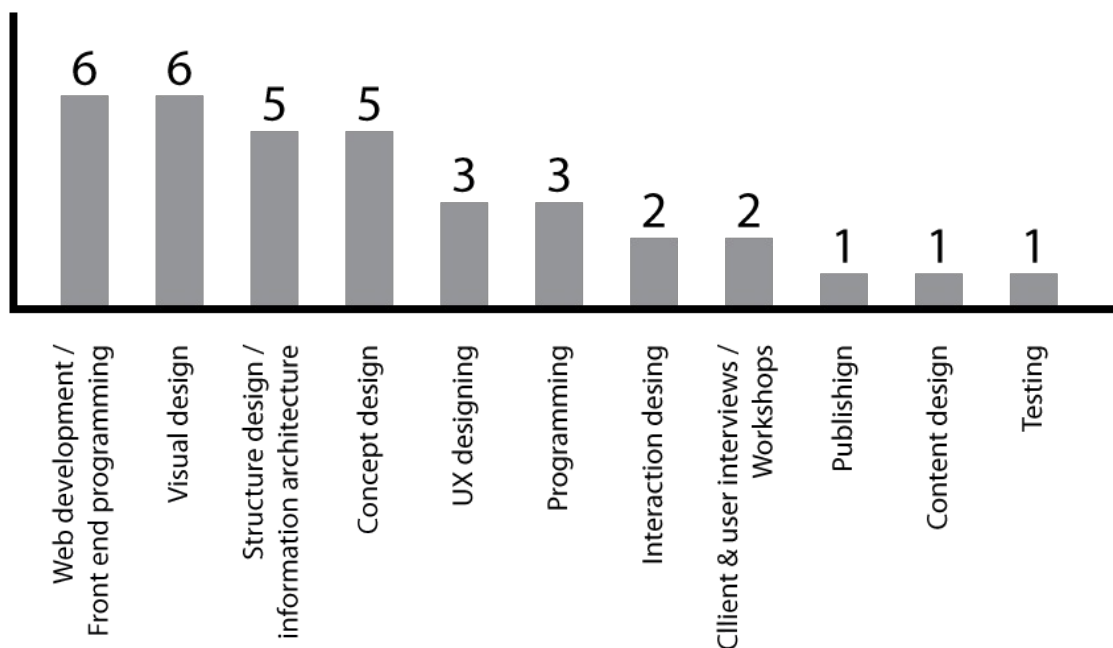
FIGURE 7: Assingments mentioned by the interviewees.

When asking about usability in general, the interviewees saw it mainly related to understanding the users´ need and tasks they needed to perform. Usability was related to words as easy, intuitive, understanding users and designing for flow. Many interviewees

also raised points about site related attributes like navigation, content and visual hierarchy. They were related with words like easy, short, simple and clear. Also, the fact that website was usable with multiple devices was seen as an important aspect of usability.

> *"Designing with usability in mind means eliminating bottlenecks betwneen the user and their goals."*
>
> – Interviewee 1

> *"...web usability means that the flow of a website or web service makes sense regardless of device..."*
>
> – Interviewee 2

Web usability was mainly related to similar attributes. This time the interviewees brought up more detailed points. Understanding the users´ tasks was still important for most of them. Words like simple to use, learnability, intuitive etc were clustered under user task. A good website should also encourage users to interact with it. Under the same category formed another cluster of codes, consistency and cohrency. Many interviewees related usable website with good and intuitive navigation and content with clear hierarchy. Visual elements were also considered important. Simple and clear design with easy to find call-to-action elements were mentioned.

> *"...the service should address the user in a helpfull manner. And within context, propose to engage in other related activities relative to the current task..."*
>
> – Interviewee 3

> *"Site navigation should be clear and closely match the way users think about the taks at hand."*
>
> – Interviewee 1

These were the examples interviewees gave when asking about a website with high usability. The reasons they were picked can be found inside the brackets.

- smashingmagazine.com

- awwwards.com (good navigation and hierarchy of content)

- copyblogger.com (nothing over-complicate, clear text and buttons)

- codeacademy.com (simple to navigate, tells what it is about in seconds)

- mailchimp.com (encourages to use)

- facebook.com (user interaction is present all the time)

- microsoft.com

- apple.com

- mtv.fi
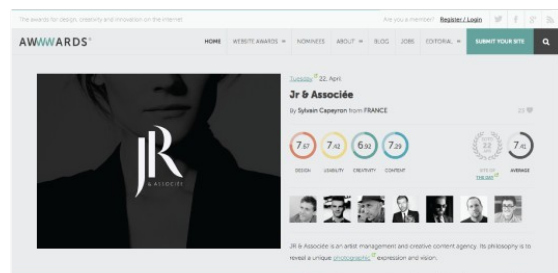
FIGURE 8: Examples of websites with good usability (Screenshots taken 22.4.2014)

When asking the interviewees about the ways they bring end-user closer to the design process, many said that co-design, workshops and user interviews were a good way to understand what users need and want. Other important things were to do user testing, even in a very light manner by just showing the design for outsider. Prototyping was also seen as important part of bringing users closer. Few interviewees mentioned that the end user had to be represented in every stage of the design process. In a few cases, some of the interviewees clearly confused end-user and client by referring to stakeholders.

"...to ask others for opinions on the design."
- Interviewee 2

"...workshops and co-creating, so not quessing what users would really want... "
- Interviewee 4

"...make sure the end user is taken into account in every step..."
- Interviewee 5

When asking about the impact these user involvements had on projects, the opinions were divided. Many interviewees stated a positive impact. User involvement was seen as important refinement, valuable input that gives development team measurable results and understanding the everyday usage of the website. It was also seen as a way for deeper understanding of the brand of the client. Some of the interviewees saw user involvement problematic. It may cause project to last longer, the outcome may end up being biased and when the site is designed too well, there is no room to sell updates.

"...involving actual users from the start will provide you with valuable qualitative data on the client company's real-world customer base."
- Interviewee 1

"...in business thinking, it can be seen negatively when the lifeline of one site gets long. If you want continously sell something to the client, then you shouldnt make the site too good"
- Interviewee 4

Most of the interviewees did not use any particular check-list when they went through web sites they developed. Only one interviewee named a list that was based on Nielsen's usability heuristics. All the other interviewees gave a short list of things they take into account when designing a website. These were grouped in categories of supporting intuitive usage, visibility of content and features and good way of using visual elements. Most of the answers were abstract in nature. Some were more technical, like using Google based fonts and writing code semantically.

"Not so much... I mostly take somethings for granted..."
<div align="right">− Interviewee 2</div>

"KISS – Keep it simple stupid"
<div align="right">− Interviewee 3</div>

"Fonts have to be web-safe or google fonts. Font size has to scale properly..."
<div align="right">− Interviewee 6</div>

When interviewees were asked about project model they used or prefered, many of them asked defining questions. In many cases project model was not related to organization they worked at and follow-ups were needed. Interviewees´ answers state that there is no one way of working. The working model was not usually forced, it was more like a frame. This comes clear in the form of the answers. Only half of interviewees referred to existing models or methods. Agile development model with the usage of scrum and sprint techniques was the only method that was referred directly. However, almost all of the interviewees described different attributes of organization that support the design process well. These attributes were openness, good documentation, clear task definition and that there was always someone with final responsibility.

"...working in "scrum-ish" manner, with one week sprints..."
<div align="right">− Interviewee 3</div>

"try to squeeze a design project in with a spring-based agile development..."
<div align="right">− Interviewee 1</div>

"Agile model is my favorite. Keeping meetings with your client and analyzing the work step by step make things clear and easier."
<div align="right">− Interviewee 5</div>

Question 10 was to find out what kinds of tools interviewees used to ensure high usability. The tools that were mentioned most frequently were tools that made sure that designed website worked on multiple devices and browsers. These were different emulators, actual devices and multiple browsers. Actual devices were seen more

effective than emulators. Prototyping tools were also seen important. Four of all the interviewees mentioned pen and paper as well as testing everything on paper before continuing to more detailed design. Two interviewees mentioned accessibility tools.

"...if you don't have all the possible tablets and mobile devices available, you can always go to Verkkokauppa, Apple store and to try things out with actual devices."

– Interviewee 3

"Mainly my eyes and a range of browsers and mobile devices."

– Interviewee 6

When asking the interviewees about evaluation tools and methods, quite many of them stated first that they either did not use any, should do more or were unfamiliar with these tools. After a few follow up questions, the interviewees were able to describe things they did before launching a site. The most frequently used method was human evaluation where the website was either shown or properly tested with users, clients or both. Two of the interviewees mentioned A/B testing. These testings as well as user funnel testing were performed with help of analytic programmes (Google analytics was most mentioned). Other things they tested were visual elements and that important elements were dominant enough.

"...important things with analytics is that proper funnels and events are set up for the website – relevant to the central use cases – instead of just relying on what analytics services provide..."

– Interviewee 1

"...it's (evaluation) more intuitive in design process, and turns more into science when the site is launched"

– Interviewee 3

The interviewees were asked do they read about usability and from where. Most of them stated that they do not read books or follow blogs regularly. Some of the interviewees saw that "hands on" experiences were more important than reading blogs. If the interviewees followed some topics, they were more technical. Only one of the

interviewees mentioned an author (Jakob Nielsen) during the interviews. The following blogs were mentioned during the interviews:

- smashingmagazine.com

- lifehacker.com

- udemy.com

- alistapart.com

- webdesignerdepot.com

- tutsplus.com

- hongkiat.com

> ”...now days I pretty much learn from hands on experiences, they teach a lot how concrete user testing changes ones behaviour...”
>
> – Interviewee 4

When talking about usability testing, it appeared that most of the interviewees had either no or very little experience. Most of them stated that they conducted low level usability testing in their design process, meaning A/B testing and showing the website for outsiders for comments. One of the interviewees stated that there is no time for usability testing at all and one said that the company he works for has outsourced this phase of the design project. Two of the eight said they performed professional level usability testing with test users. These two were able to explain the situation in details. They prefered face to face tests, where the testing situation was planned well, recorded, with good range of user tasks and authentic user as the best way of conducting user testing.

> ”Understanding key user problems with the design has to start before the project is launched – it might be that problems discovered after the fact are impossible to fully solve without rethinking the design and subsquently redeveloping the service...testing further helps to cement the user's viewpoint whenever it's in conflict with the client company's (or stakeholders') desire.”
>
> – Interviewee 1

"It was suprising how different people see different things."
– Interviewee 6

"Sometimes kids and non-tech-savvy persons do the weirdest decisions"
– Interviewee 3

Interviewees were asked about a project where usability became an issue and about the method, techniques and tools they used for solving it. The purpose was to find out what are the common challenges in the design process. Interviewees were asked straight about the challenges in follow up questions. In the answers, two challenges were mentioned more often than other: Responsive/adaptive designing for multiple devices/screens and to make content/features simple enough for users. For some interviewees, adaptive designing was more important than responsive since use cases with different designs might differ. The solution was to test the design with multiple devices before launching it. For the second most frequently appearing aspect (reaching simplicity), the problem appeared as too many subpages, too intimidating amount of content, hidden features and unnecessary steps user had to take before task was done. These issues were solved with limiting down the content, making task related features more prominent and creating visual hierarchy. Two of the interviewees stated that clients were the biggest challenge in web design.

"...easily screen size and pixel density, with the addition of how different devices may act..."
– Interviewee 2

"...first version of the site had a lot of info and images and too many sub-pages with different information about specific services. We simplify because it wasn't usable at all and customers were just intimitated."
– Interviewee 6

When asking about interviewees about their experiences when worked with usability designers and the impact of that had to their working, answers were divided. Half of the interviewees had not worked with them before during their career. Some of the interviewees had sceptical thoughts about having one person purely focusing on usability issues during the design process. The reasons for scepticism were that usability was seen as too narrow specifications for a web designer. Nowadays, professionals are

expected to master many different phases of a project in this field along with many different techniques. Specialising was not seen as important than mastering many techniques and work phases. All the answers were not negative. Four interviewees saw that the UX designers input made huge improvements to the outcome of the project, whether they had or had not worked with them. Working with them was seen to widen the perspective of design process. Two of the interviewees said that their role in a project had consisted UX or usability design.

> *"As a position at an agency / small dev company, I see it a bit too narrow for todays web design worker standards, where people are expected to be good visual planners, interaction designers, at least understand programming and measuring if not techie himself."*
>
> – Interviewee 3

> *"A seasoned developer/designer can do the same things while doing their stuff, so I'm guessing this is not plausible for smaller agencies"*
>
> – Interviewee 7

When talking about universal usability and accessibility, many interviewees stated that when the design in general is clear, it also benefits users with special needs. This can be achieved by making the important content and features stand out and call to actions elements prominent. An other frequently appeared attribute was to make code structure so that it is semantic and readable for screen reading devices. The interviewees also mentioned colors and sizes of fonts has to be readable for older or colorblind users. When it comes for standards, only two interviewees mentioned ARIA during the interviews. One interviewee saw these standards as something that stakeholders pay more attention to than the developers and designers. Even though all the interviewees had opinions about how to design accessible websites, three out of eight had no experience of it. There was either no time for it or the final product was not designed for special user groups.

> *"I suspect the ISO standards do not directly affect web design prectices, as they exist mainly to inform project stakeholders..."*
>
> – Interviewee 1

"In design special groups can be taken into consideration with clear designs and sufficient visual clues..."

– Interviewee 2

5.3. Reflecting codes and themes to the research questions

During the second phase of the analysing process, all the codes from the transcripting were gathered together. This time the codes were mixed together so that they were not related to any specific interview question. After that, there was a new grouping phase. Similar themes appeared during this grouping as during the previous one. Only here the main groups were much larger and there was a need of forming smaller sub clusters of similar terms and phrases. Grouping of the codes from transcripting can be found from the 4th Appendix. The process of grouping is illustrated in figure 9. This time it was also time to perform shallow quantification of these codes and themes, the amount of times they were mentioned (referring to same or very similar terms). These individual codes are illustrated as nodes in 4th Appendix. The main principle which guided this grouping process were the findings and observations during the grouping and theming, but also the original research questions. The groups with their subclusters were very close research problem of the thesis. The theoretical background helped to form entities out of raw data. The themes found during this grouping phase followed theoretical framework that was build for the thesis. After the grouping following main groups were formed: 1) Elements of usability, 2) Challenges of usability and 3) Tools and methods to improve usability. Elements were aspects, point of views and attributes that were connected to the essence of usability and what usability ment in general. Challenges were things that caused issues and problems to interviewees. Tools and methods were more concrete ideas and experiences interviewees had when working towards higher usability.

FIGURE 9: Phases of coding, theming and quantification.

The elements of usability were divided to understanding the target audience, user experience, navigation, content and visual elements. Understanding the target audience included attributes like taking the user´s need in account and making all the features and content visible and easy to access. It was seen important that website delivered the information users really needed. Task accomplishment was seen as an important factor of design and that all the necessary information was visible and easy to find.

User experience was a more abstract attribute that included a lot of sub-categories. Consistency of the website was seen as important part of high usability. Learnability and familiar appearance and behaviour were important attributes as well as understanding the current norms of design. Guiding users, making interactions obvious and giving informative feedback were part of good usability. Website should not only help the user but propose interaction. Many interviewees mentioned that clear call-to-action elements like buttons usually improved usability. Fast performance and loading times were were

mentioned too. Overall, making websites and user experience simple, intuitive and easy were considered important. Statements like "easy to use", "keeping things short, simple and available", "less is more" and "do not make people feel stupid" support the findings.

Navigation was a frequently mentioned attribute in general and web design related usability. Navigation with high usability was often related to terms like good hierarchy and simplicity. A user should never get lost on the website. The navigation system should also address the current location and possibilities as well. The whole navigation should resemble the tasks the user needs to perform. Content was related to usability relatively often. As well as navigation, content was connected with terms like good hierarchy and clearness. Two interviewees stated it to be the most important aspect of the website and usability. The interviewees saw that clear visual elements with good hierarchy, contrast and good use of white space empowered good user experience. Style and design of a website should support, not hinder usability. Visual elements should lead users and give clues how to proceed with their tasks.

When it comes to challenges of usability in web design and developments process, one aspect was mentioned much more often than any others. Designing websites for multiple devices, screen sizes and browsers was clearly seen as the biggest challenges. Making the website appear the same was not the only challenge the interviewees mentioned. Adaptive design where different behaviour and experience with different devices was seen important to achieve. The users might use a website differently or for different reasons with different devices. Another bigger challenge was to achieve simplicity when designing a website. In many cases when asking about projects where usability became an issue for designers, interviewees stated that the site they were developing was not simple enough. Websites had either too many subpages, they asked too much unnecessary input from the user or user had to take too many steps when performing their tasks. According to interviewees, other things that were found challenging were clients, lack of time for projects or conflict between technical and visual planning.

Interviewees mentioned many ways how to improve usability of the website. Tools and methods were divided into small clusters which were evaluation, design tools and methods, project model and team work, and accessibility.

During the analysis, the first impression was that most interviewees did not know that many methods or tools to evaluate usability of websites or did not use them as much as they thought was a good practice. However, many of them stated that they do at least light human evaluation by showing their designs to someone outside the project. It was seen important that at least someone with "fresh eyes" saw the design. The evaluator could be a client or stakeholder who had not seen the outcome before, friend, relative or a colleague, non-tech-savvy person or even a child. It was seen interesting how differently people experience and observe a website. Many of the interviewees mentioned that they had not done user testing on professional level. Only two of the interviewees were able to describe the situations in details showing that they did these test regularly and systematically. These were the same two who describe their role in the team consisting elements of UX designing. In one case, user testing was outsourced. Although most of the interviewees saw that user tests were beneficial, there were also comments where the advantages were doubted and approached with skepticism. Positive points were that by user testings, development team gains measurable data about the usability, client becomes more committed, it helps finding problems at the early state and which then leads to avoiding common pitfalls later, making sure that project does not go on forever and thinking about website in everyday usage. Critical attitudes were spotted from statements where usability (and overall user involvement) were seen to make outcome too biased or almost any kind of user involvement was seen to slow the design process down. Other ways interviewees used for evaluating websites were by working with analytic systems. Three of the interviewees said they used A/B testing. One interviewee brought up a point that it is not good to blindly trust in the data analytic programmes give, but to understand and create correct user funnels and after that, use the analytic data to support the findings. Technical evaluation tools that were mentioned during the interviews were related to testing the site with different devices (by emulators or real devices), different browsers and testing the loading time of the website.

Design related tools used for improving usability of websites were divided into three categories which were working with the client, technical tools and accessibility tools. When working with the client, many of the interviewees said that they did some sort of background research, interviewing the users or client, benchmarking similar sites or creating user personas. They also acknowledged that it was important to bring the user close to the design process at the very early state of the project. Two of the interviewees mentioned that they used co-creation methods where they met with possible users and clients regulary, organized workshops handcrafting user flow, funnels and use cases in co-operation. Technical tools used for improving usability were different prototyping tools where early states of website could be tested. Some of these were more functionals, some just showing the wireframes. More than half of the interviewees mentioned pen and paper. Pencil sketching, testing ideas and making hypothesis at early state of the project were seen as efficient manners to increase usability.

Interviewees were asked about their ways to take special user groups (users with disabilities, old age etc) in account when design to find out their attitudes and methods of improving accessibility. Almost all of the interviewees said that they had none or very little real hands-on experiences of this topic. When they described what the attributes that increased accessibility were, most of them stated the structure of the code. To be user-friendly for disabled users, the code had to be semantic. It had to be readable for screen readers. Other accessibility improving points that were raised were font size and style and color combinations. Only one of the interviewees mentioned standard but didn't see them guiding everyday design work.

Project model and teamwork related points form the last part of the set of tools improving usability. This specific topic raised many follow-up questions since many interviewees did not really understand the nature of question. When asking the interviewees about project model, only three gave answer that consisted of an existing model. Scrum, agile and sprint based development model were seen effective and good practices of team work to improve usability. Three other interviewees described a good organization to have the following attributes; Openness of information, documentation was done well and responsibilities were clear.

Interviewees were also asked if they worked with usability/UX designers and how did it impact their working. Half of the interviewees stated that they had not worked with one when two said their work assignment included this part of the project. Attitudes (as stated in the previous chapter) towards the benefits of UX designers were divided. Some interviewees saw that UX designers input for a project was important and which made the interviewee observe the process of web design from wider perspective. Some saw it too narrow specification or assignment for one person in the team to deal with, at least in a small company.

6. DISCUSSION

6.1 Discussion about validation

In his book, Kananen (2008) states that research can never be fully objective. The chosen research methods, terminology and the skills vary between researchers. All of us humans make different observations of the world around us and because of that, there is always a chance of error during the research project. Researchers might actually end up researching their own opinion instead of the research examinees´ or research data by letting their own opinions affect too much during the research. Researchers might lead examinees (in this case interviewees) to answer in a certain manner by leading them on during the interview. This is called reactive problem and leads to biased results. (Kananen, 2008, 121-123.)

To make sure that the research is done well and the results are exact and reliable, there are different evaluation methods for the validation and rehabilitation of a qualitative research. Even though the classical reliability evaluation methods from quantitative research do not apply in similar manner, some authors see that there are different set of tools for evaluating qualitative research. According to Kananen (2008), Mäkelä states that there are three different validation elements that can be used, 1) The saturation of the material, 2) The coverage of the material, and 3) The evaluability of the analyse and repeatability of it. Saturation refers to the fact that there is enough material so that the researcher can draw conclusions from them. Coverage means that the researchers do not base their analyze in selective parts of the material, leaving others out that might not support their hypothesis for example. To make analyse evaluation-friendly, documentation of the process has to be done well. It also makes repeatability possible. (Kananen, 2008, 123-125.)

Other used method is Guba's and Lincoln's model where evaluation of the reliability is based on credibility, transferability, dependability and confirmability. Credibility can be checked by asking examinees to state that the observations researcher has made are correct. Transferability is where the observations can be taken from the research and in to the test by generalizing them. Dependability and confirmability are hard to achieve in

qualitative study since the surroundings, researcher and examinee all affect one another and researchers approaches the material always from their own point of views. Documentation can help in solving this problem. (Kananen, 2008. 125-127.)

Usability is a wide term. It is a sum of huge amount of attributes. As said before, usability is always related to the context of what is being evaluated. Even the theoretical background the thesis shows that the phenomenon is complex and broad by nature. Though the themes and attributes of usability are divided in a fairly similar manner in the three books that were used as the core of the theory, they were all a bit different. Usability is a observation, a qualifier. It does not appear objective. This made the analysing phase really tricky. Words and phrases used to explain it where hard to open, transcript and then categorise. At the beginning of the research project, the questions were left as open as possible so that the interviewees can use their own words to describe the phenomenon. This method was selected so that research would gain as objective data as possible and to give the interviewees the possibility to be more spontaneous. After a few pilot interviews the questions were rephrased to be slightly more specific due to the repetitiveness of the answers during pilot studies. A few very open questions were left in the beginning but they were now supported by more specific ones. Also, the method of interview was changed from face to face to email so that interviewees were able to think about what they answered. As interview answers started to come in, there was a notion made that some of the interviewees did not understand the questions as they were meant to be understood. That made asking follow-ups necessary. The fact that we had to be more specific with some interviewees may have affected the results.

"What does usability mean to you in general" is a very open questions. To find out the relationships and connections between different answers was sometimes tricky. Statements like "easy to navigate", "easy to use", "logical to browse" and "intuitive and task oriented" are very close together but categorizing them and creating themes appeared more challenging. During this phase, quantification of these key words and codes was used to bring more sense to the analyse. During the creation of themes and the categories, the single statements, nodes were mixed again and again to form more solid entities. Although the themes and categories kept on living and changing, the bigger themes stayed mostly the same. The theoretical background influenced hugely in the way the categories were formed.

6.2. Conclusions

The number of the examinees together with subjective coding that is characteristic for the methods of qualitative study makes it hard to represent very reliable conclusions. However, the elements of usability that raised from the interviews were very similar than ones found when crafting the theoretical framework. In general, a conclusion can be made that usability is a wide term in theory and in practice and there are multiple ways to think about it as well as to improve it. The thoughts, tools and methods that are used by web designers resemble ones that can be found from the books and theories. The resemblance of theory and the results can be also seen as a proof of valid decisions during the coding phase. It was found out that the tools the designers who are not too engaged with usability issues use are quite similar to the ones that were found when crafting the theoretical framework.

Web designers think about usability when designing and developing websites but their approaches differ and are sometimes intuitive. They also value usability high in their work even though some of them felt that they should consider these issues more. They also see that usability is possible to achieve by easy everyday methods like sketching with pen and paper, testing a hypothesis often, interviewing possible users and just showing the design to others outside the project for more unbiased opinions. Usability always meant something for the designers and was seen as important part of a successful web experience. User testing can also be done in very light manner, even though some of the interviewees did not really use the practices that often. Accessibility was also seen a bit vague area in usability and web design, although most of the interviewees brought valid points to discussion. An intuitive approach to usability was seen when interviewees answered questions of tools and usability guidelines. Many of the interviewees stated that they did not have any structural usability list they went through the website. This doesn't prove that they did not check the site, it only shows that in many cases it was not done in a structured manner.

The original goal was that only designers that did not have too much experience of usability were interviewed. It was soon found out after starting the interviews that in this field of business, the tasks and assignments vary a lot and there are no common universal practices or ways of working. Different experience level, work descriptions

and organizations made comparing and combining results hard. Web designers' thoughts about usability seemed to vary quite radically depending on their work assignments. Designers tend to bring up point of views which are close to their own tasks. The ones that have wider work assignments could be seen to have a broader approach to usability and they used wider set of tools. To study and compare the effect of experience, work assignment, different work organization to the way designers think and improve usability could be a subject for future studies.

The scepticism towards using UX/usability designers in projects and bringing the end users closer to the design project was an interesting finding. It may occur because of lack of experience, time and also knowledge what other team members do in a project. There was not really a connection to the experience and the attitude but the small amount of research data and interviewees makes it hard to draw strong conclusions. It was also interesting to see how designers lacked experiences of designing websites with high accessibility and consideration for special user groups. Although accessibility was quite well understood as a term and most of the interviewees did know the ways to improve it. They usually lacked time to concentrate on this or the sites that were designed weren't really targeted to these user groups.

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APPENDICES

Appendix 1. Research participation request email

Request of participation sent by email:

(title)
Looking for web designers to interview for bachelor thesis

(subject)
Hey

I'm a media programme student from TAMK (Tampere University of Applied Sciences) and I'm looking for web designers to interview for my thesis research about web design and usability. My goal is to find out how designers see usability design as a part of their work and what kind of standards and tools they use.

For the interview, I'm looking for web designers in small companies, entreprenours and/or freelancers who in their work involve a processes of 1) Wireframing, 2) Graphical design of the web site and/or 3) Front-end programming.

I have selected my interviewees by asking my fellow designers and using search engines and portfolio databases. The collected research data will not be given to third parties, and the names of the companies and designers will not be published in the study.

If you fit the description and want to contribute by participating, send me reply to this email address and I will send you the interview questions. The language of my thesis is English, therefore I prefer that you answer in English. You can also answer in Finnish if you find it easier for yourself. If you have any questions about the interview, feel free to ask.

Thank you.

Sincerely,
Joonas Nissinen
joonas.nissinen@cult.tamk.fi
+358408659913

Appendix 2. Interview question email

(subject)

Thank you for your participation *(Name of the interviewee)*.

Please use this email as a template when answering these questions. If I find some interesting points, I may ask follow up questions after you reply. Feel free to ask research related questions. Please answer the interview before the 28th of February 2014.

1. What kind of company do you work for, what are the key services and what is the size of the company?

2. Describe different tasks you have during the web project; Creating concepts, designing, programming, etc.

3. How long have you been in this field of business?

4. What does web usability mean to you in general?

5. What in your opinion makes a website usable? Give an example of a website.

6. How have you brought end users closer to the design process?

7. If so, what kind of impact did it have on the project?

8. Do you use a set of usability principles or rules when you design? What are these rules? If not, what would be three most important usability aspects for you when designing?

9. What kind of project models are best for you to ensure good usability in your design?

10. What technical tools do you use to ensure usability in your design?

11. What measurements and evaluation methods do you use to measure the level of usability?

12. Do you read about usability issues? How often, and what sources do you use?

13. Have you done any usability testing? What did you think about the testing and what kind of impact did it have on your design?

14. Give an example of a project where there was an issue with usability. If there was a major problem, how did you solve it?

15. Have you ever worked with a usability designer or a UX designer? Did it change your way of working and how?

16. How do you take the accessibility of special user groups into account when designing websites?

Appendix 3. Transcrips from interviews, related to interview questions (doesn't include questions 1-3 and 12)

4. What does web usability mean to you in general?

IIIIIIIII	User needs and tasks
IIIIIII	Site related attributes / experiences
III	Visual elements
II	Devices

5. What in your opinion makes a website usable? Give an example of a website.

IIIIIIIIIII	User tasks
IIIIIIII	Navigation
IIIIIIII	Consistency
IIIIIIII	Visual style
IIII	Content

6. How have you brought end users closer to the design process?

IIIIIII	Interviews / co-design
IIII	User testings
II	Prototyping

7. If so, what kind of impact did it have on the project?

IIIIIIIII	Overall positive
IIIII	Overall negative / skeptical
IIII	Undestanding user better
III	Client brand related points

8. Do you use a set of usability principles or rules when you design? What are these rules? If not, what would be three most important usability aspects for you when designing?

IIIIIIIII	Support intuitivity
IIIIII	Visible functions / features
IIIIII	Visual elements

9. What kind of project models are best for you to ensure good usability in your design?

IIIIIIII	Organization culture
IIIII	Prototyping & testing
IIIII	Agile, scrum & sprints
IIII	User involvement
III	Content first

10. What technical tools do you use to ensure usability in your design?

IIIIIII	Device compitability tools
IIIIIII	Prototyping tools
IIIIII	Browsers related tools
IIII	Paper and pencil
II	Accissability tools

11. What measurements and evaluation methods do you use to measure the level of usability?

IIIIIIIII	Human evaluation
III	Analytic programs
II	A / B testings
II	Visual elements
II	Loading speed

13. Have you done any usability testing? What did you think about the testing and what kind of impact did it have on your design?

IIIIIIIII	Points about testing
IIIII	Done only light testings
IIII	Benefits of testing
IIII	Haven't done testing

14. Give an example of a project where there was an issue with usability. If there was a major problem, how did you solve it?

IIIIIIIII	Responsive and adaptive design
IIIIIII	Simplifying
IIIIIII	Visual hierarchy
II	Clients

15. Have you ever worked with a usability designer or a UX designer? Did it change your way of working and how?

IIII	Haven't worked with UX designers
IIII	Positive opinions
III	Skeptical opinions
II	Does UX design

16. How do you take the accessibility of special user groups into account when designing websites?

IIIIII	Code structure & screenreaders
IIIIII	Clear overall structure
IIII	No experience of accessibility
III	Fonts
II	Colors
II	Standards

Appendix 4. Transcrips from interviews, related to research questions

MEANINGS

■ = Node, one parse of code, theme after transcripting

EXPERIENCE
GUIDE AND AID USER
■■■■■■■■■
   Obvious and clear
   ■■■■
SIMPLE
■■■■■■■■■
GOOD INTERACTIONS
AND FEEDBACK
■■■■■■■
INTUITIVE AND EASY
■■■■■■■
CONSISTENCY
■■■■■■
   Norms
   ■■
FAST PERFORMANCE
■■■

TARGET AUDIENCE
■■■■■
   VISIBLE TASKS AND FEATTURES
   ■■■■■■■■■
   SIMPLE
   ■■■■

CONTENT
■■■■
HIERARCHY
■■■■■
CLEAR
■■
CONTENT IS THE KING
■■

NAVIGATION
■■■■■■■
SIMPLE
■■■
HIERARCHY
■■
DON'T LET USER GET
LOST
■■

VISUAL ELEMENTS
STYLE AND DESIGN
■■■■
CLUES AND LEADS
■■■
HIERARCHY
■■■
USE OF (WHITE) SPACE
■■■
CONTRAST
■■■

CHALLENGES

**DESIGNING FOR
MULTIPLE DEVICES**
■■■■■■■■■■■

OTHER CHALLENGES
■■■■■■■■■■■

SIMPLIFYING
■■■■■

QUICK AND EASY
USABILITY

EVALUATION

**NO / LITTLE
EXPERIENCE**
■■■■

PROCESS MODEL / TEAM

UX / USABILITY DESIGNERS
HAVEN'T WORKED WITH
■■■■
POSITIVE
■■■
SCEPTICAL ATTITUDE
■■■
DOES UX DESIGN
■■

TEAM WORK METHODS
■■■■■
   AGILE / SCRUM
   ■■■
     Sprints
     ■■
DOCUMENTATION
■■■
OPENESS
■■

TOOLS

ANALYTICS
MEASURING USER
FUNNELS
■■■■■■
ANALYTIC
PROGRAMMES
■■■■
A/B TESTING
■■■

USER TESTING
■■■■■■■■
LIGHT HUMAN EVALUATION
■■■■■■■■■■■
PROFESSIONAL LEVEL USER
TESTING
   Advantages of user testing
   ■■■■■■■■■■■■
   Understand user
   ■■■
   Client commitent
   ■■
   During user testing
   ■■■■■■■■■■
   Sceptical about benefits
   ■■■■■

TECHNICAL EVALUATION
■■■■
DIFFERENT DEVICES
■■■■■■■■
BROWSERS
■■■■
LOADING TIME
■■

DESIGN TOOLS

WITH CLIENT / USER
BACKGROUND RESEARCH
■■■■■■■■■■
   Interviewes
   ■■
CO-DESIGNING
■■■■■■
   Workshops with them
   ■■

TECHNICAL TOOLS
WIREFRAMING & PROTOTYPING
■■■■■■■■■■
PAPER & PENCIL
■■■■■■■
CREATING HYPOTHESIS
■■

ACCESSIBILITY
■■
SEMANTIC STRUCTURE
■■■■■■
   Screenreaders
   ■■■
NO / LITTLE EXPERIENCE
■■■■■■
FONTS / LETTERFACE
■■■
COLORS
■■■
STANDARDS
■■