The Effects of Web 2.0 on Interaction Design in a Web Design Company

Case study: Satama Interactive

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Preface

During my internship at Satama Amsterdam in autumn 2006 and spring 2007, I studied Web 2.0 and its effects on interaction design. Even though the phenomenon had been discussed in various forums, little focus had been put on the effects of Web 2.0 on interaction design done by web design companies. After finishing the practical training, I started to look into this subject using Satama Interactive as a case study.

This project has been a difficult but edifying one. After the initial bewilderment, through trial and error, the thesis started to form. Now, in the end of the process, I can say I have learnt a lot from both the thesis subject as well as the research process itself.

I would like to take this opportunity to thank the people that have helped me during this project. First of all, I would like to thank to my instructor Tommi Pelkonen who guided trough this research process, and Martijn van Welie, who kept me focused on the essentials. No lesser thanks are due to the skilled professionals of Satama Interactive who contributed to this thesis by participating in the survey and the interviews I conducted. I also wish to thank TAMK University of Applied Sciences and especially my tutor Ari Närhi. Finally, I would like to express my gratitude to Meri for her unwavering love and support.

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Digitaalinen media on olennainen osa kaikkea liiketoimintaa. Digitaalisen median palveluita tuottavat ammattilaiset digitaalisen median yrityksissä. Digimedia-ala sisältää useita eri osaamisalueita, joista yksi on vuorovaikutteisuuden suunnittelu. Vuonna 2004, O'Reilly Media ilmoitti digitaalisen median uuden aikakauden, Web 2.0:n, alkaneen.

Web 2.0:sta, digitaalista mediasta sekä vuorovaikutteisuuden suunnittelusta on käyty keskustelua useissa alan artikkeleissa sekä tutkimuksissa. Web 2.0:n vaikutuksista vuorovaikutteisuuden suunnitteluun verkkosivujen suunnitteluun erikoistuneissa digimedia-alan yrityksissä ei ole kuitenkaan tehty kattavaa tutkimusta.

Tämän tutkintotyön tarkoitus on tutkia Web 2.0:n vaikutuksia vuorovaikutteisuuden suunnitteluun digimedia-alan yrityksessä. Tärkeimmät **tutkimuskysymykset** ovat seuraavat:

K1: Miten verkkosivujen suunnittelun ammattilaiset näkevät Web 2.0:n ja sen vaikutukset työhönsä?

K2: Mitä vaikutuksia Web 2.0:lla on vuorovaikutteisuuden suunnittelun tuotoksiin?

K3: Mitä vaikutuksia Web 2.0:lla on prosessimalleihin, joita käytetään verkkosivujen suunnittelussa?

K4: Miten digimedia-alan yrityksien pitäisi toimia, jotta Web 2.0:sta saataisiin irti suurin mahdollinen hyöty?

Vastatakseni yllä esitettyihin kysymyksiin, toteutin verkkokyselyn Satama Interactiven, Suomesta lähtöisin olevan monikansallisen digimedia-alan yrityksen työntekijöille. Lisäksi tein kuusi puolistrukturoitua haastattelua avainasemassa oleville Satama Interactiven työntekijöille saadakseni syventävää tietoa aiheesta.

Tutkimuksen tärkeimmät **johtopäätökset** olivat seuraavat:

Johtopäätös 1: Web 2.0:lla on todellisia vaikutuksia verkkosivujen suunnitteluun erikoistuneisiin yrityksiin.

Johtopäätös 2: Web 2.0 ei muuta verkkosivujen suunnittelussa käytettyjä prosessimalleja.

Johtopäätös 3: Vuorovaikutteisuuden suunnittelun tuotokset pysyvät pääpiirteissään samanlaisina, mutta useat tuotokset monimutkaistuvat.

Johtopäätös 4: Vuorovaikutteisuuden suunnittelijat tarvitsevat uusia tietoja ja taitoja selviytyäkseen Web 2.0 mukanaan tuomista muutoksista.

Avainsanat

Internet, vuorovaikutteisuuden suunnittelu, Web 2.0, prosessimalli, verkkosivujen suunnittelu

Abstract

Author	Title	
Kalle Kuikkaniemi	The Effects of Web 2.0 on Interaction Design in a Web Design Company	
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Digital media industry is an integral part of business in all industries. The services the digital media industry provides are created by digital media companies and skilled individuals they employ. Digital media companies encompass many competences, among others interaction design. In 2004, O'Reilly Media announced a revolution in the Internet: Web 2.0.

The concept of Web 2.0 has thereafter stirred up numerous articles and studies, as has the digital media industry and interaction design itself. However, there has not been a single, comprehensive study on the effects of Web 2.0 on interaction design done by web design companies.

The main objective of thesis was to study the effects of Web 2.0 on interaction design done by web design companies.

The main **research questions** were the following:

Q1:	How is Web 2.0 perceived by web design professionals?
Q2:	What effects does Web 2.0 have on interaction design deliverables?
Q3:	What effects does Web 2.0 have on the process model used to produce interaction design deliverables?
Q4:	How should web design agencies react to cope with the changes Web 2.0 has on interaction design to get the most out of it?

In order to find answers to the questions presented above, an online survey was conducted to personnel of Satama Interactive, a European leading digital media agency based in Finland. To get a deeper insight into the research questions, six semi-structured interviews of key personnel in Satama Interactive were being carried out.

The main **conclusions** of the research process were the following:

Conclusion 1:	Web 2.0 has real effects on web agencies' work
Conclusion 2:	Web 2.0 does not change the design process
Conclusion 3:	Interaction design deliverables stay essentially the same, but many of them become more intricate
Conclusion 4:	Interaction designers need new skills and more knowledge to cope with the changes Web 2.0 presents

Keywords

Internet, interaction design, Web 2.0, process model, web design

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1 Introduction

1.1 Raising interest

Digital media industry originates from the multimedia production agencies of the early 1990s. The industry developed into a professional field of business through a period of hype caused by unrealistic growth expectations, which was subsequently deflated in the beginning of the new millennium. During this process, the industry had become an integral part of business in all industries[1].

In 2004, when the industry's situation was about to normalise, O'Reilly Media announced a new revolution in the Internet: Web 2.0. The phenomenon centred on one big idea, the Internet as a platform, on which new forms of business could emerge instead of only being a method of assisting other businesses and industries[2]. Evolving from the original definition, Web 2.0 is nowadays commonly described as a perceived second generation of the Internet, with an increased emphasis on user communication combined with the use of old technologies in new, innovative ways.

The services the digital media industry provides are created by digital media companies and skilled individuals they employ. Digital media companies encompass many competences, interaction design among others. Interaction design as a competence focuses on designing interactions between users and the system within which the users operate. The competence is essential to the industry, as it aims to fulfil the user goals, making the products the companies create more useful and usable.

The concept of Web 2.0 has stirred up numerous articles and studies[3]. The digital media industry and interaction design itself have also been researched and studied from several viewpoints[4]. However, there has not been a single, comprehensive study on the effects of Web 2.0 on interaction design done by web design companies. This thesis will try to fill in the above-mentioned study gap.

1.2 Research objectives and questions

This thesis aims to find out what effects does Web 2.0 have on interaction design done by professional companies. It focuses on the changes on the design process used by the design agencies and the deliverables produced by interaction designers. The thesis also tries to find out the views web design professionals have on Web 2.0. In addition, it aims to provide

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[1] Pelkonen 2003

[2] http://www.web2con.com/pub/w/62/about.html (25 Apr. 07)

[3] For example Fish & Jaokar 2006; Melakoski, Sirkesalo & Tirronen 2007; Rogowski 2006

[4] For example Pelkonen 2003; Chan 2006; Hakala 2007; Moggridge 2006

information for web design companies on how to cope with the changes brought upon by Web 2.0 in relations interaction design to get the most out of them.

The research objectives are met by first studying the existing theories on the main issues – Web 2.0 and interaction design. Based on this literary review, a series of suggestions will be presented and a basis for fieldwork is created. To test the suggestions, an online survey will be conducted to personnel of Satama Interactive, a leading European digital media agency based in Finland. To get a deeper insight into the research questions, a series of semi-structured interviews will be carried out to key personnel in Satama Interactive.

The research objective can be formulated into the following **research questions**, which this thesis aims to answer:

Q1: How is Web 2.0 perceived by web design professionals?

Q2: What effects does Web 2.0 have on interaction design deliverables?

Q3: What effects does Web 2.0 have on the process model used to produce interaction design deliverables?

Q4: How should web design agencies react to cope with the changes Web 2.0 has on interaction design to get the most out of it?

The chart below illustrates the research objectives of this thesis.

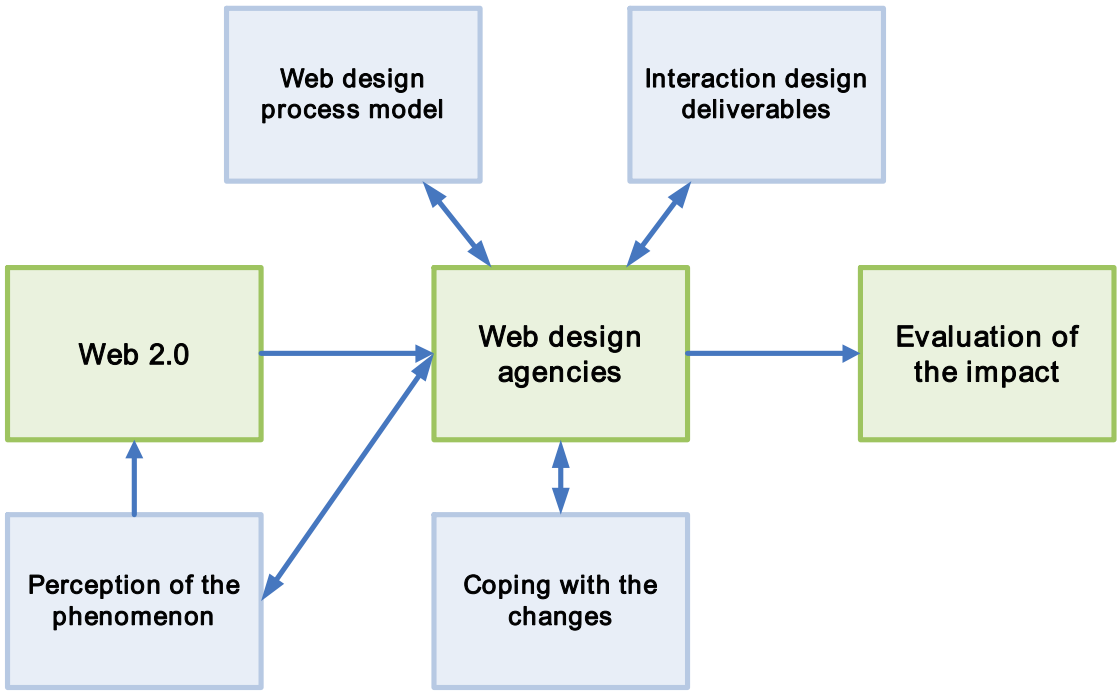

Figure 1: Research objectives

1.3 Limitations

As the concept of Web 2.0 is vast, many important aspects of Web 2.0 and web design in general have been left out. This study does not cover the areas of marketing, sales or management of web design companies, nor does it involve itself in the techniques of Web 2.0 from other perspectives than that of interaction design. In addition, viewpoints such as legislation and copyright issues of user generated content, and media convergence in Web 2.0 are disregarded. For readers interested in the last two issues mentioned, I recommend a book by Herkko Hietanen, Ville Oksanen and Mikko Välimäki, titled "Community Created Content – Law, Business and Policy"[5] and the book "Mobile Web 2.0" by Ajit Jaokar and Tony Fish[6].

1.4 Main concepts and definitions

In this chapter, the main concepts and definitions will be outlined. These concepts are interaction design, the web design process model and Web 2.0, presented in respective order. The concepts will be discussed more thoroughly in chapter 2.

Interaction design

Interaction design is often referred to as designing interactions of products from the perspective of the user[7][8]. As the main point of interaction design is to design products from the perspective of the user, the designer must consider many user-centred aspects. These aspects cover such areas as usability and accessibility, to mention a few.

Web design process model

To increase productivity in creating websites and to increase reliability in delivering products, Web design companies often use design processes. These processes are often based on design processes or frameworks used in designing and developing other products, such as pieces of offline software. Because of this evolution in design processes, the web design processes are often very similar to other kinds of design processes.

Web 2.0

The much-quoted Wikipedia article on Web 2.0 defines the phenomenon as an alleged second generation of the Internet, which bases on social communities and making online collaboration and user-to-user communication easier[9]. The term Web 2.0 was first used by

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[5] Hietanen, Oksanen & Välimäki 2007.

[6] Fish & Jaokar, 2006.

[7] http://rl.ixdg.org/uploads/aigaforlizzireimann.ppt (7 May 2007)

[8] http://www.odannyboy.com/blog/archives/001000.html (14 May 2007)

[9] http://en.wikipedia.org/wiki/Web_2.0 (27 Sept. 2007)

O'Reilly Media as a title of a Web conference held in San Francisco in 2004[10]. The company's founder Tim O'Reilly defined it as a revolution in the digital media industry business, caused by using the Internet as a platform of web services instead of using it only as means to deliver the service.[11] From this premise, O'Reilly raised seven principles of Web 2.0 that describe the attributes of the phenomenon. These principles are discussed more thoroughly in chapter two.

1.5 Outline of the thesis

The thesis is divided into five chapters in the following manner:

Chapter one: Introduction

The first chapter of this piece of writing is an introduction to the subject. This chapter presents the study gap this thesis is trying to fill. The problem statement and the main research objectives are presented also in this chapter.

Chapter two: Theory

In the second chapter, the theoretical issues of the subject will be discussed. The chapter contains separate sections for Web 2.0, interaction design and the web design process model. The findings of the theoretical phase will form a basis for fieldwork presented in the following chapters.

Chapter three: Methods of research

In this chapter, the methods of research will be presented, as well as the justification of the selected methods and the tasks and desired outcomes of the research process.

Chapter four: Case study: Satama Interactive

The fourth chapter presents the empirical data collected to reach the research objectives, as well as an analysis of the gathered data.

Chapter five: Conclusions and recommendations

The last chapter contains the conclusions based on both the theoretical data and the empirical data gathered for the thesis. This chapter also contains recommendations for web design agencies on how to cope with the changes, and recommendations for future research.

[10] http://en.wikipedia.org/wiki/Web_2.0_Conference_%282004%29 (24 Apr. 07)

[11] http://radar.oreilly.com/archives/2006/12/web_20_compact.html (24 Apr. 07)

Table 1: Thesis structure

Chapter	Contents
1 Introduction	Raising interest Research objectives and questions Limitations Definitions Outline of the thesis
2 Theory	Interaction design Web design process model Web 2.0 Impact of Web 2.0 on interaction design Summary of theory-based findings
3 Methods of research	Research model Justification of methods Data collection and analysis Tasks and desired outcomes
4 Case study: Satama Interactive	Web 2.0 as a phenomenon Effects on the design process Effects on deliverables Coping with the changes of Web 2.0
5 Conclusions and recommendations	Key findings and conclusions Research questions answered Recommendations Validity discussion Suggestions for further research
Appendices	Appendix 1: History of interaction design Appendix 2: Aspects of interaction design Appendix 3: Web limitations and possibilities Appendix 4: Web 2.0 principles Appendix 5: Rich internet applications Appendix 6: Tagging Appendix 7: Social interaction design Appendix 8: Visual feedback Appendix 9: O'Reilly Meme Map Appendix 10: List of interviewees Appendix 11: Survey Appendix 12: Survey comments

2 Theory

This chapter presents the theoretical basis for this piece of writing. Chapter 2.1 defines interaction design as a competence. In the second chapter, 2.2, a general process model is created based on existing theories and process models. Chapter 2.3 describes the basic principles of Web 2.0 proceeds to reshuffle them into four categories. The next chapter, 2.4, goes through the effects of Web 2.0 in interaction design. The last chapter summarises the findings of the theoretical part of the thesis.

2.1 Interaction design

This subchapter goes through the concept of interaction design. The first chapter, 2.1.1 defines interaction design in general. In chapter 2.1.2, the specific aspects of website interaction design are defined. The last subchapter, 2.1.3 specifies what is meant by interaction design as business.

2.1.1 Definition of interaction design

The term interaction design was created in 1980 by a British industrial designer Bill Moggridge[12], but similar disciplines have existed before. Marc Rettig divides the history of interaction design into six stages, from designing to make operating a machine possible to designing to make a system that adapts to its users possible. The current stage of interaction design according to Rettig is designing interfaces to enable connecting between users: instead of designing for interaction between a user and a computer, the machine is more and more in the role of an intermediary between people.[13] [14]

According to the definition of Dan Saffer of Adaptive Path, interaction design is "*the art of facilitating or instigating interactions between humans (or their agents), mediated by products*". He continues to define interactions as communication: one-on-one communication (as in a conversation between two persons), one-to-many (as in blogs or corporate websites) or many-to-many (as in social networking sites). According to Saffer, interaction design is not about designing human interaction with a computer or a product, but between humans.[15] Saffer's definition is thus in line with Rettig's stages of interaction design – designing to enable connecting between users.

Saffer's distinction of interaction design is however a bit limiting. For example, interactions for searching books from a library database are not human-human interactions, but more like

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[12] http://en.wikipedia.org/wiki/Interaction_design (24 Apr. 07)

[13] http://www.marcrettig.com/writings/rettig.interactionDesignHistory.v1.5.pdf (7 May 2007)

[14] For more information of Rettig's interaction design phases, see Appendix 1: History of interaction design.

[15] http://www.odannyboy.com/blog/archives/001000.html (14 May 2007)

human-computer interactions. According to Saffer, this would not be considered interaction design.

Robert Reimann and Jodi Forlizzi describe interaction design as a design discipline that defines the behaviour or products – artefacts, web pages or systems. They continue to define interaction design as anticipation of how the use of products will mediate human relationships, therefore also agreeing with Marc Rettig[13]. Like Rettig, also Reimann and Forlizzi add the element of context to the design process, making it a three-way equation: designing products for people in a given context.

Reimann and Forlizzi point out that professional interaction designers' perspective is from the users' point of view; interaction designers aim to understand how and why people use the products. They approach the products as entities, not as a collection of attributes and features.[16]

Whereas Reimann and Forlizzi see the interaction design focusing on a product, Saffer considers the product to be only a tool for achieving the interactions. Even though the two approaches' perspectives differ significantly, they can be summarised by stating that interaction design is *designing and facilitating interactions between humans (or their agents), and combining them in to one entity, forming a product.*

There are several aspects that an interaction designer must take into account when designing a system. As the main point of interaction design is to design products from the perspective of the user, also these aspects focus on users. In his article, First Principles of Interaction Design, Bruce Tognazzini of Norman Nielsen Group agrees with this statement[17]. Aspects like protecting the users' work, being consistent and fulfilling the users anticipation are very important in interaction design. In addition to the above-mentioned aspects, it is vital for interaction designers to take into account issues such as accessibility and usability.[18]

2.1.2 Website interaction design

Even though interaction designers can participate in designing almost any product, this study focuses on website interaction design. Websites are limited by the software and hardware that are used to browse them; issues like bandwidth and browser capabilities create the guidelines within which interaction designers must do their work. For example, graphics and multimedia can only be used to a certain extent on the Internet. Using bitmap graphics is limited, as even with high-speed connections, excessive graphics slow down using the site. The

[16] http://rl.ixdg.org/uploads/aigaforlizzireimann.ppt (7 May 2007)

[17] http://www.asktog.com/basics/firstPrinciples.html (8 May 2007)

[18] For more information on aspects of interaction design, please see Appendix 2: Aspects of interaction design.

usage of vector graphics as well as various client-side techniques is limited, because most browsers do not support them by default.

The Internet as a platform has also its benefits, such as the ease of communication between users: as all users are online by nature, they can communicate with each other with minimal effort. In addition, websites do not need additional means for delivering the contents to the user – Internet provides it by nature. There is also no need for users to update their software; once the site is updated, every user receives the same, updated content.[19]

2.1.3 Interaction design as a business

Digital services today are an integral part of any field of business. Professional digital media agencies provide the digital services, forming new business models and developing the existing businesses.[20] The digital services are created by professionals from various competences within the company. Interaction design is one of these competences.

As business, interaction design needs to balance the needs of the users with the needs of the clients; the best design for the users is not always the best design for the client. With limited resources, decisions need to be made from a business point of view. Doing interaction design as a business also requires a high level of professionalism. The ability to do teamwork is essential, as projects can rarely be done by one person. Compromises between interaction design and other competences are often inevitable; staying within the limitations of the budget or creating a great visual experience can often limit interaction design. Tight co-operation between the interaction designer and the graphical designer is very important, as is the co-operation of the interaction designer with the developing team.

2.2 Website design process model

The digital media agencies use process models to increase productivity and the reliability in delivering products. The process model is in key position in determining whether a digital media agency can cope with the changes presented by the dynamic industry. The design processes are often based on process models or frameworks used in designing and developing other products, such as pieces of offline software. Because of this evolution in design processes, the web design processes are often very similar to other kinds of design processes.

Unified Process, a software development process framework, the Website Design Process Framework by New Media Knowledge[21] (an information resource for digital media industry)

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[19] For more information on Web limitations and possibilities, see Appendix 3: Web limitations and possibilities.

[20] Pelkonen, 2003, 94

[21] http://web.archive.org/web/20070511003739/http://www.nmk.co.uk/article/2004/01/27/website-design-process (16 May 2007)

and the process described in the book "Web Style Guide" by Patrick Lynch and Sarah Horton[22] all have their own definitions of a design process. However, they all share a similar structure: first create general guidelines, then design the product, develop it and finally publish it.

The three processes mentioned above are all separated in to phases. The phases are not similar, however. Unified Process (UP) describes four phases: inception, elaboration, construction and transition[23], whereas the process described by Lynch and Horton has only two: planning and developing. The Website Design Process Framework (WDPF) has four phases like the Unified process, but the phases themselves are somewhat different: scoping, development and testing, launch, and nurture[21].

To create a synthesis of these three processes, I will use the Unified Process as a basis and categorise the steps in the two other processes according to the model of the Unified process. Less attention is paid to the steps unrelated to interaction design. For example, search engine optimisation and search engine marketing are completely left out of this process.

To make following the design process easier, a chart combining all of the elements is presented below.

Table 2: Website design process model and interaction design deliverables

Phases	**I Inception**	**II Elaboration**	**III Construction**	**IV Transition**
Description	Setting the scope and goals of the product	Designing the product	Building the product	Publishing the product
Interaction design deliverables	End-user analysis Market analysis Personas Scenarios Content inventory Requirements	Information architecture Wireframes Flow diagrams Concept rationale Detailed wireframes Mock-ups Prototypes Test plans Test reports	none	none

2.2.1 First phase – inception

The planning phase of Lynch and Horton, the scoping phase of WDPF and the inception phase of UP all have similar features: they describe the actions that must be taken before initiating the design phase.

The goals of the website are defined at the very beginning of the project, outlining the strategic objectives of the product. The client's general business objectives, target markets, branding and other related issues should be covered, producing a general plan of the website's goals, as

[22] Horton & Lynch 2002.

[23] http://en.wikipedia.org/wiki/Unified_Process (16 May 2007)

well as the methods of achieving them. As a part of the inception phase, also the possible risks of the project must be acknowledged.

To define the project plan further, the users of the website must be defined; whether the site is an intranet or a public site. After the initial definition, the audience will have to be analysed more thoroughly: what are the users like? What do they want out of the website? How technically skilled they are? What are their likes and dislikes? For extensive knowledge about the users, a thorough **end-user analysis** can be conducted. In addition, the existing sites can be studied for a **market analysis**, to define the existing competition and current markets.

To find out how, when and where the users would like to use the product, **personas** and **scenarios** are created. Personas are fictional characters, which represent different user types in the target audience. They are given characteristics and a personality, including among others their goals, background and pain points. The personas can then be used as prototype of users to find out how they would use or want to use the product. Using the personas, scenarios are created to describe certain situations where the personas use the product. The aim is to find out how well the system would work within the target group. They can also assist in finding major issues in the design, or in finding new approaches to designing the product.

To find out what content already exists and what needs to be created, all contents must be inventoried, resulting in a **content inventory**. Without a list of existing and needed contents, creating a viable information architecture later on may be very hard if not impossible to do.

To exclude non-essential parts of the website, a tight scope must be defined. A well-defined scope makes it possible to create websites without excess or needless contents or functionalities that do not serve the overall goals of the website. Cutting down idle contents also lowers the budget. Like any project, website design project needs project management. In addition to schedules and other plans, also a preliminary budget must be drafted. This budget will be redefined after the design phase of the project model.

Based on the scope, goals, personas and scenarios, general functionalities are described into a document. This document lists the **functional requirements** of the site: what functionalities need to exist and how they work in general.

Based on the functional specifications and other parts of the inception phase, a plan of how the product will be developed. The technical specifications include a general level plan over the implementation of the site, as well as a plan discussing the technical requirements of the site.

WDP includes also prototyping and usability testing in the first phase, but as they are more in line with the second phase of UP, they will be discussed in the following chapter.

2.2.2 Second phase – elaboration

The aim of the interaction design is to create functionalities on the site that best serve the users' aims and goals. Most of the interaction design deliverables are fashioned in the elaboration phase of the project.

The second phase is defined differently in each of the three process models. Whereas Unified process has its own phase for designing, called elaboration, the two others have added also other steps from other phases. Combining the deliverables from the two other models into the Unified Process creates the following list of tasks.

Based on the existing content inventory, all of the contents of the site are organised to a well-defined structure. This structure helps the users find the information they need. There are many ways in categorising content, varying from taxonomies to tag-based folksonomies. The **new information architecture** can use an existing product's information structure and only readjust it to better suit the needs of the new product, but it can also be completely new.

Formed on the foundation created by the information architecture, personas and scenarios and requirements, the first **wireframes** and **flow diagrams** are crafted. They describe the most important choices regarding general layout, navigation and a few most important sections of the design. General flow diagrams, illustrating the users' route to completing tasks, are also created. **A concept rationale** is also formed to justify the selected interactions and navigational choices. This document describes the design decisions made in this phase, and explains how the interactions described in the other documents fulfil the goals set in the inception phase.

Based on the flow diagrams and earlier wireframes, **detailed wireframes** are created. These designs include all pages or templates used in the design. They also describe all of the functions of the product, and they are used by graphical designers and developers to form the final product.

To test the created designs, user testing is often used. Depending of the phase of the project, various techniques are used.

Mock-ups are created based on the created designs. They are often crude, non-graphical illustrations of the final product, containing often some or all of the designer functionality. The mock-up can be in a digital form, working in a similar way to the final product, or also in an analogue format, as in sheets of paper representing pages of a website.

Prototypes are used to test new ideas. Instead of trying to figure out the pitfalls and problems of the design from the designer's point of view, the design is handed to the actual users for testing. The results of the user testing will then tell if there actually are problems in the design, from the users' perspective.

User testing is often used throughout the design process. Before advancing to the next stage of designing, user testing can help reveal problems that would be much harder to fix later on in the project. Users are often asked to use the prototype or mock-up of the design to accomplish specific tasks. The users and their reactions are then monitored to find out how well the design works. Based on the user testing, a **test report** is created, which is then used to enhance the designs.

The graphical design is created based on the client's branding, their existing style guides and other strategic aspects. In addition to the graphical design, a site style guide is often created, outlining the general guidelines for creating contents and graphical elements. In addition to graphical design, also the technical design is crafted. The technical design covers the planning of implementing the graphical and functional designs into a working website. Client-side coding and HTML are designed, as well as databases and server-side coding, before actually creating them.

2.2.3 Third phase – construction

The third phase consists of implementing the designs made in the design phase. As most of the interaction designers' work is already in the previous phase, this phase is not covered in depth.

All elements are created in this phase are based on the designs made in the previous phase. After finishing the development and creating a fully functional site, final check-up is often required. This check-up makes sure that the website works the same way it was designed to work, containing all the functionalities described in the designs, and nothing else. In addition, a final proofreading must be gone through, as well as testing with all of the browsers the site is designed to work with.

2.2.4 Fourth phase – transition

The fourth and final phase consists of moving the website to the server or servers it runs on. The site is usually tested and after the feedback from the client, it may be redefined. User training is also a part of the final phase. The final phase ends in the final release of the product and the client signing it off.

2.3 Web 2.0

After the initial Web 2.0 conference, O'Reilly published a more extensive article on Web 2.0, in which he defined the seven principles of Web 2.0[24]. The whole basis of O'Reilly's Web 2.0 postulate is using the Internet as a platform. Wikipedia explains "The Web as a platform" referring to applications that are entirely usable through a browser[25], such as Zoho online

[24] For a more in-depth view of the Web 2.0 principles, see Appendix 4: Web 2.0 principles.

[25] http://en.wikipedia.org/wiki/Web_2.0#Characteristics_of_.22Web_2.0.22 (24 Apr. 07)

office suite[26] and Google Docs & Spreadsheets[27]. In O'Reilly's definition, "The Web as a Platform" represents a new approach of providing users with a product, as well as a change in business logic.

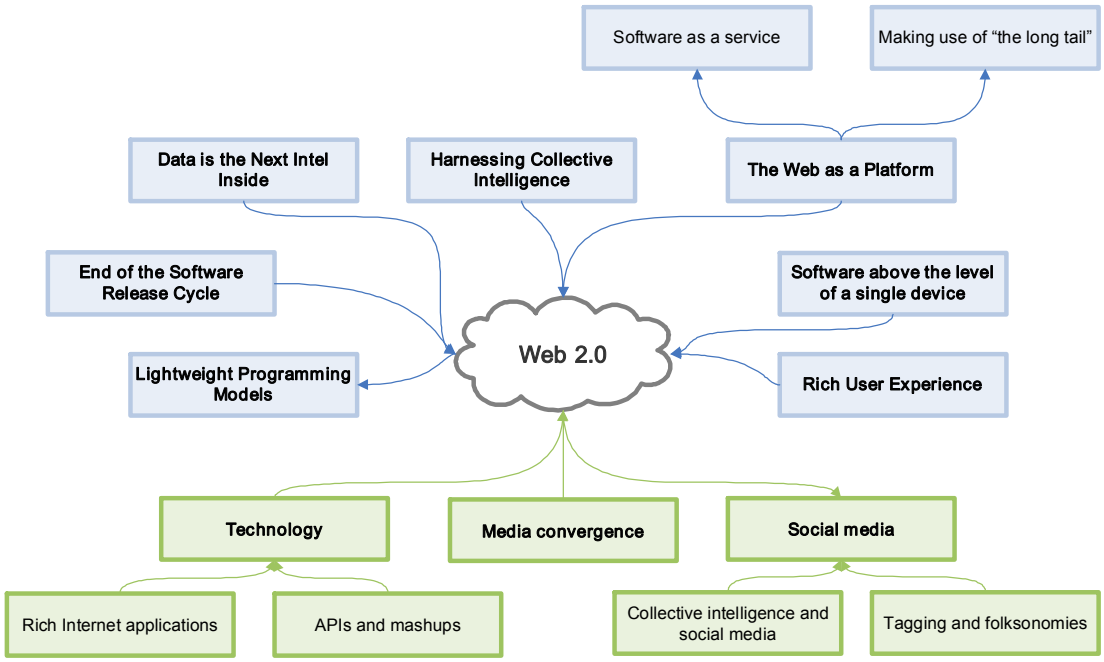

Figure 2: O'Reilly's Web 2.0 principles and the aspects of Web 2.0 used in this thesis.

To better suit the needs of this study, I have chosen to reorganise the characteristics of Web 2.0 as three different aspects of Web 2.0. The three aspects I will use in this study are **technology**, **social media** and **media convergence**. This chapter goes over the previously mentioned aspects, with each aspect having its own subchapter, in respective order.

2.3.1 Technology in Web 2.0

This chapter goes through the technological changes presented by Web 2.0.

Rich Internet applications

The term rich Internet application or RIA was presented by Macromedia in a white paper in 2002[28] to market their newly published multimedia authoring tool, Macromedia Flash MX. Macromedia described RIAs as rich, thick clients that would improve the quality of end-user applications[29]. As the white paper was aimed to promote their new product, their definition of RIAs is somewhat slanted. However, it mentions many of the attributes also currently associated with RIAs.

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[26] http://www.zoho.com/

[27] http://docs.google.com/

[28] http://en.wikipedia.org/wiki/Rich_Internet_application (2 May 2007)

[29] Guldman 2002, 1

RIAs are often described to be web applications that are more like desktop applications than websites. They usually create a richer user experience by using animations or multimedia. As the techniques used to create RIAs are more versatile, the user interface limitations typical to websites do not apply to them. RIAs also often work asynchronously, providing users a smoother experience.[30]

Ajax

One of the most hyped technological advances associated with Web 2.0 is Ajax. The term was coined by Jesse James Garrett[31] of Adaptive Path in 2005 when trying to create a shorter term for a collection of technologies he was proposing to a client[32].

Some of the Ajax techniques or their predecessors have existed for a long time, but the way Garrett suggested that they would be used created a new way of building web applications. The new approach allows asynchronous communication between the server and the client; the Ajax engine contacts the server only if new data is needed. The data is then combined with the appearance on the client side, cutting down the dataflow between the server and the client. The data can also be loaded before the user actually needs it, so when the user clicks on a link, the feedback is instantaneous, as there is no need to contact the server.

Because the Ajax engine is responsible for creating the user interface – i.e. binding the XHTML, CSS and the data – alterations to the interface can also be done without contacting the server. Combined with JavaScript's ability to manipulate and control nearly any part of the browser, this creates a vast amount of new interaction models and additional functionality that can be used in web applications.

Ajax enables updating specific regions of the site at any given time. JavaScript can be used to access a specific table cell or a layer on the layout, and when needed, update that very element's contents without reloading the whole page. When the whole page does not need to be reloaded from the server, the response time of the site is significantly lower in comparison to a classic web application. This is especially useful for applications with a large data load and applications in a low-bandwidth network, as the dataflow is significantly smaller.

Adding functional JavaScript to the asynchronous communication between the server and the client makes it possible to create more sophisticated user interfaces. This allows the usage of new user interface metaphors, such as dragging and dropping. JavaScript is used to react to the users' actions, for example clicking on an element and dragging it to another location. The asynchronous communication enables saving the new location of the element to the database on the server side without reloading the page.

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[30] For a more thorough overview on RIAs, please see Appendix 5: Rich internet applications.

[31] http://www.adaptivepath.com/publications/essays/archives/000385.php (1 May 2007)

[32] http://en.wikipedia.org/wiki/Ajax_%28programming%29#History (1 May 2007)

The ability to create more sophisticated user interfaces also detaches the user interface from the limitations of the backend. Traditional web applications' user interface often follows the structure of the database and the server-side code. With the Web 2.0 techniques, the interface can be liberated from the restraints of the backend, creating a more usable interface, but still feeding the backend the data it needs in the format it needs them.

APIs and mashups

An API refers to an application programming interface, an interface that a computer system provides to support requests of service by computer programs. In the Web, this usually means an interface a web service provides to other web services to use. An API can provide other services the means to connect to their database and extract specific information or the ability to use certain functionality of the original web service. Web services that use one or more APIs from one or more sources to create new kind of functionality or information are called mashups. A mashup could for example display the various locations of different eBay artefacts on Google Maps, with the help of an API from eBay and from Google Maps.

Mashups can often be created with a low cost, as the data or the functionality in them has already been developed. The data in the existing services that offer the APIs can also be immensely valuable and hard to create without the help of the APIs. At the time of writing this study, Programmableweb lists over 400 APIs that are free to use[33]. The listed APIs vary from offering mapping services to searching royalty free stock photos.[34]

There are some distinct benefits for creating APIs for a web service. For example, letting users show Amazon recommendations and product details directly adds user traffic on Amazon.com, resulting in more sales. The same applies to Google, but instead of rerouting users to their web service, Google APIs add Google AdSense advertisements to the site. With the distribution of their APIs, already existing web services can extend their commercial reach also to other companies' websites as also private individuals' websites.

2.3.2 Social media in Web 2.0

Defined by Anthony Mayfield of Spannerworks, social media consists of a group of new kinds of media often sharing five characteristics:

Participation is described as the ability for anyone to contribute and give feedback to the contributions of others. **Openness** means that the feedback given by users it moderated only to abide by legislation – differing opinions are welcomed. Openness also means free access to content, as password-protected content is frowned upon. **Conversation** describes the revolution of content distribution from one-way (producer to consumer) to two-way

[33] http://www.programmableweb.com/ (4 May 2007)

[34] http://www.programmableweb.com/apilist (4 May 2007)

(consumer to consumer and consumer to producer). **Communities** evolve rapidly in social media environment. Users that share common interests come together in one location, and share their thoughts and creations on the subject. **Connectedness** is created by linking different sites together via hyperlinks and combining different kinds of media – audio, video and images – in one place.[35]

Mayfield continues to categorise social media into six different categories: **Blogs**, perhaps the most well known form of user-generated content, are online journals with usually chronologically ordered entries. **Social networks** are areas in the Internet that allow people to build their personal profiles or websites and then connect with friends to share thoughts and contents. The larges social network online is MySpace with over 100 million members and growing by over 200,000 per day[36]. **Content communities** are communities specialised in sharing and organising a particular type of content. Typical examples are Flickr (photo sharing), YouTube (video sharing) and Del.icio.us (bookmarked links sharing). **Wikis** are websites that allow uses add, edit and remove contents, creating a communal collection of articles. The best-known wiki is Wikipedia with over 7,000,000 articles[37]. **Podcasts** are audio files that users can subscribe through a service, such as iTunes. Video podcasts are often called vidcasts or vodcasts. **Forums** are online areas for discussion, often ordered around a specific theme or topic.[38]

With the rise of Web 2.0 and social media, a concept called **tagging** has emerged. A tag is a keyword or a piece of metadata that helps defining the content with what it is associated. With tagging, users have the ability to add labels to the items or articles on a website. These labels can then be used to categorise the content and to form structures. The result of users collaboratively categorising content by creating and managing tags is called a **folksonomy**. CM Harrington of Blocklevel divides tagging to two categories: author-based tagging and user-based tagging[39]. Author-based tagging uses a controlled vocabulary, and user-based tagging allows users to create their own tags.[40]

2.3.3 Media convergence in Web 2.0

In addition to three categories mentioned above, O'Reilly's definition of Web 2.0 mentions the aspect of media convergence, or as he puts it, software above a single level of a single device[41]. Although this is a very important part of Web 2.0, because this study is focused on Web 2.0 effects on *website* interaction design, it is mostly out of the scope of this study. For those who

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[35] Mayfield 2007, 5

[36] http://money.cnn.com/magazines/fortune/fortune_archive/2006/09/04/8384727 (7 May 2007)

[37] http://meta.wikimedia.org/wiki/List_of_Wikipedias#Grand_Total (25 Apr. 07)

[38] Mayfield 2007, 6

[39] http://blocklevel.com/weblog/information_architecture/tag_youre_it/ (22 May 2007)

[40] The concept of tagging is discussed further in Appendix 6: Tagging.

[41] http://www.oreilly.com/lpt/a/6228 (27 Apr. 07)

are more interested in this subject, I recommend the book Mobile Web 2.0 by Ajit Jaokar and Tony Fish[42].

2.4 Impact of Web 2.0 on interaction design

This chapter goes over the effects of Web 2.0 on website interaction design done as business. The chapter is divided into six subchapters. The first four subchapters are based on the process model phases presented in chapter 2.2. The subchapter 2.4.5 illustrates general effects Web 2.0 has on interaction design.

2.4.1 Impact on the inception phase

As discussed earlier, creating a website using a project model has four steps - inception, elaboration, construction and transition. In the inception phase, the general plans of the website are created. In addition, extensive studies may be conducted to analyse the end-users of the product.

Website interaction design deliverables done as business can be roughly categorised into two categories: studying users, markets and existing content and designing the products. Of the deliverables listed earlier, studying-related encompass all of the deliverables that focus on analysing the end-users and their motivations and goals, as well as studying the current market environment and existing content. A list of these deliverables would look the following:

- End-user analysis and market analysis
- Personas and scenarios
- Content inventory
- Testing plans and reports

Testing excluded, these deliverables are created in the inception phase of the project model.

Studying in the inception phase

Even though techniques and business models of websites change, the people using them mostly stay the same. However, as websites change, people using the websites also learn how to use them. In Prioritizing Web Usability, Jakob Nielsen and Hoa Loranger reveal that according to their studies, changes in user behaviour are behind 11% of the improvements in website usability[43]. This means that people do adapt to the poor designs done on the Web and learn how to use them, and actually even expect websites to have the functionality they are used to. The same also applies to other parts of web design: the more websites offer certain

[42] Fish & Jaokar, 2006.

[43] Loranger & Nielsen, 2006, 120.

functionalities – user generated content or rich content – the more users will expect to find them on other websites as well.

As users find more and more user generated content on the Web, being a part of a web community becomes easier. As users learn more about creating content for the Web, the willingness and skills to do it also increase; whereas only a small group of enthusiasts had a personal webpage in the 1990s, an immense amount of people have nowadays their own blog, MySpace page, Flickr account or YouTube profile. Nevertheless, these *changes in user behaviour do not necessarily change the methods of creating interaction deliverable*s: even though users expect different things, a usability study is still done the same way it was done before. *The changes in user behaviour do require interaction designers to stay alert and keep up with the changes*: creating personas or scenarios for users that do not exist anymore does not serve its purpose. Thus, end-user analysis and market analysis need to be as thorough as possible to understand how "Web 2.0" the real end-users are.

Suggestion 1: Even though the method of analysing users does not change, changes in the user behaviour and require an enhanced focus on user studies

Designing in the inception phase

Excluding the study-related deliverables mentioned earlier, the only deliverable left in the inception phase is the requirements. The requirements of the website describe the desired functionalities in the site on a general level. They are based on the goals of the product, as well as the defined scope and personas and scenarios.

As the possibilities of websites expand through new technologies, user generated content and new interaction models, the *functionalities of the websites inevitably change*. However, as the requirements created in the inception phase are not so much technology-oriented, the interaction designer is given quite free hands to fashion the functionalities they see fit to achieve the goals of the project.

Creating an array of functionalities requires extensive knowledge of the possibilities of the web; the functionalities need to be feasible in addition to being useful and fulfilling the goals of the project. *To be able to create realisable requirements thus obliges the interaction designer to know thoroughly the possible technologies, their limitations and possibilities.* Feasible functionalities also mean that they are not only possible, but also cost-effective; the whole budget of the project cannot be spent on developing a single piece of functionality.

As interaction designers are not developers, mastering all developing techniques is not possible. That is why *good communication between the designers and developers is needed*. Not do only designers benefit from this, but also the developers, as it may help them see the designs from another perspective.

Suggestion 2:	New technologies, user-generated content and new interaction models require additional knowledge from interaction designers.
Suggestion 3:	New technologies and approaches require better communication between interaction design and other competences.

2.4.2 Impact on the design phase

Most of the study-related deliverables of interaction design are already done in the inception phase. However, user testing is done during the second and fourth phase of the project – the design phase and the transition phase.

Studying in the design phase

User testing is used to find out how the actual end-users see the designs. The tests often conducted using low-fidelity prototypes, such as clickable wireframes or HTML prototypes, which allow users to interact with the designs. The user testing is done by monitoring the user while they complete simple tasks on the product, the product being in this case the prototype of the website.

As the designs are not the final products, the tests mainly only show general guidelines how users react to them. The test results are compared to the testing plan, and if the designs do not pass the testing, changes are made to the designs. This process is repeated until the test results are acceptable, or until money or time runs out.

The basics of human behaviour do not change in a short time such as years or decades. That is why the *base of user testing also stays the same*. Even huge changes in technology do not change this, as the process is independent of the product being used, whether it is a tangible object or a virtual reality engine.

Suggestion 4:	Changes in technologies or approaches do not cause a change in the way user studies are conducted.

Designing in the design phase

Most of the interaction design is done in the design phase. By the end of the second phase, the design team has created designs that are ready to be implemented into a working website.

Wireframes and prototypes

In static webpages, each page displayed has their own page also in the wireframes, or at least the page template is described in high detail. Dynamic pages can have specific segments that change or update independently from the rest of the page. These segments, including all of their possible states have to be designed separately, and then combined with the rest of the design. As *transitions and animations cannot be illustrated accurately in a static wireframe*,

they have to be described textually or using a tool, capable of creating dynamic changes in the pages.

Many wireframing applications offer only the possibility to create static wireframes, so creating a design with dynamic pages can be difficult. Jeffrey Zeldman of A List Apart states a blog entry that they use the Chuck Jones -approach[44], referring to the late cartoon artist. Like Chuck Jones, their interaction designers only draw the key frames. As the results of the Chuck Jones –approach are in a *crossbreed of wireframes and flow diagrams*, they *do not solve the problems of creating detailed wireframes with dynamic content*.

Whereas wireframes and flow diagrams serve the developers, giving them a guideline on how to build the actual website, mock-ups and prototypes are used in user testing. Developers can study the wireframes and flow diagrams and read the textual instructions, but for a successful user test, the *mock-ups and prototypes should be as similar to the actual product as possible*. If the mock-up used for testing is very different from the actual website, the results from the user testing may be misleading. Elements missing from the prototype cannot be tested if they do not exist in the prototype. This applies not only to the actual functionalities, but also to the elements the functionalities affect: the transitions used to show the contents or the additional visual cues to facilitate usage cannot be tested if the dynamic content does not exist.

An ideal solution for wireframing and prototyping Web 2.0 applications would be *a piece of wireframing software, capable of creating dynamic content as well as easy animations and transitions*. Some pieces of software do offer the possibility to add dynamic content, for example Axure and Omnigraffle. Some plug-ins also exist that can add the same functionality to Microsoft Visio, the *de facto* wireframing tool of many companies. One of them, Swipr, facilitates creating clickable HTML-based prototypes, by combining sitemaps, flow diagrams and wireframes. However, *none of these tools is capable of creating transitions or animations*.

Microsoft Expression Blend offers the possibility to add transitions and animations to wireframes and prototypes. The designs created with Blend can also contain dynamic content and code snippets that can even be used by the developers in the developing phase. To get the most out of Microsoft Expression Blend and other Expression tools, the whole Expression kit must be used. This would mean that in addition to interaction designers, this change would affect graphical design and development, as the software they use would have to be changed. In addition, as Microsoft Expression uses ASP.NET and Microsoft Silverlight, Flash developers and server-side coders would have to adjust to the changes in techniques. Changing to Microsoft Expression also can cause problems for Macintosh users, as it does not support Macintosh as a developing platform.

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[44] http://alistapart.com/articles/web3point0 (22 May 2007)

Suggestion 5: Wireframes need to change so that they can describe dynamic content.

Suggestion 6: Better and faster tools of creating dynamic prototypes are needed.

Information architecture

Even with the changes brought upon by Web 2.0, *the basic principles of information architecture stay the same*: arranging information into a logical structure. However, as the methods of navigation and information sorting change, *the methods of information architecture also change*.

Creating information architecture for any type of dynamic content can be troublesome. Even with in-house publishers, letting the contributors select the way they publish articles often creates problems. Different publishers have different views on what is important, so with free hands, most publishers will fashion a categorisation and logic of their own. This creates a heterogeneous structure, and a site that users cannot find the information they are looking for.

When the dynamic content is not created by a small number of in-house workers, the variation in content structure is even higher. Because of this, the information architecture needs to create a framework and guidelines for forming the content. *Persuading and guiding the users to create content that fits the information architecture is vital*, as otherwise each entry or article will have their own structure and logic. Also categorising the content is important, but as all the needed categories may be impossible to be included in the information architecture, it may be more important to create the guidelines of creating categories.

When considering tagging as a means of supplementary navigation, information architecture designers must weigh the benefits and drawbacks it creates. There is often no good alternative for public tagging: sites with variable contents may be impossible to tag with a controlled vocabulary. To create successful public tags, some form of enforcement may be in place: the users may be forced to add important tags from the site's perspective, such as location or content license type, and tags like media type and content creator can be created automatically. The system can also suggest some tags based on for example the textual content or tags of similar objects. Adding a controlled vocabulary may also be in place, but to ensure users do not stop entering information due to strict vocabulary, they can be made voluntary.

When creating information architecture for dynamic content, the information architect or interaction designer is actually creating only the structure of the information that categorises the content. As new content is created frequently, the categorisation of content can become problematic. As new subjects and areas of interest rise, the old categorisation may no longer be valid. Thus, *the information architecture must be designed the future changes in mind*.

Otherwise, the result may be a categorisation that seems logical during the design phase of the website, but ends up in being a collection of poorly categorised articles, due to the additional content and additional categories.

The information architecture of a site with *user-generated content needs a more abstract level of structure*. As not all categories or page structures can be defined, the *information architecture must focus on a higher level, forming a general framework for information on the site*.

Suggestion 7:	Even though the basis of information architecture does not change, the used methods do change.
Suggestion 8:	Creating an information architecture for a site with user-generated content changes from forming strict categories to creating a higher-level framework for information.

2.4.3 Impact on the development phase

As most of the work of interaction designers is done in the design phase, there are no major interaction design changes in the development phase. However, if there are problems for example creating expressive designs and prototypes, the interaction designers should make sure that the developed product actually reflects the designs in the way the designer sees fit. In addition, the possible changes made in the interaction designs due to technical limitations or other issues should be reviewed by the interaction designer.

Like with traditional website, user testing should take place to make sure that the developed product is usable. When using Web 2.0 elements in the design that have not been used before, additional attention should be paid to testing the new elements.

Suggestion 9:	New, untested approaches require stronger communication between interaction design and other competences.

2.4.4 Impact on the transition phase

As the transition phase focuses on moving the developed website to its final location, there is not much work for interaction designers. Even though Web 2.0 techniques in use may affect the transition phase in general, there are no distinctive changes to the work made by interaction designers.

2.4.5 Overall impact on interaction design

This chapter goes over the overall changes in interaction design that are not related to any one deliverable or a design phase.

User-generated content

Adding user-generated content to the site has benefits to the creators of the content, the consumers and the owner of the site. The content creators receive the satisfaction of creating new contents and sharing their work. Content creators are often also compelled to show off their knowledge and skills by helping other users. This, of course, benefits also the other users.

The contents users create do not only help the content creators and consumers, but act also as contents that other users can consume and enjoy. Users can get more information about the products mentioned on the website, also from another perspective than from the official content producer. When they can get the information on the official site, they will spend more time there instead of trying to get the information from external forums.

Users who participate in creating contents to a site are often more committed to the site and its other contents. When creating contents on the site, users tend to return to the site to check if somebody has replied to them or commented on their contents. Feedback and comments received from the users does not only benefit other users, but it can be used in enhancing the products more to the direction users want. Suggestions and ideas from users can also be beneficial in researching and developing the products.

Social interaction design

As described in the history of interaction design by Marc Rettig, interaction design is shifting from creating interactions between a user and a computer system to creating systems that mediate human interaction[13]. Adrian Chan of Gravity7 has created a group of white papers focusing on a new approach to interaction design – social interaction design[45].

Chan describes social media systems as *talk systems*[46]. In these systems, users do not focus on fulfilling traditional, goal-oriented tasks – printing a page, creating a new post – but rather on creating continuous interaction with other users, much like in talk situations. *Users do not think the site through terms of technology, but through terms of communication and relationships*: instead of aiming to create a post, users aim at receiving comments to their post. Even though the aim of interaction design – to fulfil users' goals – does not change, the users' goals change, creating also a change to interaction design itself.

To fulfil a social goal of a user – for example receiving comments on their posts – actually two goals need to be fulfilled: the post still has to be created to receive comments to it. Thus *creating interactions for a social network site is twofold: designing interactions between the user and the system, and designing interactions between users, mediated by the system.*

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[45] http://www.gravity7.com/ (29 May 2007)

[46] Chan 2006, 8.

This complicates interaction design, because in addition to traditional interaction design, where user interacts with the system, the system must also mediate interaction between users. Thus, interaction design for social sites can be divided to at least two categories: designing to facilitate using the site, and designing to mediate user interaction through the site.[47]

Suggestion 10: A change in user goals creates a new level of interaction to web applications: designing interactions between users, mediated by the system.

RIAs

Designing rich internet applications has its differences compared to designing static, traditional internet applications. As the technologies used change, the upsides and downsides of the technology have to be taken into account when creating the design.

Asynchronous communication

Even though asynchronous communication provided by RIAs can enhance the performance of the site and user efficiency by decreasing network traffic, it also has its downsides. *Users are accustomed to traditional, static webpages* that reload completely every time a link or a button is clicked. As individual elements can be updated or changed with asynchronous technologies, the users most be made aware of the changes done in the layout. *For interaction designers, this means adding additional visual cues*. The visual cues are often small animations that draw the user's attention to the updated content. For example, when updating asynchronously a shopping basket, the basket might flash or pulsate lightly for a second. This entices the user to look in the area of the flash, and making them see the changes done in the site.

Asynchronous communication also may cause additional problems with network latency. A slow connection between the client and the server, an overly stressed Ajax engine or other problems may result in delays in showing new content. In classic web applications, a slow connection or other latency problems are usually experienced as a longer loading time for new pages. However, when upgrading only small fragments of the interface at a time and not reloading the whole page, the delays are perceived as non-working links or buttons; clicking on a link or a button just does not appear to do anything. *Additional visual cues are thus needed also when loading content asynchronously*.[48]

Suggestion 11: Asynchronous communication requires additional visual cues to be implemented in the site.

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[47] For a more thorough view on social interaction design and designing to mediate user interaction, see Appendix 7: Social interaction design.

[48] For more information on visual cues, please refer to Appendix 8: Visual feedback.

Back button and bookmarking

Maybe the most common reasons of critique towards RIAs and Ajax are that they break the browser's Back button and do not allow the users to bookmark specific pages. Whereas static webpages use URL as an individual identifier, *dynamically altering pages on the client side does not automatically update the URL*. As bookmarking is based on preserving a copy of the URL, the bookmarked items do not contain the dynamic alterations. The browser Back button is broken because of the same reason: the browser history contains URLs, but as the page contents may be changed without changing the URL, the Back button leads the user not to the previous contents, but to the previous URL.

Breaking the Back button is a big usability issue. According to Jakob Nielsen and Hoa Loranger, as the second most used feature of Web browsing, the Back button is the lifeline of the user. It allows users to browse comfortably through a website, as they know they can always go back.[49] In addition, when the back button does not work, it directs the users to a page they are not anticipating to see, causing distraction. After going back, navigating back to the dynamically created contents may take a long time and a lot of effort.

Removing the users' ability to bookmark pages severely hinders the users' ability to relocate the page. Bookmarks are used as a quick way to navigate back to the location where interesting information or other contents were found. URLs are also used to provide a quick reference to friends and colleagues. Without individual URLs, users will face difficulties in finding the relevant information they think is too difficult to find by navigating but interesting enough to save for later.

Some methods do exist to update the URL while updating other site contents asynchronously. For example, adding an URL fragment to the URL with JavaScript and storing it in the browser history will in theory enable both bookmarking and the Back button functionality[50]. However, using client-side scripts to undo the usability problems created by other client-side scripts may turn out to be hard to do. *Not only does it require additional coding, it requires a vast amount of testing with different browsers and platforms*. At the moment, *a cross-browser panacea for an easy way to update URLs does not exist*. Even though implementing dynamic URLs to a small and simple site may be quite easy, as the site's size and complexity increase, the difficulty of adding new functional elements to it also increases.

Suggestion 12: Sites with asynchronous communication and RIAs require more work from developers, as issues like Back button and bookmarking need to be solved.

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[49] Loranger & Nielsen 2006, 63-65.

[50] http://www.onjava.com/lpt/a/6293 (1 May 2007)

More sophisticated user interfaces

Using Ajax and other RIA techniques enables designers and developers to implement a completely new collection of interface concepts: drag and drop environments, asynchronously updating content and an array of nifty gadgets. Even though new techniques and user interface concepts exist, their existence does not justify using them.

A principle known as Occam's razor states that "*entities should not be multiplied beyond necessity*"[51].The sentence is often rephrased to "*the simplest solution tends to be the best one*". This also applies to interaction design. There is no good reason to spend excessive amounts of time into designing and developing a new way of presenting information, if the old way is just as good or even better. In most cases, *the old way is often the better one*, as users are used to them and know how they work.

Users are not accustomed to new interaction concepts, and as such, do not instinctively know how to use them. Using Web conventions in designs really helps the users, as they know how they work, based on their previous experiences in the Web. As such, the users do not have to spend time on learning how to use the system. *As using web conventions helps the users, not using them hinders the users from reaching their goals*.

Creating a new interaction concept takes a lot more time than sticking to the old ones: *designing it takes more time and so does developing it*. In addition, the user tests conducted to see how the system actually works often need to be even more thorough than usual. Sticking to existing Web conventions often results in a usable interface quite easily, as users intuitively know how to use it. To be as good as an existing solution, the new concept must also be very intuitive, even more so than the existing solutions. Web conventions are not all formed out of pure logic and intuitiveness, but Web users have just learnt how to use them. To find out also the users see the interface as intuitive and logical, *extensive user testing must be conducted*. If the user tests reveal problems in the design, an additional iteration round of designing must often take place.

Another problem with *new user interface concepts* is that they *need a lot of new expertise*. Designers and developers tend to have the knowledge how to create traditional web applications; they know what to do and how to do it. Even if the system would greatly benefit from using a Web 2.0 gadget on the site, the designers may not even be aware of its existence. If the designer gets a great idea and tries to implement it in their designs, the odds are that lacking the existing references, they will encounter at least some difficulties in making it usable and intuitive. Even though the design might work well in the designs, developing it is an entirely different issue. As the design is probably new to the developers as well, they will need to gather the expertise how to build it. If the designer does not have an in-depth view of the problems and limitations of the techniques used, the design might prove to be impossible

[51] http://en.wikipedia.org/wiki/Occam's_razor (31 May 2007)

to implement. If implementing the designs into a working website is possible, there still may be issues that severely get in the way of other aspects of the website, such as search engine optimisation, or previously described problems, such as disabled bookmarking and a broken Back button.

The ability to distinguish the useful elements from the elements that do not help the users reach their goals is imperative. Like Bruce Tognazzini states, "*Eliminate any element of the application that is not helping. Be ruthless*"[17]. Including the cool, nice to have elements only creates a bigger workload for the designers and developers, without any additional benefit to the user. As stated before, following the web conventions usually automatically results in a usable environment, whereas using new techniques requires a lot more work to reach the same level. There is no point in using new techniques and spending more time to create an application that is only just as good as the easier, more traditional way.

As new interaction models often break the Web conventions users are relying on, they have to be extremely well designed and developed. If both steps are done properly, the new interaction models can facilitate the usage of the site, making using the site more enjoyable and easy to use. For example, using a drag and drop feature to organise objects on a website is a lot easier and intuitive than ordering them using drop down menus and radio buttons. *Rich interfaces can be more entertaining, and if using asynchronous communication, more productive and efficient.*

Suggestion 13: New, untested interaction models require more time to design and to develop.

Suggestion 14: New user interface models require more time for testing.

Suggestion 15: New user interface concepts require new skills from the designers and the developers.

Search engine optimisation

Even though search engine optimisation is not in the field of work of interaction designers per se, it must be taken into account while creating the designs. As many RIA applications use a lot of dynamically created text, or the text contents of the RIA are contained inside the RIA in a way search engines do not understand, *RIAs often make creating good search engine optimisation difficult or even impossible*. As a large part of search engine optimisation consists of and placing appropriate keywords into different locations of the HTML document – such as header tags, meta tags and the URL – *when creating a RIA, additional measures into creating the appropriate tags and contents need to be taken into account*. In addition, search engines are not usually able to analyse dynamically created content, as they do not usually execute client-side code when crawling through a website. For example, if a site consists only of content created with Ajax, search engines are not even able to see most of the

contents. This is why a whole another site often needs to be created for search engines, which makes implementing the designs the site more difficult, or sometimes even impossible.

Suggestion 16: RIAs and dynamic contents make search engine optimisation more difficult.

Cross-platform development

Tim O'Reilly mentions software above the level of a single device as one of the elements of rich Internet applications[52]. Due to the limitations of handheld devices, ubiquitous cross-platform development is not possible, at least for the time being. Many modern handheld devices support basic XHTML webpages, but the usage of Ajax or multimedia authoring tools is currently not an option due to the lack of support. Adobe offers the Flash Lite player, which is designed to provide simple Flash functionality for mobile, but at the time of writing this article, less than 20 devices supported their newest release, Flash Lite version 2.0[53].

O'Reilly's postulate can also be interpreted as software above a single platform, such as browsers and operating systems. Depending on the requirements created in early stages, the site needs to support various operating systems and browsers. The more platforms and operating systems are included in the support plan, the more work is needed to develop the website. That is why only the most common browsers and platforms are supported by websites created by web design companies. According to W3Schools, the most common browsers are Mozilla Firefox, Internet Explorer 6 and Internet Explorer 7, covering over 90 per cent of all browsers[54]. The Windows family covers nearly 90% of all platforms, the most common operating system being Windows XP with a share of 76%[55].

Even though only three browsers would be supported, ensuring the optimum experience for the users requires a lot of work. Many RIA applications that require a plug-in, such as Adobe Flash or Microsoft Silverlight work the same way in all browsers they support. However, browsers interpret JavaScript differently, so when creating an Ajax-based RIA, some of the functionalities can be hard to implement to all of the browsers.

APIs and code libraries

APIs can be used to facilitate developing rich Internet applications. However, as many of the Web 2.0 services are in a constant beta phase, so are their APIs. This means that there are no guarantees that the service will also exist the next day. As Google Maps API Terms of use puts it,

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[52] http://www.oreilly.com/lpt/a/6228 (27 Apr. 07)

[53] http://www.adobe.com/mobile/supported_devices/handsets.html (2 May 2007)

[54] http://www.w3schools.com/browsers/browsers_stats.asp (28 September 2007)

[55] http://www.w3schools.com/browsers/browsers_os.asp (31 May 2007)

> *Google shall have the right [...] to reject any request to use the Service at any time and for any reason. [...] Google shall not be liable to You for damages of any sort resulting from its decision to reject such a request.*[56]

Some clients may not want to use APIs even though they would benefit the site, if the API provider cannot offer them a service level agreement, ensuring the levels of serviceability, availability and performance. Due to the commonness of constant beta phase in Web 2.0 applications, a service level agreement is often not available, which automatically means that these APIs cannot be used in some projects.

Many companies also prohibit the usage of their APIs in commercial use. For example, Last.fm gives out their API for free usage, but only for non-commercial sites. Sites that can barely cover their expenses with advertisements are not considered commercial, but making "a healthy profit" automatically prohibits the usage of their API.[57] Yahoo!'s non-commercial APIs go even further, and disallow their usage in any "high traffic, established commercial-oriented or business websites or applications".[58]

As many companies do not have a business strategy for the APIs they provide, they tend to use only limited resources on them. That is why APIs usually have limits on the amount of usage, which severely holds back mashup services to grow too large. For example, Google SOAP Search API limits its usage to 1,000 searches per 24 hours[59]. Companies' limited resources for the APIs they provide can also manifest themselves in high latency and slow APIs.

As companies spend more resources on developing API business models and creating revenue from their APIs, the usage limitations and latency of the APIs are bound to lessen. An example of this is the newer version of Google Search API, Google Ajax Search. The newer version of the API does not have any restrictions on daily usage.

Whereas APIs offer an easy access to another service's data or functionality, code libraries offer gadgets and functionalities that can be embedded into the website. Many major companies, such as Google, Yahoo and Microsoft offer their own Ajax or JavaScript libraries to developers for free. Each library has a different approach and offers different kinds of functionalities. However, *the libraries are usually not compatible with each other*. Creating an application combining functionalities from different libraries can thus be impossible. Even though the libraries are being developed by huge companies with vast resources, they are not perfect. The problems concerning, for example, search engine optimisation, bookmarking and the Back button functionality are not covered in all cases. Solving these issues often requires additional work from developers. As the libraries tend to be thousands of lines of code long,

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[56] http://www.google.com/apis/maps/terms.html (4 May 2007)

[57] http://www.audioscrobbler.net/data/webservices/#User%20Profile%20Data (4 May 2007)

[58] http://developer.yahoo.com/usagePolicy/ (4 May 2007)

[59] http://code.google.com/apis/soapsearch/api_faq.html#gen7 (27 September 2007)

editing them to fix the usability issues may result in breaking the actual code and generating even more bugs, or it may turn out to be unfeasible within the limits of the budget. With browser differences taken into account, the developing process can become very difficult.

Suggestion 17: Even though JavaScript libraries and APIs make more sophisticated interfaces feasible, they create additional work for developers, as lot of issues have not yet been solved.

Suggestion 18: Interaction designers need to have knowledge on how APIs and JavaScript libraries work and the skills to design within the techniques' limits.

Coping with the problems and downsides

For a company to be able to design and develop sites with Web 2.0 elements in them, the designers and developers need to be educated. The designers need to know what can and what cannot be done, and the developers must have the means to implement the designs. Thus, education is needed in all areas of the website design process model.

Using completely new approaches in client projects can be troublesome. Without the experience in designing and developing new kinds of applications, the budgets and time frames can be hard to estimate. Using the new techniques cause the projects to be more expensive and time-consuming. The expenses of the project may have to be divided between the client and the company creating the website. In projects that have to be completed on a tight schedule, using new techniques may just not be possible.

Workshops, boot camps and practicing projects may be necessary to build up the knowledge needed in using Web 2.0 elements. As each project tends to have only one interaction designer, the lessons learned from the projects should be communicated to the whole interaction design community in the company. The same applies to other professionals in the company as well; developers must transfer their gained knowledge to other developers. This is important for future projects with other interaction designers, but important as well to ensure that the gathered knowledge stays in the company. In case the interaction designer most experienced in Web 2.0 leaves the company, the expertise level of the company takes a huge step backwards.

There is also a need for more cross-discipline communication. Even though implementing the designs into applications is the job of developers, the developers must communicate the possibilities and limitations of the new techniques to the designers. The designers usually do not have the expertise required to create the applications, so they may not have the understanding of the features the technique bestows.

Not all techniques can or should be used in one project. That is why gathering the expertise to use Web 2.0 elements in websites is usually done in small steps. It is necessary to collect the gathered knowledge to one location that can be effortlessly accessed. Otherwise, the lessons

learned are easily forgotten. Collecting the knowledge should be made a compulsory step in finishing a project, as otherwise people tend to forget it. However, it is not enough to provide a source of information or a knowledge centre about Web 2.0. As people tend to have a lot of work in their hands, they have no extra time to spend studying on their own. That is why actively presenting information to the others is also important.

2.5 Summary of theory-based findings

In this subchapter, the suggestions presented previously will be regrouped to form a basis to the research process explained in the chapter 3.

1. Effects on the process model
2. Effects on deliverables
3. Coping with the changes

Each subchapter presents one of these groups and the related suggestions. These suggestions and their outcome will be discussed further in chapter 4.4.4 Evaluation of suggestions.

2.5.1 Effects on the process model

As the design process is very general, it can be used to design practically anything. Changes in Web 2.0 are not severe enough to cause a real change in the design process. However, some phases in the design process may become longer due to the new elements and the problems they present.

Table 3: Suggestions related to the process model

Suggestions
S12: Sites with asynchronous communication and RIAs require more work from developers, as issues like Back button and bookmarking need to be solved.
S13: New, untested interaction models require more time to design and to develop.
S16: RIAs and dynamic content make search engine optimisation more difficult, if not impossible.
S17: Even though JavaScript libraries and APIs make more sophisticated interfaces feasible, they create additional work for developers, as lot of issues have not yet been solved.

2.5.2 Effects on deliverables

Based on the literature review, it can be concluded that there are some very concrete changes in the deliverables created by interaction designers. The deliverables that are affected by Web 2.0 are presented below.

User studies

User studies themselves do not change, but as the user goals change, more user studies are needed to find out the altered goals. In addition, as user goals move more towards interacting with other users instead of interacting with a service or a machine, a new level of interaction design is created: designing interactions between users, mediated by the system.

Table 4: Suggestions related to user studies

Suggestions
S1: Even though the method of analysing users does not change, changes in the user behaviour require an enhanced focus on user studies.
S4: Changes in technologies or approaches do not cause a change in the way user studies are conducted.
S10: A change in user goals creates a new level of interaction to web applications: designing interactions between users, mediated by the system.
S14: New user interface models require more time for usability testing.

Information architecture

The basis of information architecture does not change, but the means to reach the wanted outcome changes. Dynamic, user-generated contents create a shift in information architecture to creating a higher-level framework instead of creating strict categories.

Table 5: Suggestions related to information architecture

Suggestions
S7: Even though the basis of information architecture does not change, the used methods do change.
S8: Creating an information architecture for a site with user-generated content changes from forming strict categories to creating a higher-level framework for information.

Wireframes and prototypes

Wireframes need to change so that they can describe dynamic content. To make presenting and testing the dynamic wireframes easier, better and faster tools for creating dynamic prototypes are needed. In addition, asynchronous communication requires additional visual cues to be implemented in the designs and the site

Table 6: Suggestions related to wireframes and prototypes

Suggestions
S5: Wireframes need to change so that they can describe dynamic content.
S6: Better and faster tools for creating dynamic prototypes are needed
S11: Asynchronous communication requires additional visual cues to be implemented in the site.

2.5.3 Coping with the changes

To cope with the changes presented by Web 2.0, interaction designers as well as other competences need new skills and more knowledge. To achieve this, communication needs to be improved between interaction designers and other competences.

Skills and knowledge

New interface concepts, new technologies and user-generated content require new skills and additional knowledge from interaction designers and other competences.

Table 7: Suggestions related to skills and knowledge

Suggestions
S2: New technologies, user-generated content and new interaction models require additional knowledge from interaction designers.
S15: New user interface concepts require new skills from the designers and the developers.
S18: Interaction designers need to have knowledge on how APIs and JavaScript libraries work and the skills to design within the techniques' limits.

Communication

To get more knowledge, more communication is needed between interaction designers and within competences.

Table 8: Suggestions related to communication

Suggestions
S3: New technologies and approaches require better communication between interaction design and other competences.
S9: New, untested approaches require stronger communication between interaction design and other competences.

3 Methods of research

The aim of the research process of this thesis is to find out how the web professionals see the concept of Web 2.0 and its effects on interaction design. In this chapter, the research methods used in this study are explained. Subchapter 3.1 describes the research model used. Chapter 3.2 aims to justify the methods used in this piece of writing, and chapter 3.3 goes over the way of collecting and analysing data in this research process. Chapter 3.4 lists the tasks and desired outcomes of this research process, as well as the methods and tools to achieve the wanted results.

3.1 Research model

The research model describes the steps that will be taken to achieve the desired results. These steps will be described in this subchapter.

In order to answer the research questions presented in chapter one, the following **research objectives** were formulated:

1. Understanding Web 2.0 as a phenomenon.
2. Analyzing the process model used by web design companies and identifying interaction design deliverables.
3. Identifying the effects Web 2.0 has on interaction design deliverables and the process model used to produce them.
4. Providing web design agencies knowledge on how to adjust their methods of working to get the most out of Web 2.0.

The research process starts with an overview of the existing theories and studies on the subjects – Web 2.0 and interaction design. The key elements of Web 2.0 are inventoried and reorganised to form an overview of different aspects and elements of Web 2.0. In addition, interaction design will be studied, with the intent of creating a general process model used by web design agencies, containing the interaction design deliverables. Based on the existing theories and studies, a series of suggestions will be presented.

Using the findings resulting from the steps described in the previous paragraph, a basis for fieldwork will be created. To get quantitative data to test the suggestions, a survey will be conducted to personnel of Satama Interactive. In addition, to elaborate the survey findings with qualitative data, a series of interviews will be conducted to key personnel of Satama Interactive in Finland and in the Netherlands. The qualitative and quantitative data makes it possible to create guidelines and recommendations on how web design companies should cope with Web 2.0 and its effects on interaction design.

3.2 Justification of methods

As noted in previous chapters, in addition to the theoretical basis, both qualitative and quantitative data will be used as a part of this study. The justification of selected methods will be presented in this chapter.

A quantitative approach is used in this research to get measurable data on how various competences in the case study company, Satama Interactive, relate to the research objectives. Quantitative approach also makes it possible to create generalisations, which qualitative study does not allow.

To get deeper insight into the research objectives, also qualitative approach is used in this research. According to Patton[60], qualitative approach produces detailed information from a small group of people, enhancing the understanding on the subject with a limited possibility to generalise. As the survey presented above presents the possibility to create generalisations, the qualitative approach is used to deepen the understanding on the subject.

To achieve a high enough level of validity, triangulation – a method of cross-checking data – is utilized in this piece of writing. Out of the four types of triangulation presented by Patton[60], this research makes use of the following:

1. **Data triangulation**: using multiple sources of data to validate the research results. The participants are from different competences, and on different levels in the hierarchical system of the company. In addition, the fieldwork is done in two offices and in two different countries.
2. **Methodological triangulation**: using multiple methods of research to validate the results. The research uses two methods: qualitative approach (interviews) and quantitative approach (survey).

3.3 Data collection and analysis

This chapter discusses the methods of collecting the data with the above-mentioned methods. The first subchapter, 3.3.1 Case study company: Satama Interactive, presents the company which serves as a case study in this thesis. In the second chapter, 3.3.2 Company-wide survey, quantitative data used in the research is presented. The last chapter – 3.3.3 Semi-structured interviews – introduces the qualitative data collected for this research process.

3.3.1 Case study company: Satama Interactive

The company studied in this research is Satama Interactive – a European digital services company founded in 1997 in Finland. Satama Interactive has offices in Finland (Helsinki, Tampere and Turku) the Netherlands (Amsterdam), Germany (Düsseldorf) and Sweden

[60] Patton, 1990.

(Stockholm). In the end of June 2007, Satama Group employed 318 people in Finland and 61 abroad, 379 people in total[61].

The interviews were conducted in the Satama Interactive's Amsterdam office and in the company's Helsinki office. The survey participants were from all of the three Finnish offices as well as Satama Amsterdam.

The head office of Satama, the Helsinki office started in 1997 after as a result of a merger of several Finnish new media companies. Satama expanded quickly from a Finnish company of 90 employees to a multinational company with over 400 employees in 2000. Satama Amsterdam was founded in the year 1994 under the name General Design, and it was acquired by Satama Interactive in 2000.

Satama Group separates its services into three business areas: marketing, productivity and mobility.

Table 9: Satama services.

Marketing	Productivity	Mobility
Plan & Insight, Dialogue, Involvement, Analytics and Measurement, Interactive Marketing, Rich Media	Strategy & Service Design, Microsoft Solutions, Open Source Solutions, Support Services	Mobile Marketing, Mobile Publishing, Self-service, Business Solutions

Based on the services Satama Group offers, Satama can be referred as a full service web and mobile agency. This makes Satama Group a good case study company for this research.

3.3.2 Company-wide survey

As the quantitative part of the research process, a company-wide Internet survey was carried out. The survey was done by using a specific online survey tool, QuestionPro[62]. The survey participants were selected among Satama employees in Finland and in the Netherlands. Employees working in management and marketing were excluded from the survey. The employees to whom the survey was sent were chosen by their title from a list of Satama employees.

Invitations were sent to 202 Satama employees out of three different competence groups: Designers group, Development group and Graphic group. The different groups and the competences that included in them are presented in the table below. The table also contains the number of participants from in each group and in each competence.

Table 10: Survey participants

[61] Satama Interactive Group's interim report, January 1 – June 30, 2007

[62] http://www.questionpro.com/

Designer group (N=39)	Development group (N=116)	Graphic group (N=47)
Concept Designer (18)	Flash or Rich media developer or programmer (14)	Art Director (19)
User interface designer or Interaction designer (15)	Interface Programmer (18)	Graphic or Visual designer (28)
Other Designer (6)	Software architect or Solution architect (11)	
	Software developer or Software engineer (50)	
	Technical consultant or Technology consultant (22)	
	Other Developer (1)	
Participated (n=18, 46%)	**Participated (n=46, 40%)**	**Participated (n=8, 17%)**
Concept designer (9)	Technical consultant (10)	Art director (4)
User interface designer or Interaction designer (8)	Software developer or Software engineer (19)	Graphic or Visual designer (4)
Senior designer (1)	Flash or Rich media developer or programmer (7)	
	Interface programmer (5)	
	Software architect or Solution architect (4)	
	CIO (1)	

The survey was divided into four sections:

1. Attitude
2. Challenges
3. Skills and experience
4. Coping

In the first section, the survey participants were asked for their attitude towards Web 2.0. The first section consisted of question matrixes where participants could evaluate Web 2.0-related statements on a four-point scale, from disagreeing completely to agreeing completely. The participants could also add their own comments and thoughts about Web 2.0.

The second section consisted of questions concerning the challenges Web 2.0 poses to web design companies. Again, the participants could rate related statements using the four steps from disagreeing completely to agreeing completely. They could also use a free text field to fill in their own views of the impending challenges and threats.

During the third section, the survey participants were asked for competence-related background information. They were also asked to give an estimate of their colleagues' skill and experience level.

The last section approaches the problem of coping with the changes using the same methodology as in the previous sections – rating statements. Statements were related to issues like communication, education and knowledge sharing. Participants were also able to give out their own suggestions of how to cope with the future and current problems.

For the whole survey and its questions, please refer to Appendix 11: Survey.

3.3.3 Semi-structured Interviews

As the qualitative part of the research process, multiple interviews were conducted to key personnel in Satama Amsterdam and in Satama Helsinki. The following table illustrates the interviewed Satama employees and their competences.

Table 11: The interviewees

Design group (N=3)	Development group (N=1)	Other (N=2)
Senior designer, Helsinki	Technical Consultant, Amsterdam	Director, Helsinki
Senior interaction designer, Amsterdam		Strategist, Amsterdam
Design director, Amsterdam		

A semi-structured interview was selected as the type of interview to find out if the theories suggested in earlier parts of this paper did not cover the whole reality of the business; by giving the interviewees the possibility to speak freely about the selected themes, the interviewees could also discuss issues not covered by the theories presented earlier. A semi-structured interview could also raise highly related issues that were not originally thought of by the writer of this thesis.

As the focus of this thesis is on interaction design, most of the interviewees have practical experience in this area. To view the field of interaction design from another perspective, also people from other competences were included in the interviews. To get a view broader than the one of just one office, the interviews were carried out in two offices, Helsinki (Finland) and Amsterdam (the Netherlands).

The interviews were conducted face to face to create a better connection between the interviewer and the interviewee. The interviewees were encouraged to share their own opinions on the selected themes, constraining them as little as possible. Even though the themes and the structure were virtually the same in each interview, the interviews were not identical, as the interviews followed the interviewees' flow of thought.

The interviews were divided into four themes:

1. Effects of Web 2.0 on the design process and deliverables
2. Effects of changes in interaction design and in other competences
3. User-generated content
4. Coping with the changes

The interviewees' overall views towards Web 2.0 were studied in the first theme. The questions covered interviewees' opinions on the effects that Web 2.0 has or has had on various aspects, such as designing and developing websites, the website design process and the deliverables produced by interaction designers.

During the second phase, the indirect effects of Web 2.0 were charted. The interviewees were asked how the changes' in interaction design reflect on other competences. In addition, the

effects of the changes in other competences' were studied. Questions dealt with issues such as JavaScript code libraries, APIs and business effects.

The third phase focused fully on user-generated content and on its effects on designing and developing web sites.

In the last phase, the interviewees were asked how they thought digital media companies should react to cope with the past, current and future changes caused by Web 2.0. In the fourth theme, the interviewees were asked for ideas for improving company processes and modes of operation. The questions concerned among others issues like knowledge sharing, education and communication.

The interviews were conducted in May and June 2007. Each interview lasted from one hour to one hour and a half. The interviews were recorded and transcribed later. The first interview was a used as a pilot, after which the question structure was slightly adjusted. After transcribing the interviews, the textual data was labelled using *Atlas.ti* software. The labelled text fragments were then categorised and grouped, thus sorting the interview contents by subject.

3.4 Tasks and desired outcomes

The objectives and research questions are illustrated in the table below. This table also shows the methods and tools used to reach the research objectives. The Tasks-column describes the tasks related to this research, formulated based on the research objectives and the research questions. The rightmost column demonstrates the preset desired outcomes of each research objective.

Table 12: Objectives, tasks and desired outcomes

Objectives	Research questions	Methods and tools	Tasks	Desired outcomes
Understanding how Web 2.0 is seen by web design professionals.	How is Web 2.0 perceived by web design professionals?	Literature study Interviews Survey	Finding out how web design professionals see Web 2.0.	An overview of how web design professionals see Web 2.0.
Identifying the effects Web 2.0 has on interaction design deliverables and the process model used to produce them.	What effects does Web 2.0 have on interaction design deliverables? What effects does Web 2.0 have on the process model used to produce interaction design deliverables?	Literature study Interviews	Identifying the effects Web 2.0 has on different stages of the process model. Identifying the effects Web 2.0 has on individual deliverables.	A description of the effects of Web 2.0 on individual stages of the process model. A description of the changes in the deliverables.
Providing web design agencies knowledge on how to adjust their methods of working to get the most out of Web 2.0.	How should web design agencies react to cope with the changes Web 2.0 has on interaction design to get the most out of it?	Interviews Survey	Finding out what kind of actions should web design agencies take in order to get the most out of Web 2.0 in relations to interaction design.	A guideline, describing the key factors Satama Interactive should take into account to cope with Web 2.0 in relations to interaction design.

3.5 Research validity and reliability

As stated in chapter 3.2, data triangulation and methodology triangulation were utilised in this research to achieve a high enough level of validity. Overall, the research process was successful. The six interviews gave ample insight into the research subject. In addition, the response rate of the survey – 36 per cent – is large enough for creating generalisations and conclusions. The issue of validity is discussed more thoroughly in chapter 5.4.

4 Case study: Satama Interactive

This chapter presents the essence of this study: the findings from the survey and interviews conducted in the case study company, Satama Interactive. The findings of the research process will be presented in four chapters. The first chapter (4.1) presents the findings related to understanding Web 2.0. The second chapter (4.2) presents the effects on the process model, the third chapter (4.3) presents the effects of Web 2.0 on individual deliverables, and the last chapter (4.4) presents the means of coping with the previously discussed effects.

4.1 Perception of Web 2.0

This chapter presents the views and opinions of the interviewees and the survey participants on Web 2.0. The chart below illustrates the area research presented in this chapter.

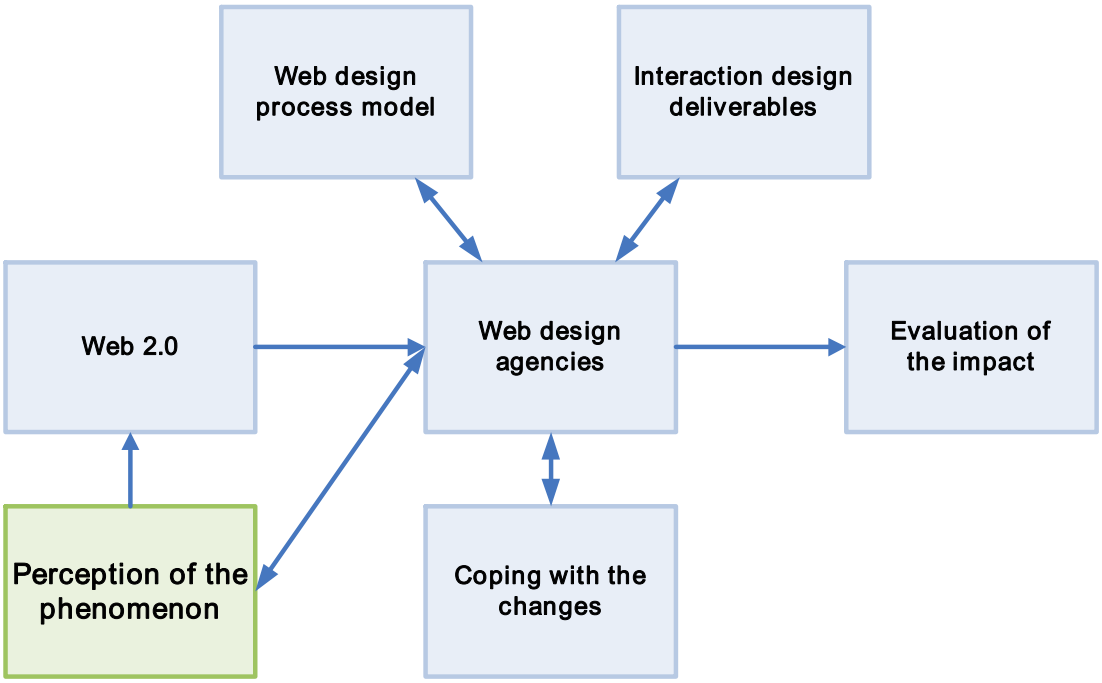
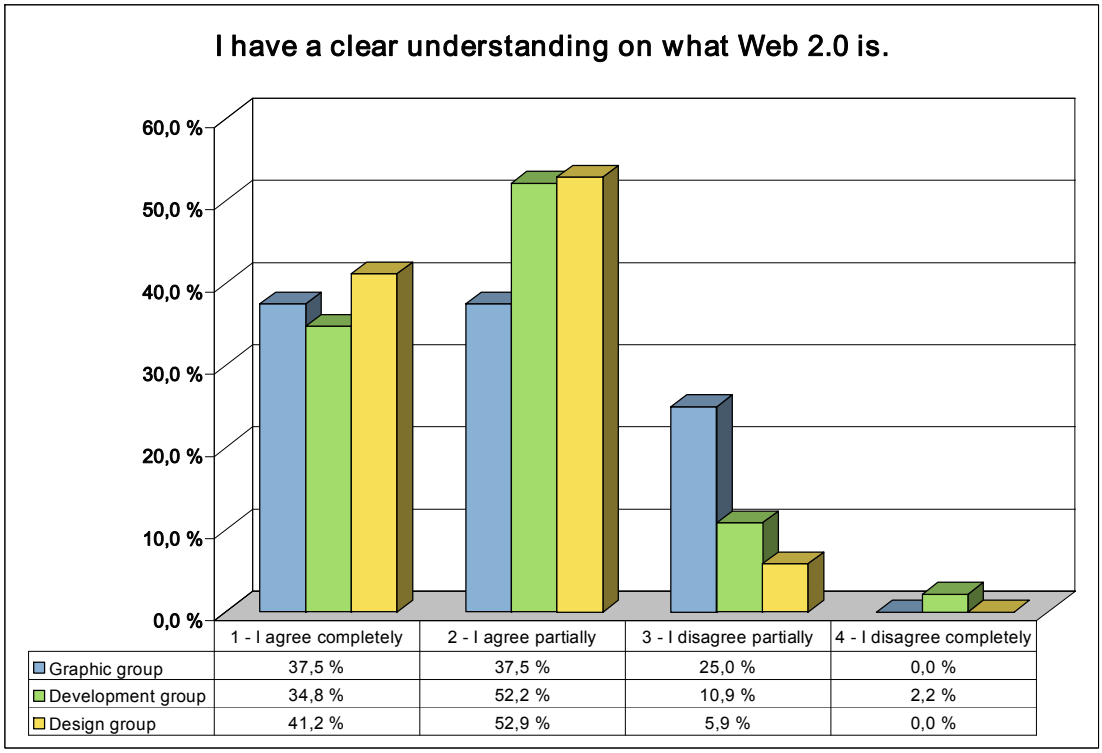


Figure 3: Research objectives: Perception of Web 2.0

4.1.1 Understanding Web 2.0

The survey participants were asked about their attitude towards Web 2.0. As the first question, they were asked how well they know the concept of Web 2.0:



	1 - I agree completely	2 - I agree partially	3 - I disagree partially	4 - I disagree completely
Graphic group	37,5 %	37,5 %	25,0 %	0,0 %
Development group	34,8 %	52,2 %	10,9 %	2,2 %
Design group	41,2 %	52,9 %	5,9 %	0,0 %

Figure 4: Understanding of Web 2.0 (n=71)

As the chart above shows, *most of the respondents have quite a clear understanding on what Web 2.0 is*. However, the Graphic group has somewhat more doubts on the issue than the developers or the designers. When taking a closer look on the question, also some other differences show up.

According to the survey, *25 per cent of graphic designers are not sure on what is meant by Web 2.0*. This can be explained by that most of the Web 2.0 innovations are related to technology or new concepts, and not so much on graphical design; graphical designers can still do the very same things they could before. I another words, *the phenomenon may not be interesting enough for graphical designers*, as it does not offer them that much new.

Approximately 25 per cent of developers did not have a clear understanding on what Web 2.0 is, whereas the same number with user interface designers is 15%, and only 10% with technical consultants. The rest of the survey participants stated that they have at least a partially clear understanding on what Web 2.0 is. All Dutch developers stated that they have at least a partially clear understanding on what Web 2.0 is, whereas *over 30 per cent of Finnish developers state that they do not understand what Web 2.0 is*. However, only three Dutch developers have participated in the survey, so the results of this cross tabulation are only allusive.

Finding 1: Web 2.0 is quite well known across all competences.

4.1.2 Defining Web 2.0

The interviewees were asked to review the original meme map by Tim O'Reilly[63] and his original definition of Web 2.0. The *interviewees agreed with the original definitions and the meme map*, even though some interviewees commented the meme map to lack the aspect of mobility. Mobility is however mentioned in the meme map, encompassed in the concept of Software above the level of a single device.

Even though some of the survey participants were not sure on their views, their definitions of Web 2.0 were quite well in line with the original definitions of Tim O'Reilly.

> *I get confused every now and then by the dual meaning of web2.0. On the one hand it means user participation and user generated content, such as social networking and bookmarking. On the other hand Web2.0 is mentioned as the techniques that make all these new forms of internet usage possible, like ajax and flex and such. (Survey respondent. Interaction designer, Amsterdam.)*

> *Web 2.0 is much more than just user generated content, think for example about mashups, new front-end technologies. (Survey respondent. Interaction designer, Amsterdam.)*

The interviewees' definitions of Web 2.0 were quite well in line with the survey participants' definitions.

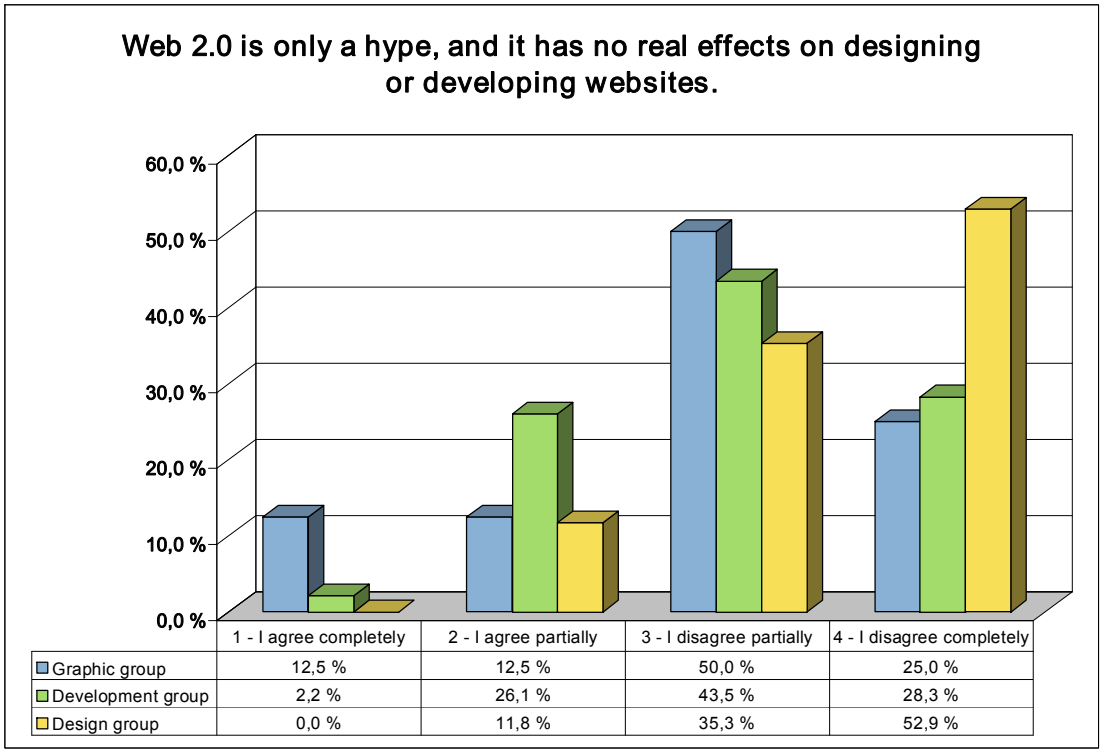
> *One aspect is UGC as general sense and all the services that are related to it, creating mashups, software as a service. Another aspect is on a level of user interface components, modifying DOM without using page refreshes. (Director, Helsinki.)*

Finding 2: Web 2.0 is seen twofold: it denotes user participation and user-generated content, and a collection of new techniques and approaches.

4.1.3 Hype or a real deal

To find out if the Web 2.0 has any real effects on designing or developing, the survey participants' were asked if they thought Web 2.0 to be a hype.

[63] See Appendix 9: O'Reilly Meme Map.



	1 - I agree completely	2 - I agree partially	3 - I disagree partially	4 - I disagree completely
Graphic group	12,5 %	12,5 %	50,0 %	25,0 %
Development group	2,2 %	26,1 %	43,5 %	28,3 %
Design group	0,0 %	11,8 %	35,3 %	52,9 %

Figure 5: Hype or real deal (n=71)

The group most sceptical towards Web 2.0 was the Graphic group, with 25 per cent agreeing at least to some extent with the argument. This result, like in the previous question, can be explained by that *Web 2.0 does not strongly affect graphical design*. Still, seventy-five per cent of graphic designers thought that Web 2.0 does have an impact on designing or developing websites.

When taking a closer look on the Graphic group, it seems that graphic designers were opposing the argument, whereas art directors were not as unanimous. It seems that the biggest differences of opinion were not among the graphical designers, but the art directors. According to the survey, *all art directors disagreed with each other,* whereas graphic designers were in concord. Graphical designers were also opposed to the argument that Web 2.0 does not have any real effects on web design.

Other competences were not as sceptic about the effects of Web 2.0. Almost 90 per cent of designers thought that *Web 2.0 does have real effects on designing or developing*, as did over 70 per cent of developers.

The survey results were backed up by the interviews: *one of the six interviewees considered Web 2.0 as only a buzzword and a complete hype*, but the other five interviewees considered it to have at least some content. Everybody did, however, perceive Web 2.0 as a very strongly hyped phenomenon; Web 2.0 itself contains nothing new, but it is only a new name to a collection of old techniques and user involvement.

Finding 3: Web 2.0 is considered to have real effects on designing and developing.

4.1.4 Revolution or evolution

Web 2.0 was generally considered not to be a revolution, but an evolution to the point where designers and developers are less tied to the earlier limitations of the Internet. The change is not however restricted only to technical issues, but also to a change in the mindset towards the Internet; *Web 2.0 is the new coming of Web business*, fulfilling the dreams web designers had in the 1990s.

> *Internet is in the lives of all consumers. It's no longer a promise, it is the reality. It is mass markets, everybody's personal mass media. (Strategist, Amsterdam.)*

Although Web 2.0 was seen as only a new packaging to a group of old techniques, interviewees considered it to have positive influences to the Web. If used sensibly, the new approaches and techniques could improve user experience and web site usability:

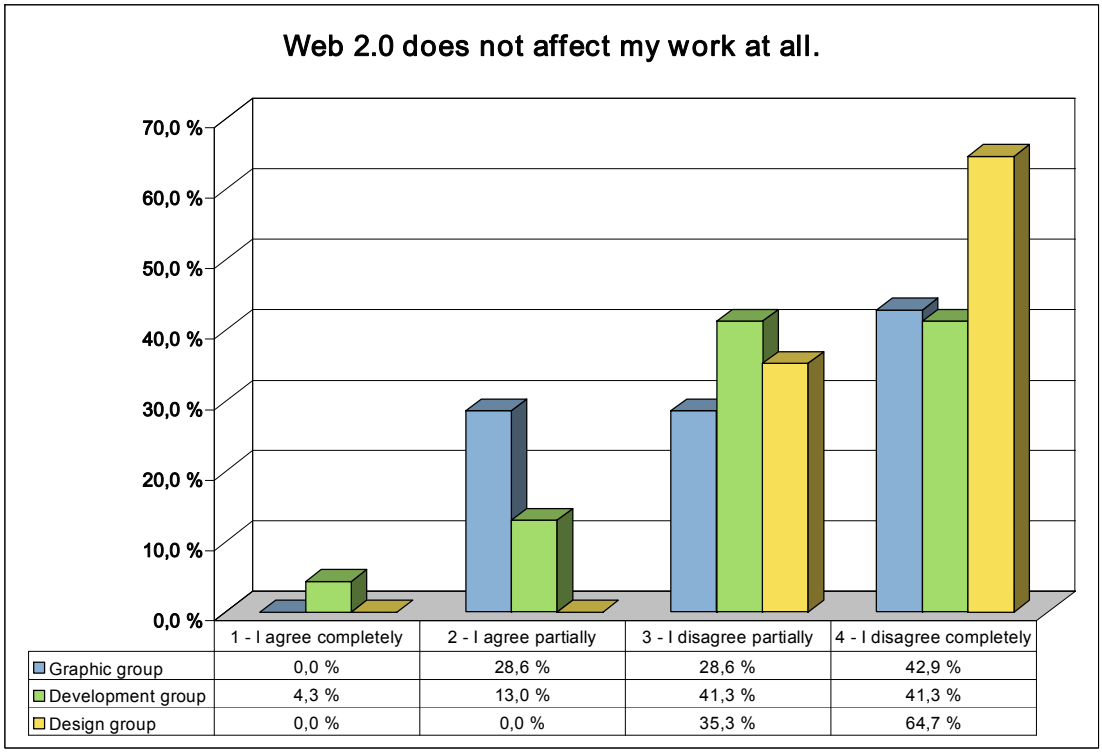
> *We are less bound to the ideas of going to one page from another, only having text links, so now we've got the full interactive, better experience kind of stuff (Design Director, Amsterdam).*

One interviewee also compared the Web 2.0 hype to the dot-com hype of the 1990s, with the difference that Web 2.0 is on a more solid ground than the dot-com hype was. Hype in both cases was created by people – venture capitalists, Web users, developers and designers – having great expectations. The difference between the two hypes is that now there is a user base, whereas in the 1990s it was nonexistent. In addition, the investors are now more careful, as they have learned a lesson from the previous hype.

Finding 4: Web 2.0 is seen as a very strongly hyped phenomenon.

4.1.5 Web 2.0's effects

When asked about how they see the effects of Web 2.0 on their work, most of the survey participants thought it to have at least some kind of effect.



	1 - I agree completely	2 - I agree partially	3 - I disagree partially	4 - I disagree completely
Graphic group	0,0 %	28,6 %	28,6 %	42,9 %
Development group	4,3 %	13,0 %	41,3 %	41,3 %
Design group	0,0 %	0,0 %	35,3 %	64,7 %

Figure 6: The effects of Web 2.0 on work (n=70)

As the graph above shows, *all of the designers thought that Web 2.0 affects their work*. The Graphic group was a little more sceptic, supposedly due to the minor effects of Web 2.0 on graphic design. Still, over 70 per cent of the Graphic group stated that Web 2.0 does have an effect on their personal work.

Over 80 per cent of the Development group thought that Web 2.0 has an effect on their work, but at the same time, nearly five per cent of them thought it to have no effect at all. Like in the previous questions, the deviation of votes is wider in the Development group than in the other groups. When studying the results more closely, it turns out that there are some developers, who are very sceptic towards Web 2.0. In most of the questions, the most sceptical responses come from the very same people.

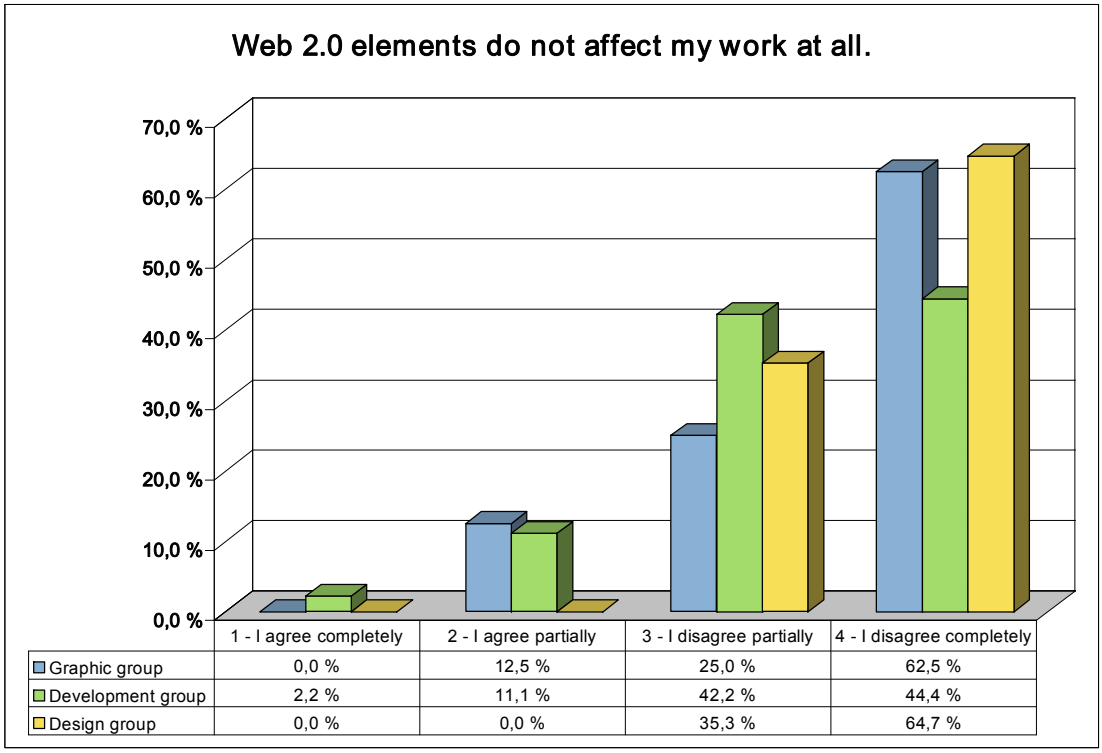
> *Web 2.0 is stupid name old technology. [...] i think web 2.0 is totally 'marketing hype'. (Survey respondent. Developer, Helsinki.)*

Incongruously, even though having very strong thoughts on Web 2.0, one of the most sceptical developers towards Web 2.0 also disagreed completely with the argument "I have a clear understanding on what Web 2.0 is".

Finding 5: Web 2.0 is perceived to have real effects on web agencies' work.

Web 2.0 elements' effects

The participants were also asked how they think Web 2.0 elements affect their work. In the survey, Web 2.0 elements were defined as "an array of new user interface ideas and techniques used commonly in Web 2.0 sites, such as drag & drop environments, autocompletes (Google Suggest) or elements using asynchronous communication with for example Ajax". Most participants disagreed with the argument.



	1 - I agree completely	2 - I agree partially	3 - I disagree partially	4 - I disagree completely
Graphic group	0,0 %	12,5 %	25,0 %	62,5 %
Development group	2,2 %	11,1 %	42,2 %	44,4 %
Design group	0,0 %	0,0 %	35,3 %	64,7 %

Figure 7: Effect of Web 2.0 elements on work (n=70)

The results resemble the results of the previous argument, "Web 2.0 does not affect my work at all", with the distinction that *Web 2.0 elements are seen having a stronger influence than Web 2.0 in general*. Overall, only nine per cent of the survey participants thought that Web 2.0 elements do not affect their work.

Like most of the survey participants, *all of the interviewees thought that the new techniques Web 2.0 affiliated with Web 2.0 have at least some impact on designing* web sites and services. The techniques make more things possible at the same time take down some of the restrictions that have previously limited web development.

According the interviewees, *Web 2.0 changes also what is designed*: the designers need to use APIs and third party tools to take advantage of other services and content created by others. This requires additional skills and knowledge from the designer, as they have to know what APIs are available and what can be done with them. Designers also need to develop skills to

work within the limitations the APIs have, and within the limitations, alter their appearance and functionality to suit the project's needs.

Two interviewees also noted that APIs might need to be used so that people can find the site more easily. I addition to using RSS feeds or optimising the site for search engines, popular syndicating and social media services such as Digg[64] or Del.icio.us[65] should be harnessed to draw in more visitors. This often requires using the APIs the other services offer.

One interviewee stressed that in implementation-only-projects, Web 2.0 should be used to reach the wanted outcome faster, easier and with a better result. This however requires the designer to be able to innovate within the API limits, to use the API to get to the desired goal. To do this, designers need a lot of new knowledge about the APIs: what are they, how are they used, and what can they do.

> *[A designer] needs to know the services, the ones that have already won, with which you shouldn't hassle with, building your own CMS like we did in '99 or '97, or building your own video bank or image service and try to compete with Flickr. Why would you do that? Use Flickr, feed the stuff in it and download it back to our service using their API. (Strategist, Amsterdam.)*

Another interviewee also spotted a problem related to marketing people's knowledge on Web 2.0: if they do not know what is possible, or how Web 2.0 can be leveraged to benefit the client, they cannot sell it. This may not result only in lost clients who get better proposals from other companies, but also in lost opportunities to learn and to create better user experience. This was also backed up by survey participants:

> *Client should be educated about web 2.0. It starts with the selling. (Survey respondent. Technical Consultant, Amsterdam.)*

Finding 6: Web 2.0 elements are seen to have a strong influence on work.

Finding 7: Designers need new skills to be able to design through APIs.

Finding 8: Marketing people must be able to sell Web 2.0.

Employing Web 2.0

According to the interviewees, *one of the biggest problems of Web 2.0 is the hype*, as it makes it difficult to see what is hype and what is there to stay. Because of that, designers should be careful not to give in to hype and use new technologies and ideas just for the sake of using them. All of the interviewees specifically stated that various Web 2.0 elements should be used only if they add value to the service or to the client, and in such sense, they do not differ from any other web design elements:

[64] http://www.digg.com/ - A community-based article syndicating service

[65] http://del.icio.us/ - A social bookmarking service

I see my task as a designer to create the best possible solution for the client's problem. Could be that some Web 2.0 elements come a part of that, and could be that none are. (Design Director, Amsterdam.)

This notion was seconded by survey participants:

We shouldn't push 'Web 2.0' selling to clients too much. This idea has it's place and we must learn to see where to use it and where not. Proper tools for proper needs. (Survey respondent. Technical Consultant 1, Helsinki.)

Most of the interviewees agreed on the effects of Web 2.0 on the business of designing and developing websites – they are quite nonexistent. Clients only want basic sites, and Web 2.0 can help achieve that, but that is the extent the clients are interested in it.

We just need to sell more products, and we need to inform people better, and to reduce the number of calls to the call centre. If there's anything that I see on the Web 2.0 landscape that could help them, they would be interested in it, but [...] I never get a customer who says "Hey, I would like a Web 2.0 site". (Design Director, Amsterdam.)

Finding 9: Web 2.0 should be used only if it adds value to the client.

Web 2.0 in service design

One of the interviewees also brought up the aspect of using Web 2.0 in service design. A digital media company should harness Web 2.0 elements in also creating innovations for clients and not only use it to enhance the designs:

The power of Web 2.0 is in creating quick protos and demos and illustrating the potential prospects. [...] A high level designer should be innovating these things, and Web 2.0 could be at least one tool in quickly creating them, getting contents, making it concrete, creating layouts and embedding images and videos in it. (Strategist, Amsterdam.)

After creating the innovation, after somebody creates the challenge, then we produce it, with means and technologies currently available.[...] This would mean using the Web as a platform, to enhance and change the core processes in companies. Changing the models of producing, communications or financial management. (Strategist, Amsterdam.)

This was also backed up by survey participants:

The main challenge for us is to find methods for increasing the speed of developing new businness models for our customers. This challenge requires deep understanding about the web 2.0 philosphy. Technology itself is not very promising for making business but business models for our customers which are based on web 2.0 will create more and more consulting and also implementing business. (Survey respondent. Technical Consultant 2, Helsinki.)

We need to find the real solutions and design applications that really bring value to the company (Survey respondent. Technical consultant 3, Helsinki.)

Finding 10: Web 2.0 should be used in service design, creating innovations for clients.

Simplicity over everything

Even though the designs themselves become more complicated, *the user interface has to be at least as simple and efficient as before*. If the new elements make the site more difficult or unpleasant to use, they are working against the designer.

> *If it adds value, you should do it, if it doesn't you shouldn't do it. Pretty simple. But I've seen in projects, that Web 2.0 becomes a hype, so everybody is looking for a way to add dynamic, moving drag and drop things that nobody gets, or do not really add to the user experience. I think we should be careful for those developments. (Senior Designer, Amsterdam)*

Although the interviewees thought that Web 2.0 would increase the amount of work designers need to do, they also welcomed the change. According to the interviewees, *Web 2.0 makes it possible to create a better user experience through better usability and richer interface*. Still the interviewees' attitude towards Web 2.0 is somewhat bipolar. Even though new techniques can create a better user experience, it can also have a harmful effect for the site if used wrongly.

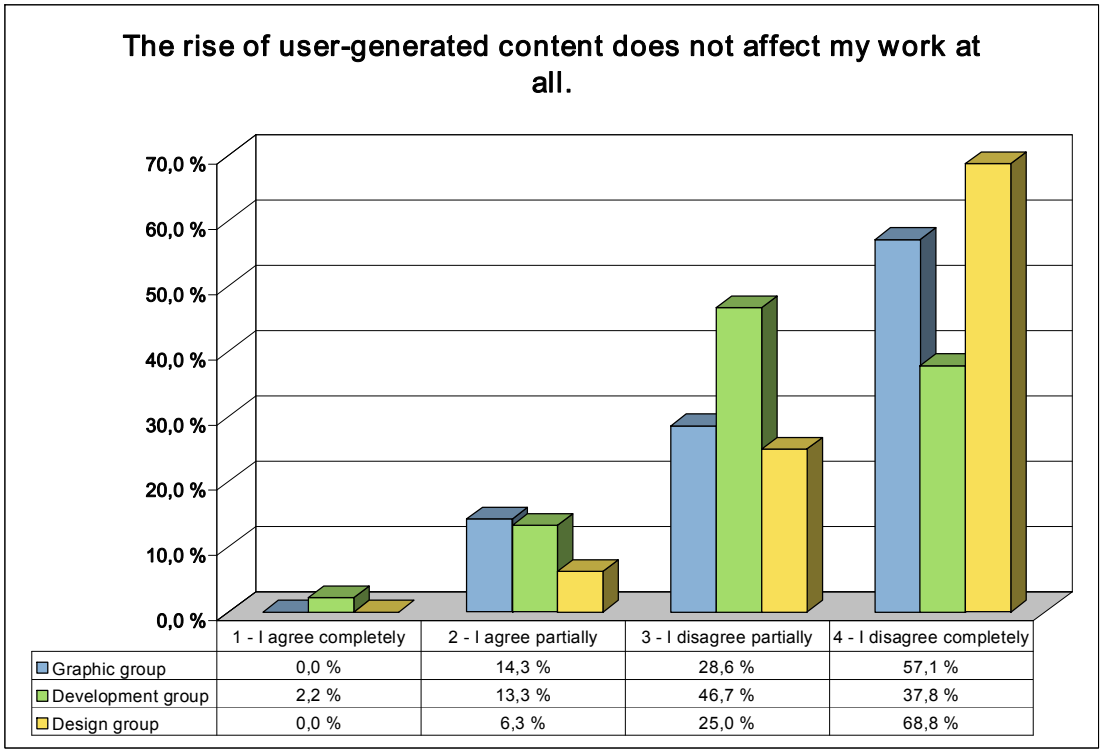
> *The danger is that it just gets too confusing or too crowded, all those Web 2.0 animations and dynamic behaviour. In the end, usability is lower than in a static 1.0 site. (Senior Designer, Amsterdam)*

The amount of new technologies, ideas and approaches can also form a problem for the designers, as they may not have the skills or the experience required to use them. According to one of the interviewees, *designers do not trust new ideas that have not been proven to work*. If the designers do not have the experience, or they are not up to date with the latest ideas and discussions, they are unable to use new ideas and techniques in their design in the best possible way.

Finding 11: Web 2.0 should be used only if it adds value for users.

User-generated contents' effects

The survey participants were asked to rate the effects of user-generated content on their work:



	1 - I agree completely	2 - I agree partially	3 - I disagree partially	4 - I disagree completely
Graphic group	0,0 %	14,3 %	28,6 %	57,1 %
Development group	2,2 %	13,3 %	46,7 %	37,8 %
Design group	0,0 %	6,3 %	25,0 %	68,8 %

Figure 8: Effects of user-generated content on work (n=68)

The vast majority of survey participants thought that user-generated content has an effect on their work. In both the Graphic group and the Development group, about 15 per cent agreed to some extent with the argument, whereas with the Design group the number was six per cent. The Development group's responses were quite in well in line with the other two groups, with the biggest difference of having twenty per cent votes moved from completely disagreeing to partially disagreeing. In another words, *developers thought user-generated content to have a slightly smaller effect on their competence* compared to other competences.

User-generated content was seen as an important aspect of modern web by all of the interviewees. However, the interviewees' opinions varied from user-generated content being the only real effect of Web 2.0 to user-generated content being *"one of the most hyped things in Web 2.0" (Strategist, Amsterdam).*

Two of the interviewees said user-generated content is about empowering the users, and offering them the forum to express themselves – with certain limitations of course:

> *You provide a framework where users can interact and be involved. It's not so much that you offer the content, but the users themselves are involved in creating the content or communicating. (Senior Designer, Amsterdam.)*

> *User-generated content says to me, that there is a site that is empty, and it is up to others to fill it with whatever content they feel is relevant to get this site going. It attracts a certain community, which enhances itself, keeps on spinning faster and faster. (Technical consultant, Amsterdam.)*

Finding 12: User-generated content is perceived to have a clear impact on web agencies' work.

Quality content is king

One of the interviewees pointed out that user-generated content – content created by web users – has existed for ages. What made it interesting is that people started to create quality content, and *with high quality, consuming it becomes as enjoyable* as consuming contents created by professional media companies or journalists.

> *It's about the fact that people are now able, at least some of them, to produce really quality content, and that is what makes it interesting. Because they're not tied into a company, they're not tied into rules. (Design Director, Amsterdam.)*

Another interviewee noted the same thing: user generated quality content is revolutionary, challenging traditional ways of producing media. The interviewee however pointed out that *most of the content is not quality content*, but masses of low quality, personal content. According to the interviewee, a lot of *user-generated content is the next step forward after reality TV*: you have to be seen to be somebody, and the Web is the easiest way of achieving that.

> *Reality TV created a generation who was used to seeing people's horribleness and positivism and coarseness and genuineness, and it created a group of people who were grown in to that, lived that and want to be celebrities and share themselves. You're nothing if you're not in MySpace. (Strategist, Amsterdam.)*

The interviewee noted that as the whole phenomenon as it is, is only a couple of years old, so nobody really knows if it is going to last, or how it will be shaped in years to come.

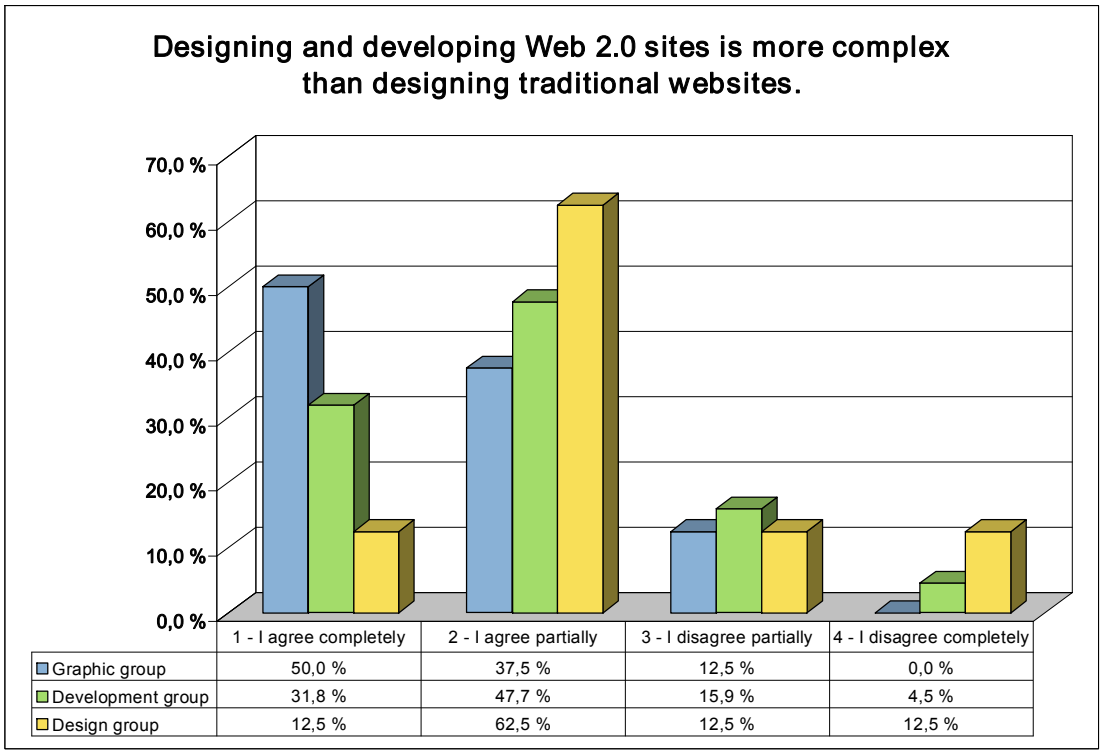
Another aspect presented by one of the interviewees, is peer media. People tend to trust their peers – their friends, colleagues and other people around them more than advertisements or brand publications. When these people go online and share their ideas and views online, they form the *peer media, which may be more trusted than official communication and official advertising by brands and commercial instances*. This not only diminishes the effects of advertising, but may also create new producers of purchasable goods.

> *Where should I take a loan? Go online, but not to the average online bank site, but check out the peer media. And this may lead to that you take a peer-to-peer loan with a better interest than the ones banks offer. (Strategist, Amsterdam.)*

Finding 13: User-generated content needs to be of high quality to be valuable.

Web 2.0 makes designing and developing more complex

To find out what kind of effects Web 2.0 has on designing or developing, the survey participants were asked on their opinion if Web 2.0 makes designing and developing websites more complex:



	1 - I agree completely	2 - I agree partially	3 - I disagree partially	4 - I disagree completely
Graphic group	50,0 %	37,5 %	12,5 %	0,0 %
Development group	31,8 %	47,7 %	15,9 %	4,5 %
Design group	12,5 %	62,5 %	12,5 %	12,5 %

Figure 9: Web 2.0 makes designing and developing more complex (n=68)

Eighty per cent of all survey participants agreed with the argument, either partially or completely. The number was slightly lower within the Design group, where 25 per cent stated that Web 2.0 does not make designing or developing more complex. The user interface designers' answers were scattered quite evenly to all of the alternatives, even though as many votes were given to the alternative "I agree partially" than to the rest of the alternatives together. The concept designers were well aligned with the interaction designers, but even more *concept designers answered that they agree partially with the argument*.

The survey's results were quite well in line with the interviewees' opinions. *Five out of six interviewees thought that Web 2.0 would increase the work web designers do.* According to more than one of the interviewees, Web 2.0 "*enriches the vocabulary of the things that [designers] do" (Design Director, Amsterdam.)*, as the new technologies and ideas create new possibilities. It is increasingly hard to pick the optimum solution to the problem the designer is trying to solve, as the amount of solutions is higher than earlier. This also tends to lead to *more complex designs than with traditional, statistic web sites*.

Finding 14: Web 2.0 is perceived to make designing and developing more complex.

4.2 Effects on the design process

This chapter discusses the effects of Web 2.0 on the design process used by web design companies. The discussed area of research is illustrated in the graph below.

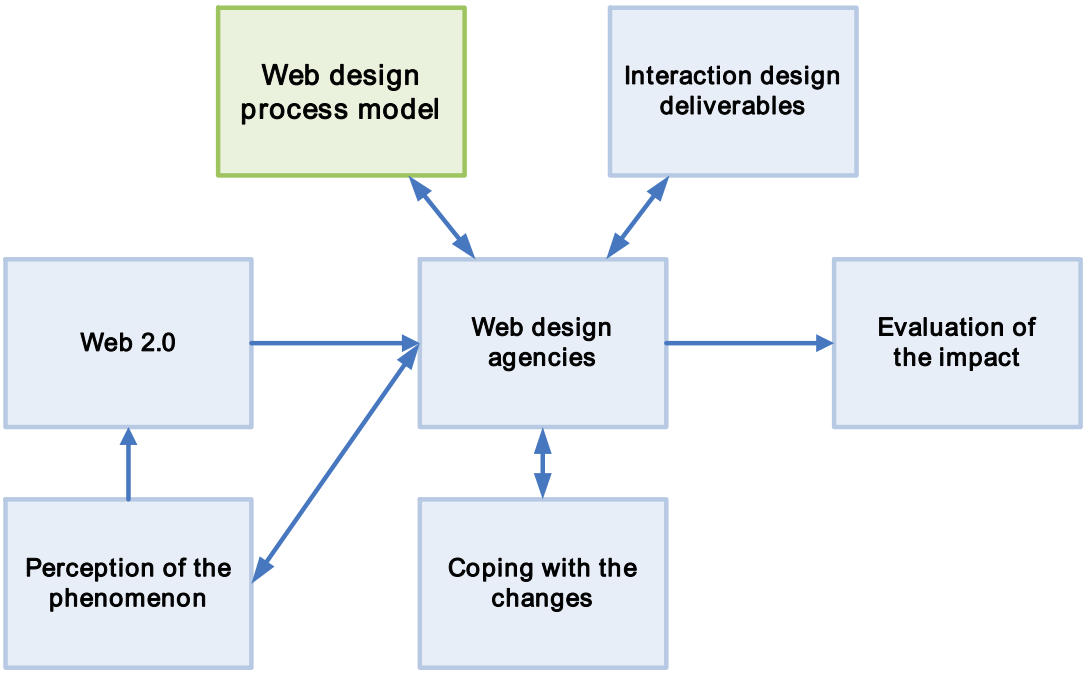


Figure 10: Research objectives: Web design process model

4.2.1 Little effects on the process

Although the interviewees thought that Web 2.0 would have an impact on designing, they perceived its effects on the design process much lesser. All of the interviewees stated that as the process itself is quite general – it could be used to design any product with small modifications – so the *changes presented by Web 2.0 are not severe enough to change it*.

However, all but one of the *interviewees said that parts of the process should be adjusted to fit better the new possibilities*. Documenting the designs should be improved, so the design documents could describe more precisely the intent of the designers. Documentation should also be improved because of the dynamic nature of Web 2.0:

> *A static wireframe document is not suitable for Web 2.0 animated, drag and drop user interface (Technical Consultant, Amsterdam).*

One interviewee suggested that the elaboration phase – where most of the interaction design is done – should become longer because of the increased amount of documentation. In time, there might also be "*some additional deliverables or additional activities" (Senior Designer, Amsterdam.*) that are formed as designing Web 2.0 applications becomes more of an everyday job.

One interviewee suggested that more effort should also be put to the beginning of the project, the inception phase, where the goals and scope of the project are set. To fill the users' expectations, the users should be studied more carefully, especially their skill level and type of social media they use. Also more effort should be put into finding out what are the current user interface standards users are already accustomed to use.

Finding 15: Web 2.0 does not change the design process per se.

Finding 16: Some parts of the process model may become longer due to the effects of Web 2.0 on individual deliverables.

4.2.2 Changes in development phase

According to the interviewees, the changing interfaces also have an effect on other competences. The changes mostly influence the implementation of the designs, as new techniques and technologies are needed to construct the designed product. This requires more time from the developers, as learning new skills always takes time.

> *For HTML, CSS, everything has been said, everything has been written, every aspect we know. But with this, it's totally new. What are the issues, how do we debug this, how do we make sure it works in every browser. We have to start all over again. That's something that has to be in our minds that we are [...] not the experts, but we have to become the experts, which takes time and effort. (Technical Consultant, Amsterdam)*

The more complex the designs are the more code is usually needed to implement them. *This also shows in the amount of testing* that needs to be done, which increases the time the developers need even more.

According to one of the interviewees, the increase in the amount of code will also increase the need for support services. When the amount of features grows, the absolute amount of bugs also grows. This means that *more work is needed in fixing the bugs* after the initial release. According to the interviewee, there is *also a need for more project management*, as it often correlates quite well with the amount of developing and testing going on in a project.

Even though the new designs challenge the developers more, it also works the other way around; new things are technically possible, so designers need to learn how to use them in their designs. However, as two of the interviewees stated, really specific designs need to be created only quite rarely. Usually the same ideas and concepts just need to be reused and adjusted to suit the project.

According to one of the interviewees, the *balance between design and development still stays the same*. The designed things may be more complex, but because they are done more often, the implementation process becomes easier in time:

> *In the past it quite a big deal to have an automated news feed on a website, now it's so we don't even really have to talk about that. And now with these new libraries or these frameworks, then even having some special effects on your website becomes easy, whereas a couple of years ago it would've been a quite a big deal. (Design Director, Amsterdam.)*

Even though most of the changes in user interfaces affect implementing the designs, one interviewee also stressed that the flexibility of Web 2.0 web sites should be taken into account also beyond design and development. *The interactivity should also be expressed by the graphical design* making the site appear more *"smooth and dynamic"* (Senior Designer, Helsinki).

Because of the changes, most of the interviewees agreed that more communication is needed between competences, especially developers.

> *There is much more that can go wrong. It's not only building a face, but it's building the whole interactive behaviour with appropriate responses, scaling…so there's a lot more that can go wrong if you don't communicate well between departments. (Senior Designer, Amsterdam.)*

One of the interviewees pointed out that the *focus of all competences should be enhancing user experience*. To reach this common goal, it should be studied from various perspectives, together with all the competences. To reach a good outcome, the competences should work closer together than before.

> *The business guy sells it, the designer studies it and the techie implements it with the designer. The business person measures it, and the designer defines the conversion points the business needs. And the interaction in all of this should be tighter than ever. Maybe Web 2.0 is a good agent of change, because it provides the conversation needed to create the interaction. (Strategist, Amsterdam.)*

Finding 17: The amount of work increases in the development phase, as developers need to learn new skills and spend more time on testing and bug fixes.

Finding 18: More communication is needed between competences.

4.2.3 Effects of business

The interviewees pointed out different aspects of how business effects designing in relations to Web 2.0. One interviewee stated that *project management skills and knowledge on Web 2.0 had sometimes caused problems* as they had sold things to clients that the designers disagreed with. In some cases, project management had underestimated the costs of using Web 2.0 elements in the design.

Another interviewee said that designers must be very careful in using new untested or poorly known elements in their designs. If the decision to use them has been a bad one, the project

can become very unprofitable. Opting to go for a Web 2.0 solution thus requires the team a thorough knowledge of the techniques and technologies used in the project. Not knowing them may lead to underestimating the budget, as there may be surprising barriers and delays.

One interviewee remarked that business should not affect design, but it should affect pricing. If more designing or developing is needed, *the additional time needed should be added to the pricing, at least to some extent*. Using APIs to speed up the projects the interviewee categorised as being idealistic.

A third interviewee reminded that that the *definition of policy of what the company does, dictates completely what is designed*. A digital media company like Satama can either create new business ideas and enhance company processes, or focus on creating standardised products that can be sold and resold to clients. Not innovating may lead to a situation, where a company like Satama cannot *"renew itself and become a company of the next generation" (Strategist, Amsterdam)*.

4.2.4 Effects of changes in development

According to the interviewees, the new techniques and ideas affiliated with Web 2.0 allow developers to implement designs that are more complex. As always, the designs must be implemented within the allocated time. This requires the designers to have a good understanding of Web 2.0 techniques and technologies, so they know what is easy and fast to develop. One interviewee pointed out that if the designs are unfeasible within the limits of the budget, the designs often need to be revised to produce a doable design. Another interviewee stated that because of the reasons above, both *designers and developers should be allocated more time to do their work*.

New skills and more knowledge are required from the developers to be able to implement the new designs. Developers also need to renew their way of creating the websites, by using new tools such as JavaScript libraries.

JavaScript libraries

The rise of JavaScript libraries has made it possible for one person to reach the same result in mere hours that would a few years ago required months of work from a skilled development team. Even though this is clearly a benefit for developers and designers, it also creates new problems: JavaScript libraries cut down on the work developers have to do only in the case that the required feature is doable with the selected library. The libraries are often thousands of lines of code long, so *if the library does not offer the wanted features, a lot of work is needed to tune up the library to get to the desired outcome*.

One of the interviewees said that using code libraries makes the work easier for both the developers and the designers. Designers can use standard solutions and components as a part

of their designs, and developers can reuse the components and elements found in JavaScript libraries. *Standardised elements make the designers' work easier*, as they do not have to create new solutions from the very beginning, but they can use the acknowledged practices that they know are usable and create a nice user experience. The same applies to developers, as they can reuse the code snippets they have used in earlier projects. Still, using non-standard solutions is also possible, but as it requires more work, it also shows in pricing.

Another interviewee also noted that JavaScript libraries are often a lot better than a small or medium sized company could do:

> *I think there are only a few, say hundreds or thousands of developers that can really create excellent JavaScript libraries, rather than millions. And we are the millions, we are not one of the hundreds or thousands that can do this. We have to stick with this that other people come up with. (Technical Consultant, Amsterdam.)*

The interviewee continued to point out that there only a few libraries are good enough to be used professionally. The libraries have to be actively developed, preferably by a large company with a large group of developers and a good documentation for it to be reliable enough.

> *We are currently using the Yahoo! library, which seems to work pretty well. Of course, it's a big name, there are multiple developers from Yahoo! working on this. They use it themselves on pretty large sites. It gives you confidence, and that's something you need. You cannot rely on your local gardener-developer from Kazakhstan who developed this "great, great library". (Technical Consultant, Amsterdam.)*

According to the interviewee, also the large libraries have problems: they are often too big to be used to solve a small problem.

> *If you want this tiny thingy, you have to include this 200k library. That doesn't work. That's too much, it's overkill. (Technical Consultant, Amsterdam.)*

Two of the interviewed designers said that they do not think that much about how the actual implementation process goes. The designs are done from the client's perspective, not from the developers' perspective.

> *My experience is that I didn't have to do much with these libraries, it's something the developers have to worry about. I just design the way I think it should work. And then communicate if it's technically feasible to implement it that way. I personally don't worry that much about the libraries. (Senior Designer, Amsterdam.)*

Some of the interviewees stated that this is the biggest problem: *designers do not know or understand the technical part of the web design*. Designing without understanding the implementation process causes additional work for the developers, as they have to spend more time on the designs. The other option is that the design is returned to the designers for a redesign, as what they have planned cannot be built within the limits of the budget. One of the

interviewee noted that this is not a Web 2.0 specific problem, but Web 2.0 just heightens the effects, as there are many new things to be learnt.

Finding 19: JavaScript libraries make creating standardised complex applications easier.

Finding 20: If an exact feature is not supported by a JavaScript library, creating it may require a lot of additional work.

Finding 21: Designers need more knowledge on JavaScript libraries.

APIs

Some of the same issues that are related to JavaScript libraries are also associated with APIs: designers do not know enough of the technical part.

> *The bigger problem there is that none of the designer ever looks at the tech guys at all. I mean, ask around [...] [designers] don't even know what an API is. (Design Director, Amsterdam.)*

As APIs can be modified only to a certain extent – to the limit their owner allows them to be modified – even more knowledge is required from the designers. According to one interviewee, designers' limited knowledge on new technical issues often limits their designs.

> *Either they don't know what is possible, or they do know it but they don't know how to design it in such a way that we can implement it. Or they think they don't know it can be implemented, so they don't design it. (Technical Consultant, Amsterdam.)*

Designing with APIs also limits the things you can design, and as such, it changes the way of designing. Instead of creating a design from the beginning, the designer must find the ways to form the desired outcome within the limits the API sets. Like one of the interviewee put it,

> *You become the slave of what somebody at Microsoft, Google or Yahoo! has done. You can't design as freely as you used to, change buttons and navigational arrows even though you could do it earlier. It becomes more like software design, tailoring the applications. (Strategist, Amsterdam.)*

According to some of the interviewees, also APIs and mashups change the design process, as they make creating service innovations faster than ever:

> *If you know the APIs and their specs and have some technology skills, you can create service innovations faster than ever. You don't have to buy a video server or a community server, or even a CMS. A two-person company can set up such a service, that previously everybody would have wondered how that is possible. [...] If you are ready to live with that it doesn't look completely like you would have made it, you can innovate faster than ever. (Strategist, Amsterdam.)*

Not all interviewees did however agree on APIs speeding up the design process:

> *There will always be idealists who say that "we take this from Digg and read that from Flickr and get those feeds from Google". It's very easy to create specs for systems on this level. [...] It takes a lot of effort to make these things work smoothly and properly. (Director, Helsinki.)*

One interviewee noted that the model where designers create the concept and the developers implement it must become more collaborative – people from design and from development must interact more.

> *The designer must be determined, to want to carry out his designs, but the coder must realise that he is also a designing the product. Web 2.0 is after all so technology-led with APIs and all, that the tech-designer-coder must be able to tell the designer "Your dream is cool, but it can't be done. I found another way to do it". Or when implementing the designs, tweaking it to create an even better product. (Strategist, Amsterdam.)*

The interviewee continued to describe a successful Web 2.0 project as a return to the roots of web design business:

> *When we created Satama.nl, design and tech were interacting really well, thinking about the possibilities, building them and testing the code out. It became more like the way it was in the beginning of the Web, when everybody was multiply skilled and participated in other competences' work. Coders created concepts and conceptual planners wrote code, and it was all quite natural. (Strategist, Amsterdam.)*

Five of the interviewees said that the changes in the technologies and the increased interaction possibilities create a *need for more communication and interaction between designers and developers*. This would increase both competences' understanding of the other competence and improve the both the designs and their implementation. This could reflect to the design process as increasing the developers' input in the early phases of the project and the designers' input in the later phases of the project.

Finding 22: Designers need more knowledge and skills on working with APIs.

Finding 23: More studies are needed on the effects of APIs and mashups on the design process.

4.3 Effects on deliverables

This chapter discusses the effects of Web 2.0 on individual deliverables. The graph below illustrates the discussed area of research.

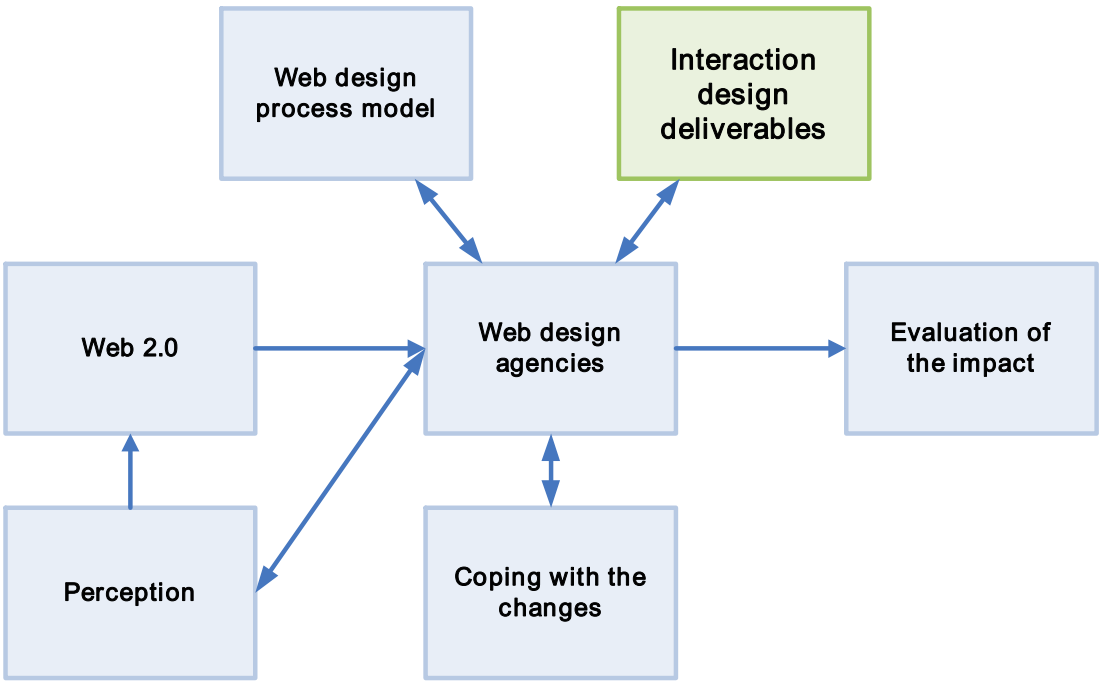


Figure 11: Research objectives: Interaction design deliverables

4.3.1 Effects on user studies

According to all of the interviewees, there are *no notable changes in user studies caused by Web 2.0.* Independent of the techniques used, the users still have goals, and the laws of usability stay the same. However, according to the survey, *there is a change in the user goals, and this reflects on designing websites*:

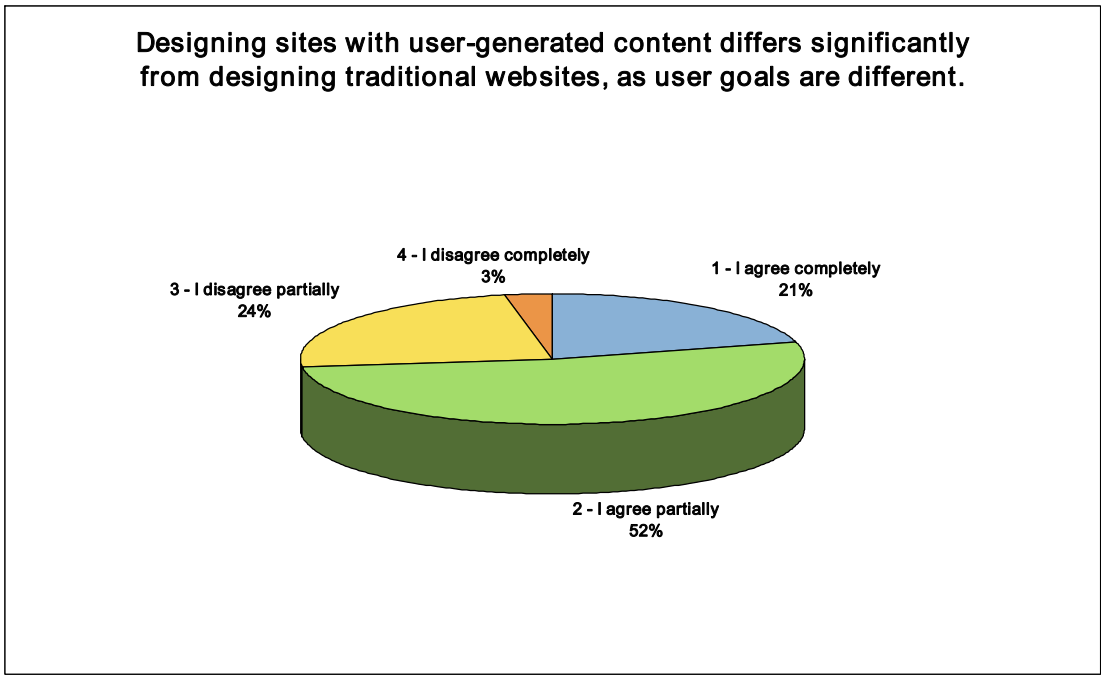


Figure 12: Altered user goals change designing (n=66)

Seventy-five per cent of the survey participants thought that shifting user goals change designing websites. The interviewees agree with the survey participants on the point that even though if there are no changes in the way the studies are conducted, more user studies may be needed due to new user goals. This is, however, only an indirect effect of Web 2.0, says one interviewee:

> *Maybe [user studies] change because it's a different kind of application, that people use in everyday lives, or extensively, every day, maybe another sort of testing for people visit the site once a month. Depends on more those kind of issues than whether it is 1.0 or 2.0. (Senior Designer, Amsterdam.)*

In addition, the complexity of Web 2.0 sites may also increase the time needed for testing.

> *It's never been one-way only, but there has been change from waiting for something to be shown to you to actually interacting with the site. Naturally that needs more testing, if you want to create a good solution. [...] Especially because there are no established or fixed solutions on how to do them. (Director, Helsinki.)*

According to the interviewees, the *lack of standardised solutions in relations to the new user interface concepts also creates the need for additional testing*. To cut down on the excess usability studies, the best practices should be inventoried and reused in other projects. Designers should gather more knowledge on the best practices, either by conducting usability studies or following up on studies done by other people. One interviewee especially stressed the importance of studying the motives of social media usage, so that they can be capitalised in the best possible way.

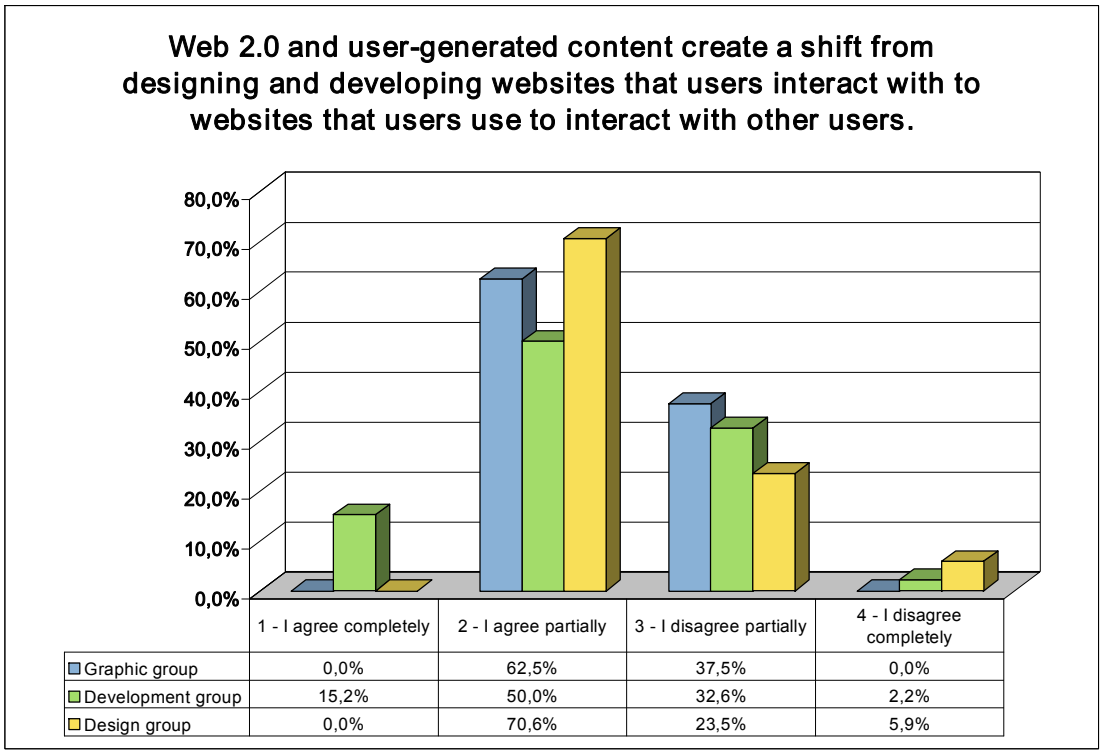
Finding 24: The way of conducting user studies does not change.

Finding 25: Additional user testing is needed, as new interface concepts have not been proven usable.

Finding 26: Changes in user goals require an enhanced focus on user studies.

Designing interactions between users

The survey participants were asked if they agreed with the argument that Web 2.0 and user-generated content create a shift from designing interactions between users and a system to designing interactions between users, mediated by the system:



	1 - I agree completely	2 - I agree partially	3 - I disagree partially	4 - I disagree completely
Graphic group	0,0%	62,5%	37,5%	0,0%
Development group	15,2%	50,0%	32,6%	2,2%
Design group	0,0%	70,6%	23,5%	5,9%

Figure 13: Shift from user-website interaction to user-to-user interaction (n=71)

Sixty-five per cent of the survey participants agreed with the argument. Like with previous questions, the Development group's votes were scattered to a somewhat wider area than with other disciplines. The Development group was also the only group that had members that agreed completely with the argument. When looking closer at the Development group, it can be seen that almost all competences in the group had people agreeing completely. As many as 25 per cent of Software architects and 20 per cent of Interface programmers agreed completely with the argument, whereas only one Technical consultant disagreed completely with the argument.

Even if the survey participants' opinions were somewhat scattered, so were the interviewees' views on the issue. Two out of six interviewees agreed with the argument, two disagreed, and two stated that they both agree and disagree.

The interviewees disagreeing with the argument stated that even if user goals change, users still use the user interface to communicate with each other. If the user goals are communicating with other users, that must be taken into account.

I think it is very poetic that we now design a different barrier, a different interface. [...] But I think that the domain changes a bit, but not that it is a different ballgame. It's still design, still trying to analyse the goals of the users, what they want to achieve, what their problems are, what their barriers are, and try to come up with a good solution. (Senior Designer, Amsterdam.)

The comments advocating the argument stated that users' goals are more social than before. Designers thus need to focus more on not only enabling users connecting with each other, but also the social aspects and the social goals of users.

I think it is back to understanding how people socialise together. [...] It's a lot about status in social things. As designers we have to think about topics like that, how to influence it and which kind of functional things we offer in how to make it nice. (Design Director, Amsterdam.)

Finding 27: An additional social dimension is added to interaction design regarding sites with user-generated content.

4.3.2 Effects on information architecture

According one of to the interviewees, information architecture and navigation has to change from traditional information hierarchies due to larger amounts of information. The traditional information models no longer work in a world of user-generated content:

Nowadays [using traditional information hierarchies] is not possible in any way in the UGC world, because everything is in the net and in a cloud. We have to use some pretty creative metadata solutions, think more and more how to link, to know where the users come from. (Director, Helsinki.)

This means creating new navigational models to adapt to user-generated content and increase in the volume of information. The new methods and navigational models have to be more pliable than the strict structures of traditional taxonomies. The designer must be able to create a more general outline for organizing the information on the site.

Navigational solutions just need to become different. The masses of information are so huge, that otherwise nothing works logically. (Director, Helsinki.)

You don't know how to organise all the content in a right way, because you don't know what the content is they're going to produce in some of the places. (Design Director, Amsterdam.)

However, as one interviewee pointed out, tagging does not solve problems of categorising content:

I think now people are starting to realise that tagging is not the solution taxonomy problems. Tagging is good for certain things and taxonomies are good for other things. (Design director, Amsterdam.)

Finding 28: New navigational models are needed to cope with user-generated content and increased volumes of information.

4.3.3 Effects on wireframes

The biggest changes in deliverables interaction designers do were seen in wireframes and prototypes. In static websites, every time a link is clicked, the whole page is reloaded, so they are easy to describe in static wireframes. With dynamic pages created with for example Ajax, elements of the page can be loaded without the whole page being loaded, even without the user doing anything. The designer must then design the page as a whole, but also include the dynamic elements' different stages in the designs. However, this change was not seen as a very significant one by any of the interviewees:

> *I don't see it as big deal, because usually it's like a component on a page which has some behaviour, so you just lift out that component and write the storyboard for that component. I think it will probably require some minimal adaptations. (Design Director, Amsterdam.)*

Describing the dynamic elements may be quite straightforward, but as one of the interviewees suggests, presenting them to the client may be quite a bit more difficult. *Clients tend to get frustrated with extremely long specifications*, and end up just thumbing through the documents. This often results in the clients misunderstanding the specifications and being disappointed when they see the finalised product.

> *In my opinion it would be better to give the client an interactive, clickable prototype than the traditional 50-page specification. If you start to define each and every element one by one with text and illustrations, it easily grows up to 100 to 150 pages. (Director, Helsinki)*

Another change in wireframes is caused by the possibility to create richer user interfaces using animations, transitions and new user interface metaphors, such as dragging and dropping.

> *It can't be that you have three different pages where you see this block moving from one point to another, which indicates that it is something you can drag. There has to be another format for displaying this kind of information, because that makes your document very large and incomprehensible. (Technical Consultant, Amsterdam.)*

One interviewee came up with the solution that designers, developers and graphical designers should create a symbol library that would be used in the wireframes.

> *There has to be some kind of format we find for something that is draggable or something. Different borders, different shade of grey, which indicates that this will be draggable. [...] We have to just come up with a few, like fade-in, fade-out, moving, slides, that kind of things that would just work. (Technical Consultant, Amsterdam.)*

A symbol library would help in creating and understanding the designs, but that still would not solve the problem of presenting the designs to the client. If a wireframe with these symbols would be given to a client, they would have to not only understand the symbols, but also have in-depth knowledge on how they work what they would look like after implementation.

Using specific symbols in the wireframes would also need the solutions to be standardised so that both design and development teams would know exactly what each symbol means. It is not enough to state that a certain elements are draggable, it still needs to be defined where they can be dragged, how that information is shown to the user and if there are transitions or animations used.

Finding 29: Wireframing dynamic content is considered not to be a significant change.

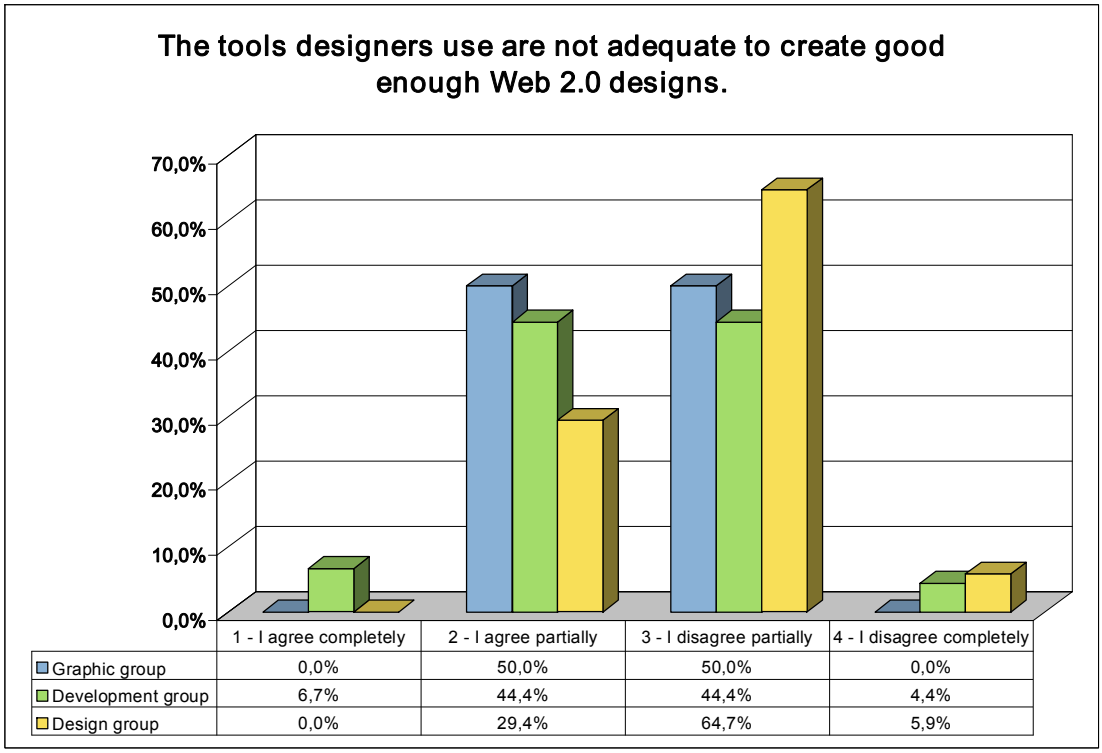
Finding 30: The ability to describe animations and new kinds of functionalities easily in wireframes is needed.

Improved prototypes

In addition to the changes in wireframes, two of the interviewees stated that *there is a need to improve the way prototypes are made*. As static wireframes no longer present the design documentation clearly enough to clients and developers, prototypes could be used instead.

However, the more dynamic the designs are, the more difficult it is to create prototypes from them. According to the interviewees, *tools that help in creating prototypes are needed*. Currently, prototypes can be produced easily only if the designs do not contain any dynamic elements. One interviewee noted that when the client is not sure of what they want, prototypes might need to be done more often. With these clients, more iteration rounds are needed to reach the wanted outcome, and the prototypes are needed to test and demonstrate the ideas.

The survey respondents were asked whether they thought the tools designers use are not adequate to create good designs:



	1 - I agree completely	2 - I agree partially	3 - I disagree partially	4 - I disagree completely
Graphic group	0,0%	50,0%	50,0%	0,0%
Development group	6,7%	44,4%	44,4%	4,4%
Design group	0,0%	29,4%	64,7%	5,9%

Figure 14: Designers' tools (n=70)

The Graphic group and the Designer group and developers were somewhat indecisive on the argument: the votes were quite evenly distributed between agreeing and disagreeing. However, designers were more opposed to the argument. *Less than one third of designers thought that the designers' tools are not adequate*.

The interviewees mostly agreed with the survey results. Even though the tools currently in use are not perfect, they are the best there is. According to the interviewees, Visio, the *de facto* wireframing tool of many agencies is the best tool there currently is for creating quick drawings essential for wireframes. Even though there are issues Visio is not able to solve, such as dynamic contents or transitions, there are no better tools currently available. According to the interviewees, even though there are no better tools now, new tools should be tested and tried out.

Finding 31: Dynamic prototypes should replace static wireframes as the means of describing designs to a client.

Finding 32: Prototypes need to become easier and faster to create.

Finding 33: There is a need for better tools, but at the moment, no better tools exist.

4.4 Coping with the changes of Web 2.0

This chapter discusses the means how a web design agency should cope with the possibilities and challenges Web 2.0 presents. The chart below illustrates the area of research presented in this chapter.

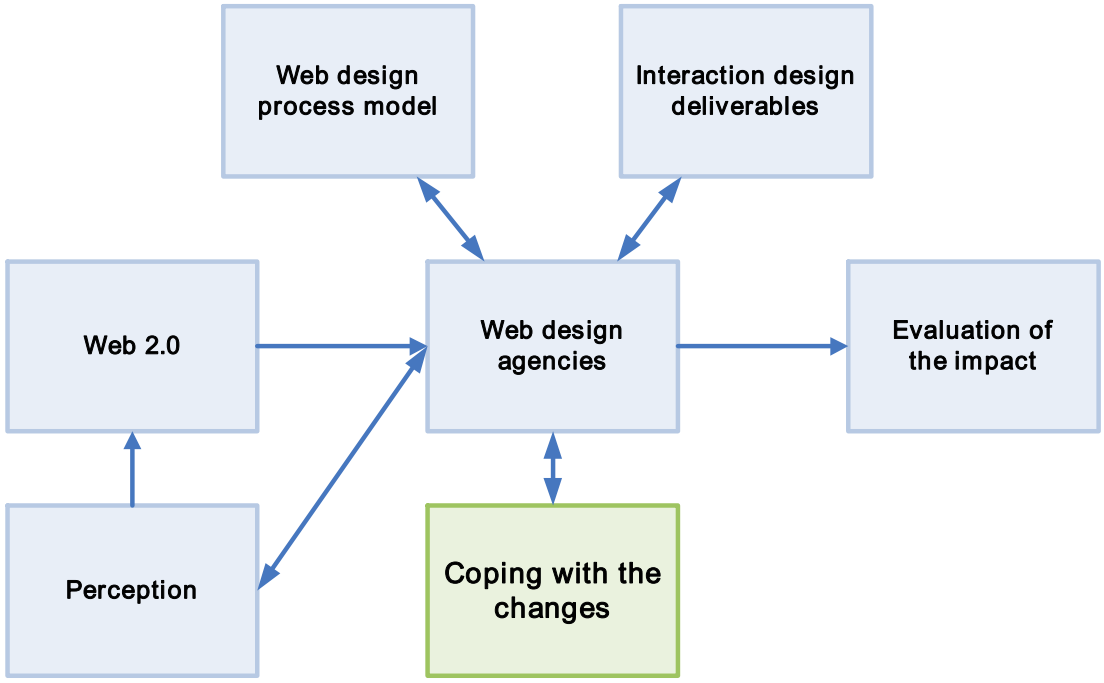
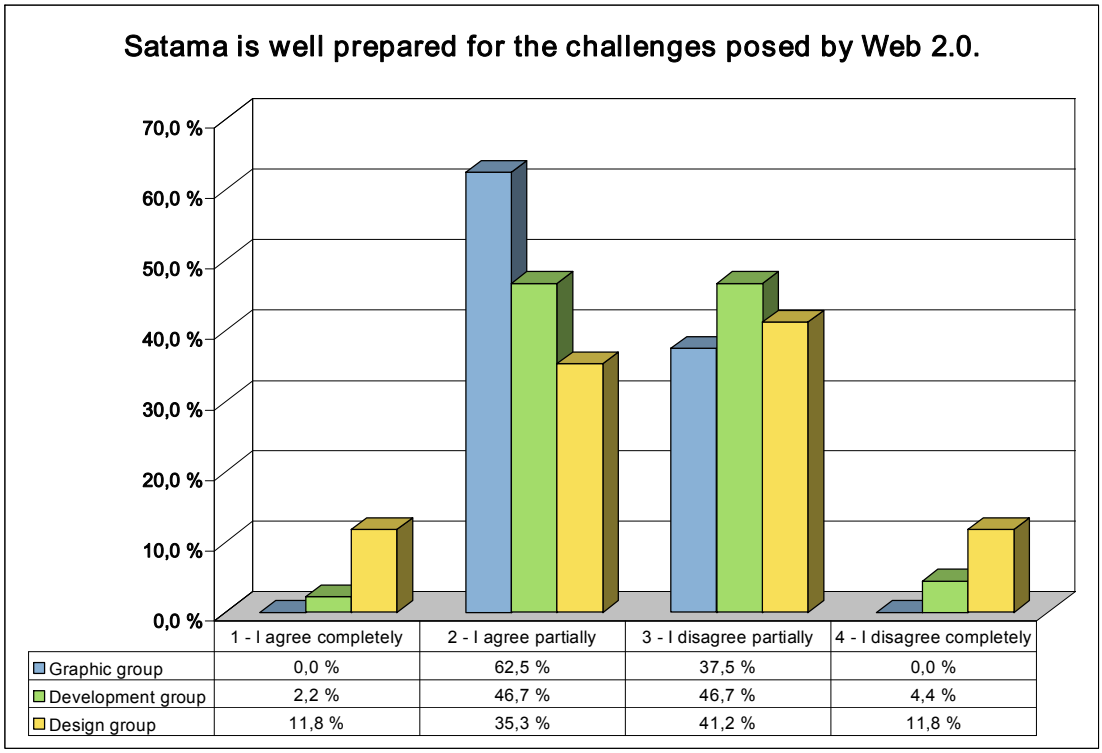


Figure 15: Research objectives: Coping with the changes

4.4.1 A need for additional measures

The survey participants were asked if they thought that Satama is well prepared for the challenges posed by Web 2.0:

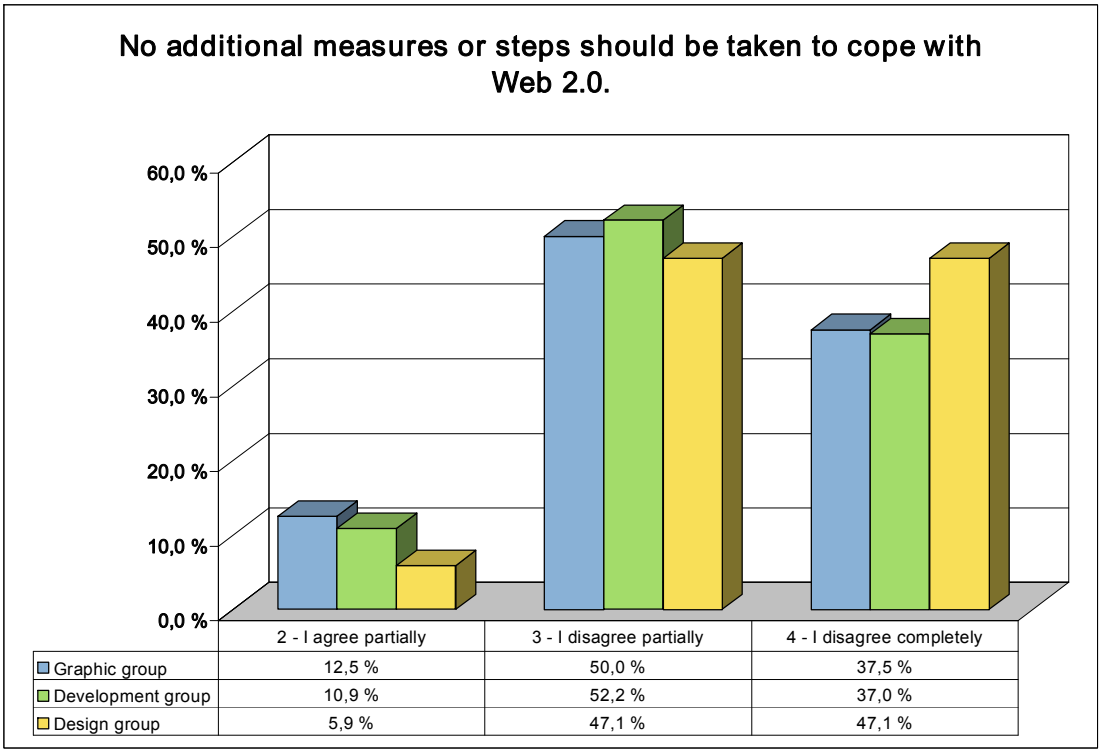


	1 - I agree completely	2 - I agree partially	3 - I disagree partially	4 - I disagree completely
Graphic group	0,0 %	62,5 %	37,5 %	0,0 %
Development group	2,2 %	46,7 %	46,7 %	4,4 %
Design group	11,8 %	35,3 %	41,2 %	11,8 %

Figure 16: Preparedness for the challenges (n=70)

In total, the votes were cast quite evenly on both disagreeing and agreeing: 51 per cent of survey participants agreed with the statement, whereas 49 per cent disagreed. The Graphic group was somewhat more positive on Satama's preparedness, whereas the Design group was slightly more negative. The votes were mostly concentrated on the two middle alternatives with fewer votes in each end of the scale. However, the Design group's votes were scattered more than the other groups' votes. When taking a closer look at the Designer group, it can be noted that Concept designers agreed more with the statement, whereas User interface and Interaction designers disagreed more; *over 70 per cent of User interface designers and Interaction designers disagreed with the argument.*

Even though the survey participants thought Satama was somewhat well prepared to the challenges of Web 2.0, they still thought that the company should take additional steps to cope with the phenomenon:



	2 - I agree partially	3 - I disagree partially	4 - I disagree completely
Graphic group	12,5 %	50,0 %	37,5 %
Development group	10,9 %	52,2 %	37,0 %
Design group	5,9 %	47,1 %	47,1 %

Figure 17: Need for additional coping measures (n=71)

Each survey group answered the question nearly identically: *approximately 90 per cent of each group thought that additional measures are needed*. The Design group was the most opposed to the argument with almost 50 per cent disagreeing completely and only approximately five per cent agreeing in any way. Not a single survey participant agreed completely with the argument.

The survey results were backed up by the interviews, as all of the interviews came up with ideas for improvements.

Finding 34: Additional measures are needed to cope with Web 2.0.

4.4.2 Designers' knowledge

The Interaction designers and User interface designers participating in the survey were asked to rate their own and their peers' skills in using Web 2.0 elements and in using user-generated content in their designs.

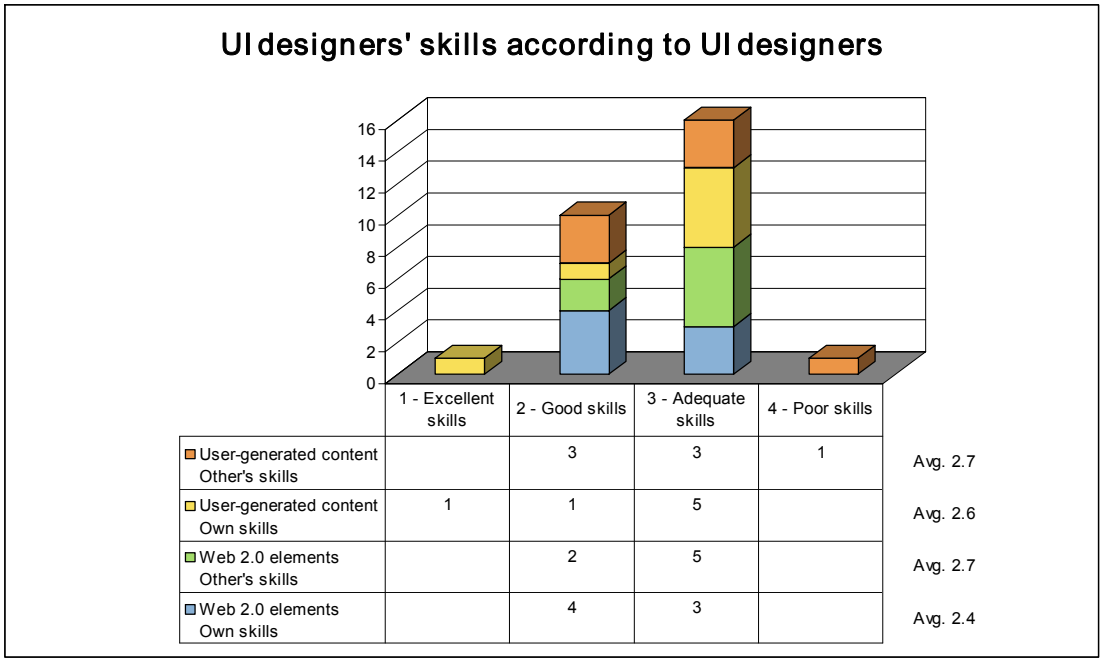


Figure 18: Interaction designers' skills (n=13)

In general, designers gave other designers better grades than themselves. When looking at skills in user-generated content, most *designers rated themselves to have adequate skills, but others to have good skills.* The average self-assessment grade for user-generated contents was 2.7, whereas the grade given to others was slightly better, 2.4. Even though the difference is small, converting the averages back to grades would mean that *designers as a whole grade themselves to have adequate skills and other designers to have good skills in designing sites focused on user-generated content.*

The trend was not as strong in Web 2.0 elements. The self-assessment votes were tied between good and adequate skills, but one vote for poor skills tipped the balance towards poorer skills. When rating the skills of other designers in relations to Web 2.0 elements, adequate skills got the most votes, but also one vote was given to excellent and to good skills. On average designers graded themselves with the grade of 2.7 and others with the better grade 2.4. Changing the averages back to grades shows that *designers give themselves and other designers the grade of good skills in using Web 2.0 elements in their designs.*

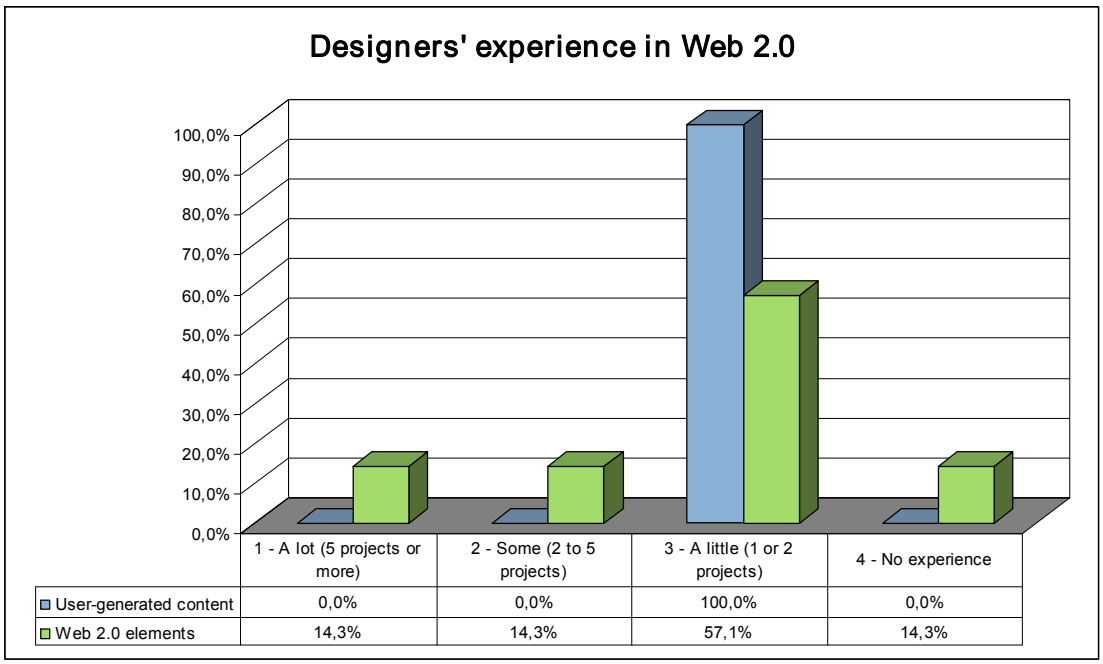
Even though the overall grade designers gave themselves is the second highest, there is some dispersion in the votes from good skills to poor skills. This infers that the *skills in using Web 2.0 elements in designs are not equally divided between designers*; whereas some designers gave themselves a good grade, also the lowest possible grade was voted. In addition, not a single designer rated their skills to be excellent.

Finding 35: Interaction designers and User interface designers have overall good skills in designing sites focused on user-generated content.

Finding 36: Interaction designers and User interface designers have adequate to good skills in using Web 2.0 elements in their designs.

Designers' experience

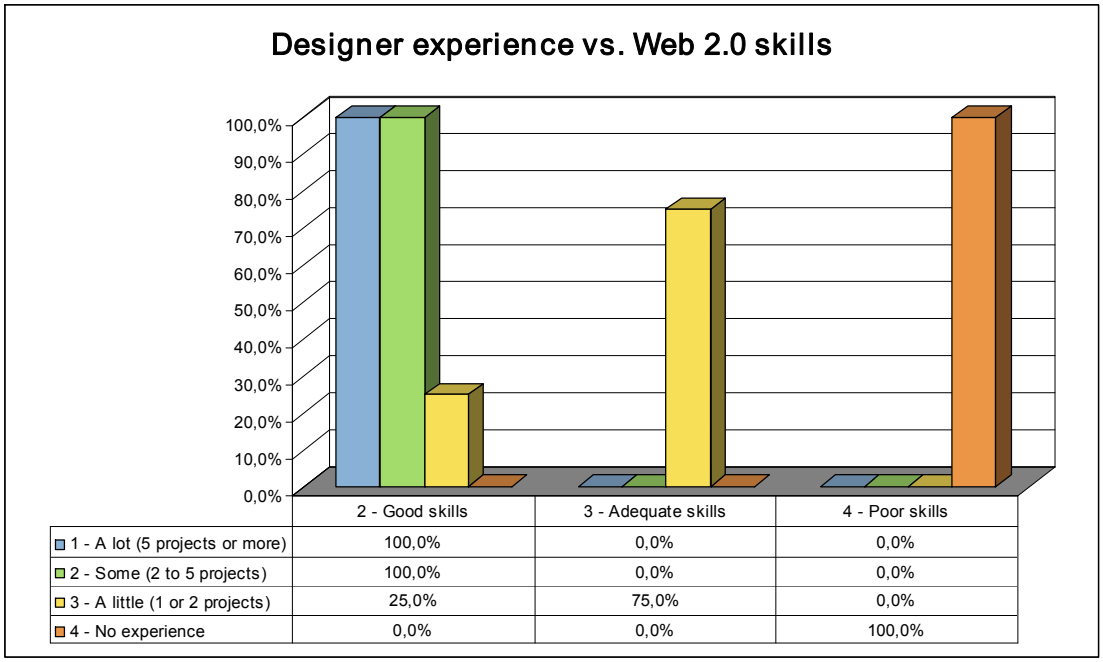
The Interaction designers and User interface designers participating in the survey were asked about their level of experience in using Web 2.0 elements and in designing sites with user-generated content:



	1 - A lot (5 projects or more)	2 - Some (2 to 5 projects)	3 - A little (1 or 2 projects)	4 - No experience
User-generated content	0,0%	0,0%	100,0%	0,0%
Web 2.0 elements	14,3%	14,3%	57,1%	14,3%

Figure 19: Designers' experience (n=7)

All interviewees stated that they have participated in one to two projects designing websites with user-generated content. The experience level in designing Web 2.0 elements was much more diverse. Most designers had a little experience, but also all other alternatives received votes. When studying the designers' experience level in relations to their skills in Web 2.0 elements, as can be expected, *the designers' experience level correlates with their skill level*:



	2 - Good skills	3 - Adequate skills	4 - Poor skills
1 - A lot (5 projects or more)	100,0%	0,0%	0,0%
2 - Some (2 to 5 projects)	100,0%	0,0%	0,0%
3 - A little (1 or 2 projects)	25,0%	75,0%	0,0%
4 - No experience	0,0%	0,0%	100,0%

Figure 20: Designer experience vs. Web 2.0 skills (n=7)

As can be discovered from the graph above, the designer who had no experience in designing Web 2.0 elements also had poor skills in designing them. Correspondingly, three out of four designers with only a little experience rated themselves to have adequate skills – the second lowest grade. The most of the designers rating themselves to have good skills also had participated in more than two projects. It can be inferred that in order to become better in designing Web 2.0 elements, *the designers need more experience* – more Web 2.0 projects.

Finding 37: More projects using Web 2.0 elements are needed to enhance the Interaction designers' and User interface designers' skills.

More trials

The survey participants were also asked if they thought that Web 2.0 projects should be actively promoted to clients:

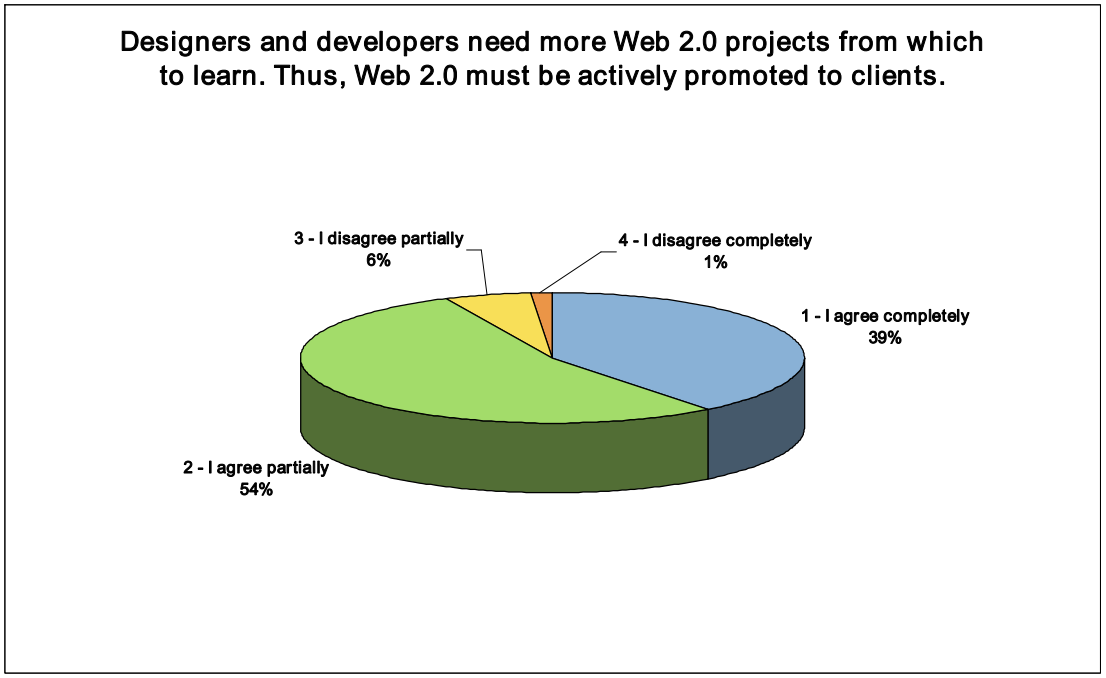


Figure 21: Promoting Web 2.0 to clients for trial projects (n=71)

As shown by the graph above, *over 90 per cent of all survey participants thought that more Web 2.0 projects are needed*, and to achieve that, they must be promoted to clients. This was backed up by the survey participants' textual input:

> *Satama should get projects which allow us to build experience in the field (Survey respondent. Interaction designer, Amsterdam).*

Interviewees agreed that more trial projects are needed.

Designers and developers need more Web 2.0 projects from which to learn. Thus, Web 2.0 must be actively promoted to clients.

> *We have to look for those kind of projects, and try to develop the process as needed to be more effective. [...] Of course in general it's a good idea to do some pilot projects to try to get some more experience. (Senior Designer, Amsterdam.)*

Non-client trial projects were also supported by the interviewees, but many of them raised the question that how can they be funded:

> *It's more a question of whether is financially feasible. Best thing of course is to do projects, try to get clients to do projects that also help us in coming better in Web 2.0 design. (Senior Designer, Amsterdam.)*

Interviewees proposed that some smaller tryouts could be done without a client, and then use the new elements in projects that are more traditional to enhance the user experience. Also monthly innovation workshops were suggested, but that would require enough time to be

provided for that. One interviewee suggested that management should support more creating innovations out of the new technologies and possibilities:

> *It should start from the management. They should give designers a budget they can tinker with, and have the chance to go over the issues with the developers, to try and to do. [...] This emerges from encouraging, developing, giving time and being ready take some risks. It shouldn't be managed in a way that it has to generate millions in the next six months. Then the risks terrorises the whole project. (Strategist, Amsterdam.)*

One interviewee suggested a kickback structure to be used in to client projects where the design company gets a part of the profit the client gets for selling more:

> *So no cure, no pay, more or less. Or not so much cure, less pay. I don't think we should do it entirely for free and only do a kickback, because then the process would be very horrible. (Technical Consultant, Amsterdam.)*

Finding 38: Web 2.0 projects should be actively promoted to clients.

Finding 39: More time should be allocated to trial projects and creating innovations.

Selling Web 2.0

The interviewees agreed that the buzzword Web 2.0 is not a very good selling tool. They stated that the company must sell innovations and better service, and use Web 2.0 techniques and technologies to achieve that, and only use the buzzword if the client is interested in it.

> *We should sell the innovations and better service, and slip [Web 2.0] in it. We should skip the whole 2.0-hype, but still use the technologies in it. (Strategist, Amsterdam.)*

One interviewee suggested that the company should make case study, illustrating how the new technologies and techniques actually benefit the client. The real numbers could then be used to back up selling with future clients.

> *We should make a case for our customers that says that you have your regular e-commerce website, which has this and this many steps, and you see that every step so many percentage drops off, because your sales flow is just too difficult to complete. First we have to measure this, persuade the customer to do a redesign, and see that we are able to deliver a better sales process, where less people drop off, so the customer gets more sales. (Technical Consultant, Amsterdam.)*

Clear sales arguments were demanded from also other interviewees:

> *To us it is imperative that our arguments are clear why this is a good thing, so our sales department can sell this stuff. And in addition to that we need the skills to create these things. (Director, Helsinki.)*

Finding 40: Clear, rationalised sales arguments are needed to sell Web 2.0.

Understanding technical issues

The survey participants were asked whether they think designers need to understand the limitations of Web 2.0 to create designs that are easy to develop, and whether they think designers should understand the possibilities of Web 2.0 to create innovative designs.

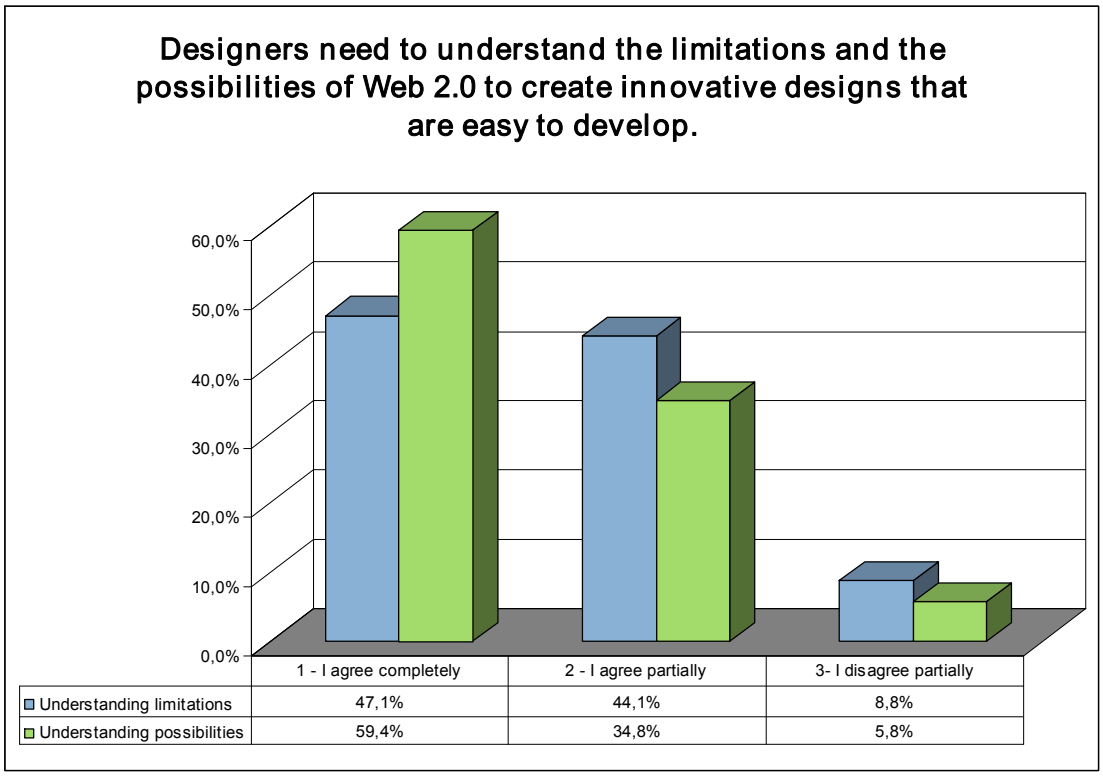


Figure 22: The need to understand limitations of possibilities (n=68)

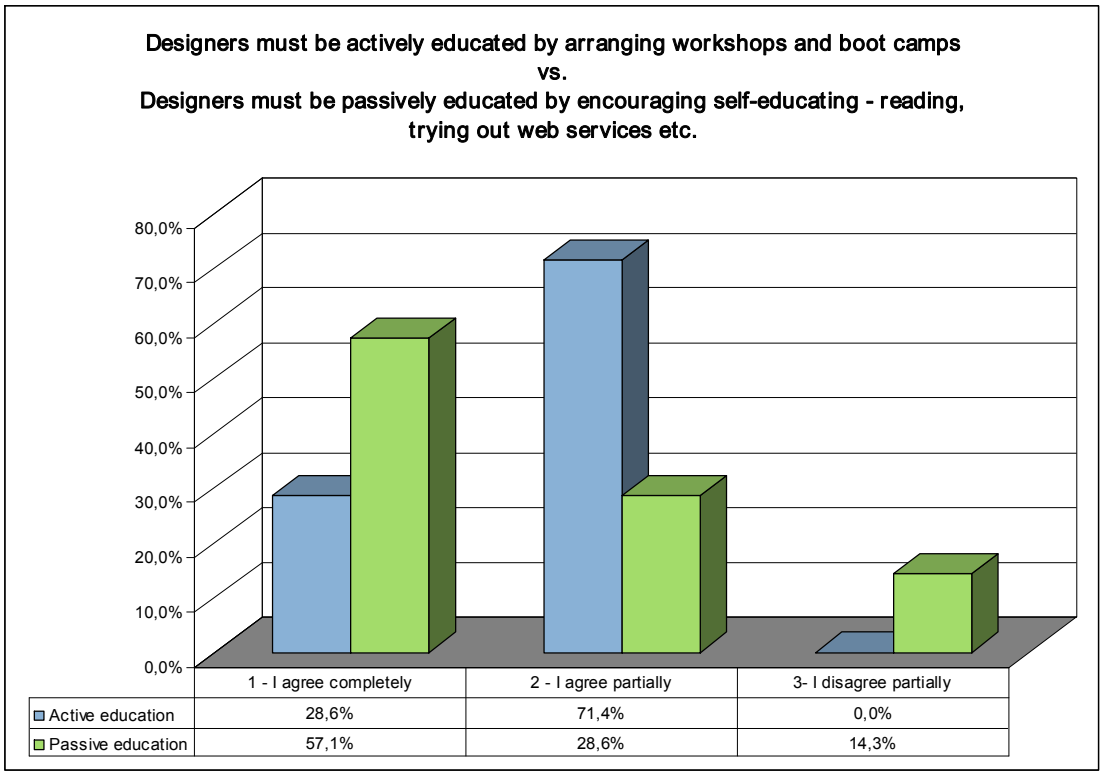
The two questions (combined in the graph above) have quite similar answers: in both questions, over *90 per cent of participants answered that designers need to understand the limitations and possibilities related to developing*. However, many interviewees stated that designers do not have a clear understanding on the technical issues of Web 2.0:

> *The problem is that designers, as I said, they don't even know what an API is. (Design Director, Amsterdam.)*
>
> *It starts with the user interface designers of course. They should have a better understanding why certain Web 2.0 things help make their work more easy, for the solutions they use. (Technical Consultant, Amsterdam.)*
>
> *Designers should know what can be done, what things are easy and fast to do and what are not. Designers should have a better grasp on what is technically sensible. (Director, Helsinki.)*

Finding 41: Designers need a better understanding on the technical limitations and possibilities of Web 2.0.

Educating designers

The designers who participated in the survey were asked if think designers should be educated passively, encouraging self-education, or actively, by arranging workshops and boot camps.



	1 - I agree completely	2 - I agree partially	3- I disagree partially
Active education	28,6%	71,4%	0,0%
Passive education	57,1%	28,6%	14,3%

Figure 23: Educating designers (n=7)

As the graph above shows, approximately 85 per cent of all designers thought that self-education should be encouraged. Active education got even more support. All designers thought that workshops and boot camps for designers should be increased. However, the people who agreed with encouraging passive education were more enthusiastic towards it; over 50 per cent of all designers agreed completely with the argument that that self-education – reading articles, trying out web services should be encouraged.

One interviewee stated that designers should have curiosity to find out new things that interest them and share it. People should be encouraged to self-study, but it should not take too much time out of peoples' work:

> *Everybody spends time doing personal stuff.[...] If I say that you have one hour per day to look around, then there is one hour to look around, then the additional hour to read the email and do the personal stuff, and then there's only six hours left. So I don't think from a business perspective we're going to formalise it. But we will encourage people to stay up-to-date. But I don't think giving people time is the right way. (Design Director, Amsterdam.)*

Finding 42: Designers should be encouraged to educate themselves, but also active education sessions should be arranged.

4.4.3 Communication and information sharing

To educate designers in technical issues, developers are in key position. Both interviewees and the survey participants pointed that communication between the two competences should be enhanced dramatically.

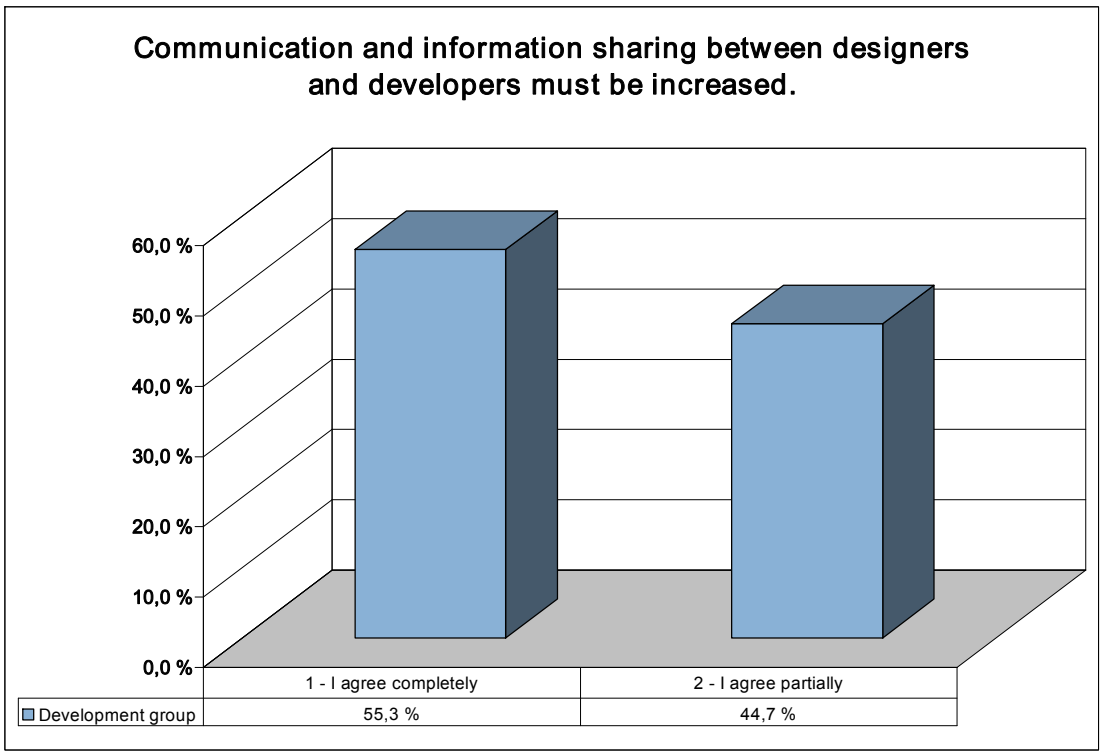


Figure 24: Communication and sharing information between designers and developers (n=38)

All developers and designers agreed with the argument that communication must be increased, and over 50 per cent agreed completely. This was also supported by textual input from the survey, as well as by the interviews.

> *We need to increase interaction in every possible way between designers and developers! (Survey respondent. Technical Consultant, Helsinki,)*
>
> *At the moment, there is a lot of just hand over -kind of mentality: we designed this, now go and implement it. [...] The two competences should overlap a lot more. [...] I think it would be good for developers with experience in design would collaborate with the designers, and designers would be more actively checking out the things developers do. (Director, Helsinki.)*
>
> *Of course we should talk more, always, certainly during the start of a project. We're at the end, most of the time, of the phases of the project, so we end up with the bullshit that*

has been created all along, and we have to solve this or implement it. (Technical Consultant, Amsterdam.)

The model where a designer creates a concept which is then delivered to tech department to be implemented as literally as possible with a CMS, it has to change. The interaction between the two competences must be absolutely incredible. (Strategist, Amsterdam.)

I think [communication] is missing right now. The developers do not push us into better solutions. Right now, probably we come up with an idea, and then the developers look into it if it is possible. It would be best, if they said "if you do like this, it would be better". That's the verbal base. There's some improvement [needed] in that area. (Senior Designer, Amsterdam.)

The same kind of results, yet not so enthusiastic, came from the question whether communication and information sharing between designers should be increased:

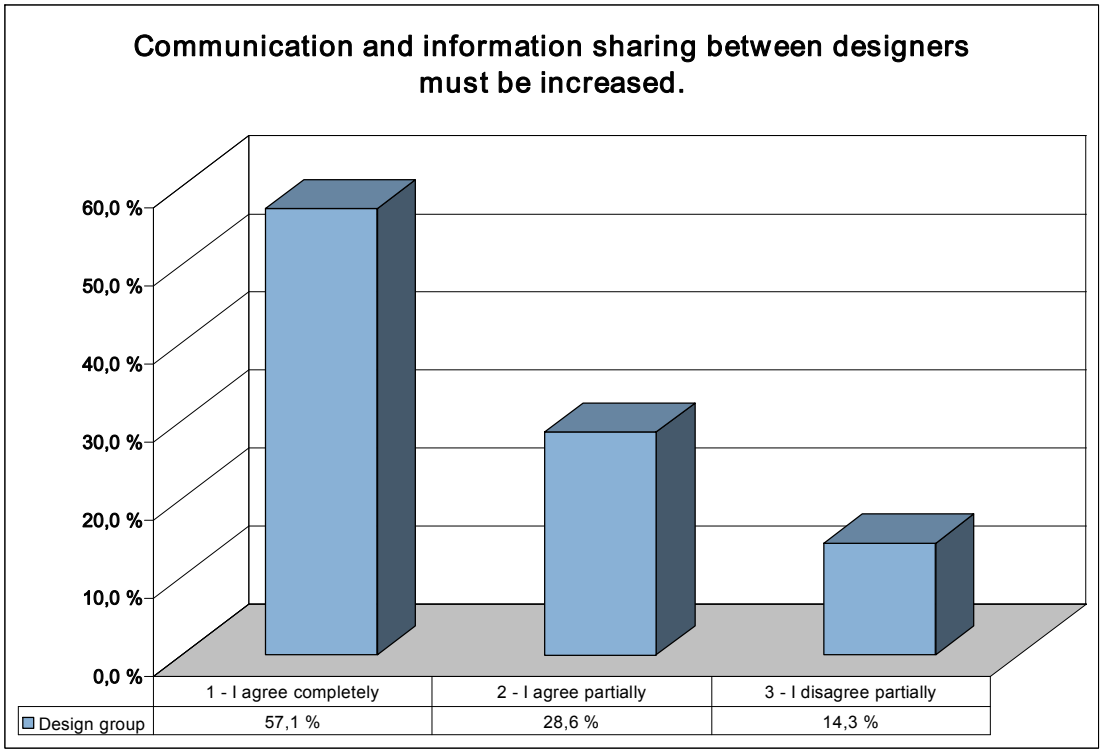


Figure 25: Communication and sharing information between designers (n=38)

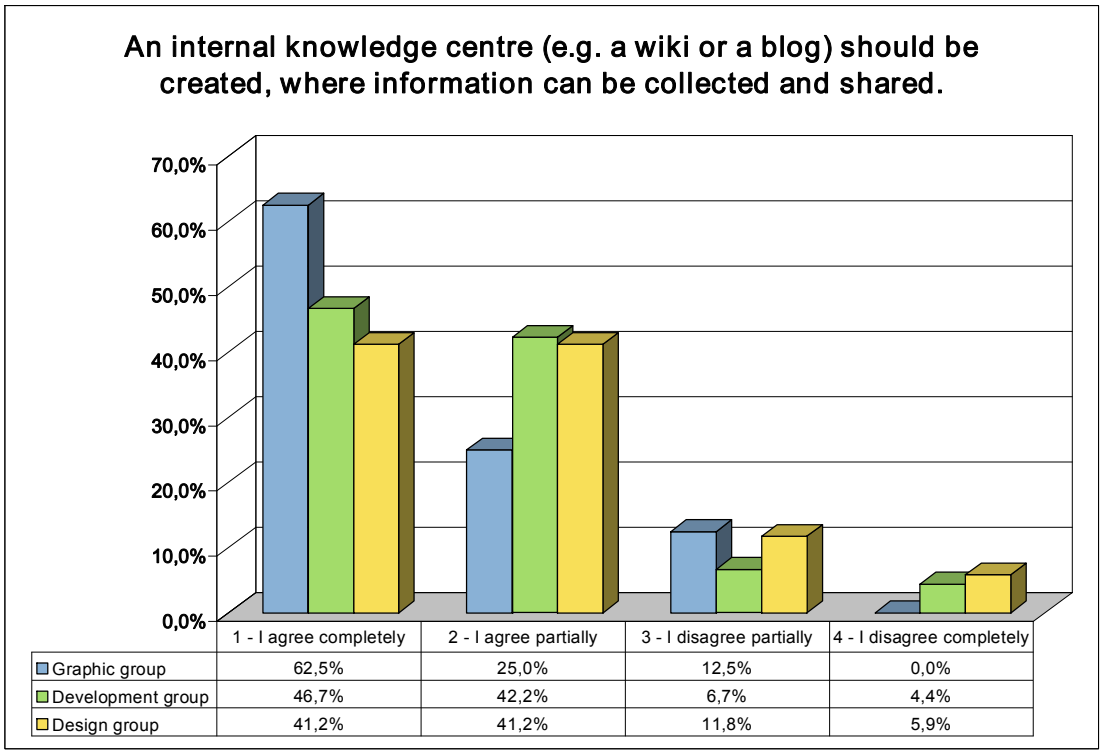
Out of all designers participating in the survey, approximately 85 per cent thought that designers should communicate more.

Finding 43: Designers and developers should interact more.

Finding 44: Designers should communicate and share information better with each other.

Preserving and sharing information

In order to preserve the knowledge gained in projects, the information should be stored and distributed. The survey participants were asked for their opinion on creating an internal knowledge centre, where information and be collected and shared:



	1 - I agree completely	2 - I agree partially	3 - I disagree partially	4 - I disagree completely
Graphic group	62,5%	25,0%	12,5%	0,0%
Development group	46,7%	42,2%	6,7%	4,4%
Design group	41,2%	41,2%	11,8%	5,9%

Figure 26: The need for an internal knowledge centre (n=70)

Over 80 per cent of all groups agreed with the argument. The most enthusiastic group were the developers, with almost 90 per cent backing up the idea.

The survey results were both supported and objected by the interviews.

> *What I need as a designer, for example if you have a dynamic drop-down menu, what are the possibilities and the constraints. [...] Designer guides would be very useful, in general. (Senior Designer, Amsterdam.)*

One interviewee pointed out that financing an information database is an issue:

> *We can start writing all things designer-specific documentation about features, but that's a lot of work. [...]I'd rather somebody else do that. I mean I'm not going to invest in it, if that's the question. It's not important enough. It's going to cost you months to write stuff like that, and we can't afford that. (Designer Director, Amsterdam.)*

Tacit information learnt from projects needs to be shared, but the interviewees stated that information databases end up not being read.

Putting stuff on the intranet is good if you're really going to look it up, but then again, it doesn't seem to get into the system of anybody. We also have the Satama intranet with sub-database and documents…doesn't just seem to get into people's system. (Design Director, Amsterdam.)

This was confirmed by a survey participant, who stated that there already are some knowledge centres, but their contents are not interesting.

There is allready MST side blogs and wiki. But me never used it gather information because there is nothing for me. Im bored read blogs which gives links to other blogs. (Survey respondent. Developer, Helsinki.)

According to one interviewee, the problem is not about knowledge centres in general, but rather their poor quality and lack of useful articles.

Reading all contents depends on its usefulness. If you feel you get something out of it, of course you read it. (Director, Helsinki.)

Finding 45: A high-quality internal information database should be created for sharing and preserving information.

Information sharing events

The biggest issues raised by the interviewees were related to the information actually reaching people.

Putting stuff on the intranet is good if you're really going to look it up, but then again, it doesn't seem to get into the system of anybody. We also have the Satama intranet with sub-database and documents…doesn't just seem to get into people's system. (Design Director, Amsterdam).

Instead of creating an information database, the interviewees suggested using informal information sharing:

When you've done your first project with Google Maps, after that you have a much better perception what can be done and what cannot. And hopefully you can share it a little bit, but it's not formalised or it's not a part of a knowledge centre or whatever. I'm not sure we really need that, maybe for the time being the informal things are good enough. (Design Director, Amsterdam.)

Training sessions and discussions were also supported by the interviewees and survey respondents:

We used to have some kind of breakfast session every Friday. There was a certain theme, discussed by two people that knew a lot about it. Something like that you could do. (Senior Designer, Amsterdam.)

That kind of teaching, I would say, it's important to share the knowledge. Because it's much more interesting if [a designer] would teach two hours on it, rather than if he would only write it down. I think he also needs to write it down, but teaching is probably a bit more interesting, or works better to keep the knowledge. (Design Director, Amsterdam.)

Creating reports that no-one has time to read is not as effective as face to face meetings and presentations. Maybe more semi-compulsory seminars with only project presentations(?) with educating aspect or something. (Survey respondent. Concept designer, Helsinki.)

The survey participants were also asked for their opinion on information sharing events.

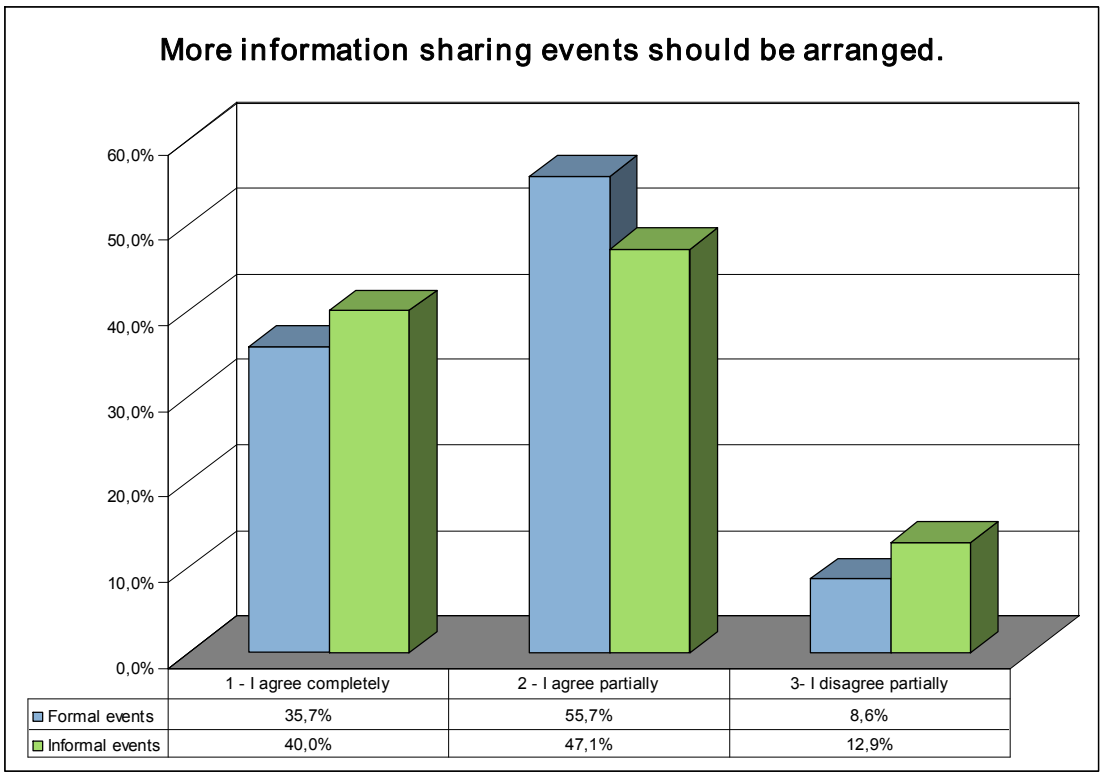


Figure 27: Information sharing events (n=70)

Formal events were described for example as post-project meetings or events, where colleagues can educate each other and informal events as for example events, where people present interesting sites and discuss them. The questions were not exclusive, but participants could answer both questions independently of the other question. Overall, *over 90 per cent of all groups wanted more formal events*, and almost 90 per cent wanted more informal events.

The interviewees agreed with the need for more communication and the usefulness of events where people can discuss and share views and ideas.

We need to keep each other sharp. Sometimes we organise Websites & Wine -session or something where we something like "what have I've seen, what have you seen". [...]That

is important to keep each others thinking sharp. […] I think there's a big role for educational sessions. (Design Director, Amsterdam.)

We should do [Websites & Wine] again, or maybe on a regular basis, even. […] It's not only showing off particular sites that you like, it's also about knowing why it works, why you like it. (Technical Consultant, Amsterdam.)

All proactive presentations, that these are the things we have done, and these kind of things can be done, all informal events […] are really good and arranging them should be absolutely promoted. (Design Director, Amsterdam.)

However, productivity issues tend to come in way of these events:

If you take two hours from 30 people, put together, that's 60 hours. And some people might have better things to do with those hours. So we need to see how we can do that. I think it is important, but then again, it's not like our live depends on it. I see it as a medium to low priority. (Design Director, Amsterdam.)

In addition to the informal events, also formal post-project meetings got some support from the interviewees:

When the whole team is together, it makes sense to go over the successes and the things that should have been done differently. I absolutely recommend that after each project, the team members go over the project, using at least a couple of hours on it to go over it properly. (Director, Helsinki.)

One survey respondent noted that company management should be more active in encouraging participating in these events:

Company policy does not encourage employees to participate in neither formal nor non-formal (or any other) events if they are not billable. Professional development does not generate enough profit? (Survey respondent. Concept designer, Helsinki.)

Management was also to blame according to one interviewee:

Satama has always been bloody awful in getting the knowledge from the minds of experts to a shareable form and creating new knowledge from that. It is a process every company should be able to create. […] These processes are in the core of information companies. If you don't do it, it's hard to work in that business. In my opinion, this is an issue of this company's management. (Strategist, Amsterdam.)

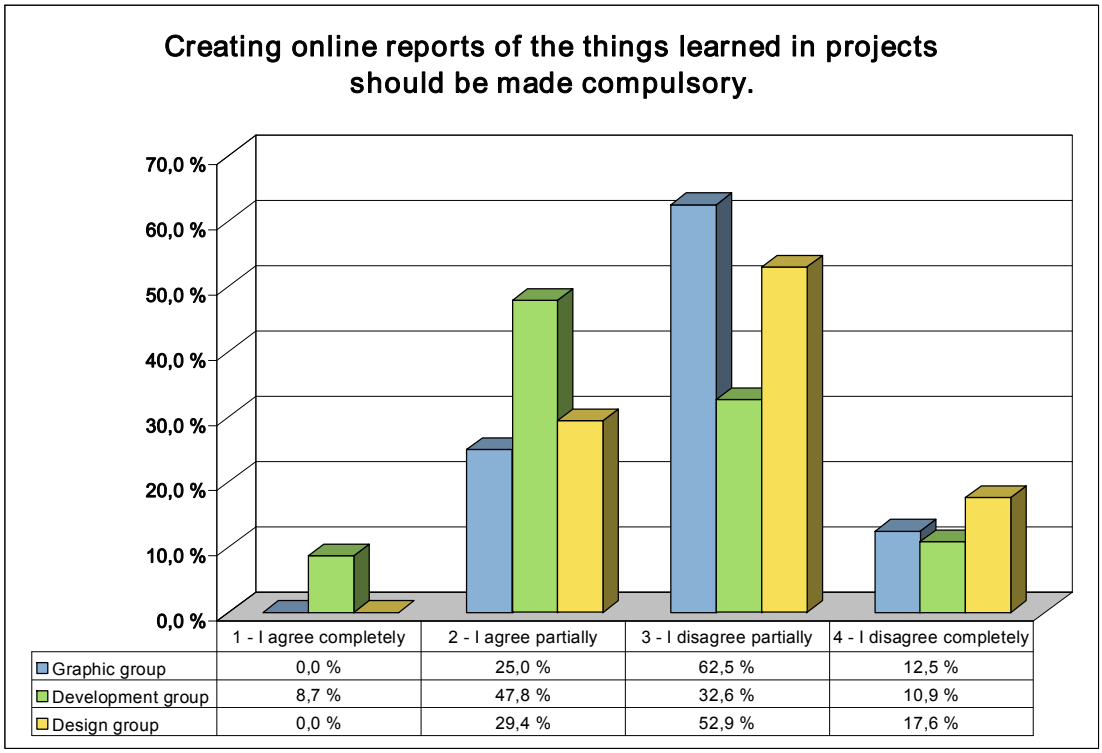
Finding 46: Informal events where information, ideas and views can be shared should be organised.

Finding 47: Formal post-project sessions, where the past project is analysed, should be arranged.

Finding 48: Company management should be more involved in knowledge management.

On-line reporting

The survey participants were asked on their opinion on giving on-line reports.



	1 - I agree completely	2 - I agree partially	3 - I disagree partially	4 - I disagree completely
Graphic group	0,0 %	25,0 %	62,5 %	12,5 %
Development group	8,7 %	47,8 %	32,6 %	10,9 %
Design group	0,0 %	29,4 %	52,9 %	17,6 %

Figure 28: Compulsory on-line reporting (n=71)

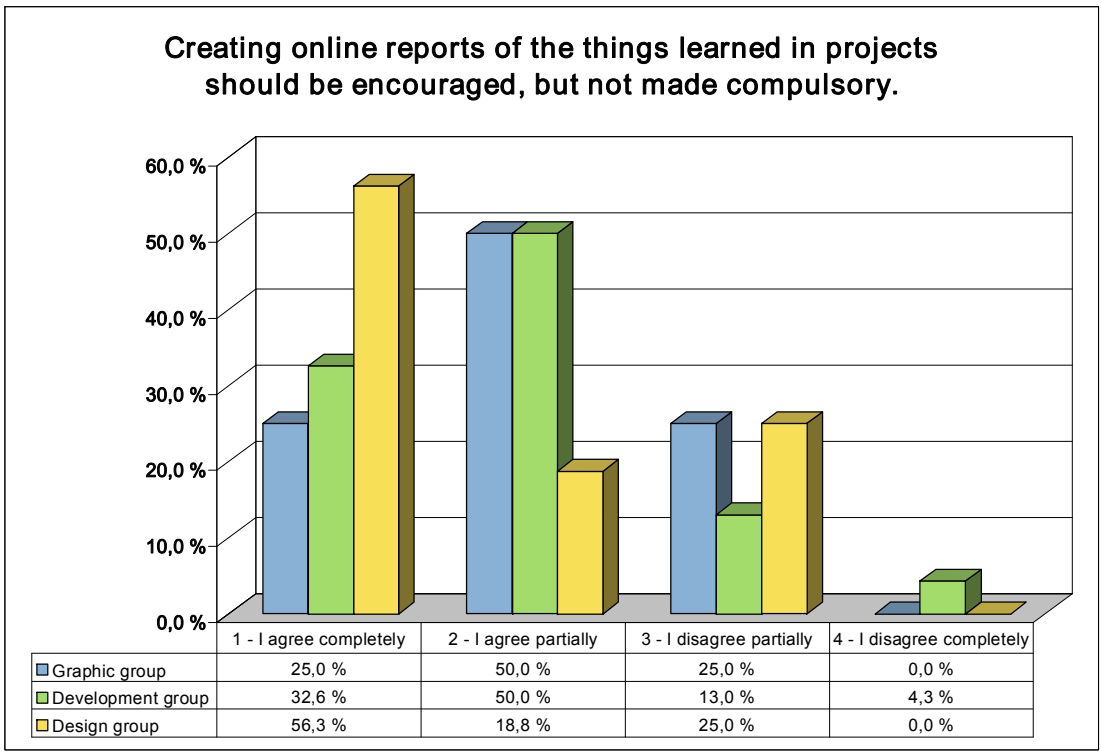
The only group supporting the argument were the developers, with just over 50 per cent of votes agreeing with the argument. Both the Design group and the Graphic group had a majority opposing the argument, over 70 per cent in both groups.

The textual input from the survey backed up compulsory reporting and enforcing information sharing:

> *Case reports should be compulsory when the project obviously deserves it. Many cool aspects of good projects go unnoticed internally (and, not to mention, by the public), since the arguments behind the concept and the design are not explicitly explained. (Survey respondent. Flash developer, Helsinki.)*

> *It is a systematic process. It requires management, insight and information on how to do it. It requires that every bloody employee in a project wraps it up and makes a case out of it. [...] If you don't do it, you don't get paid, something like that. (Strategist, Amsterdam.)*

Voluntary on-line reporting got more support from both survey participants and the interviewees:



	1 - I agree completely	2 - I agree partially	3 - I disagree partially	4 - I disagree completely
Graphic group	25,0 %	50,0 %	25,0 %	0,0 %
Development group	32,6 %	50,0 %	13,0 %	4,3 %
Design group	56,3 %	18,8 %	25,0 %	0,0 %

Figure 29: Voluntary on-line reporting (n=70)

Eighty per cent of all survey participants supported voluntary reporting of things learned in projects. When taking a closer look at the people who disagreed completely with the argument, it turns out that these people agreed completely or partially with compulsory on-line reporting. Out of the 14 individuals disagreeing with voluntary reporting, nine agreed with compulsory reporting. When taking this into account, *over ninety per cent of all survey participants agreed with creating online reports of things learned* either voluntarily or compulsorily.

Finding 49: Online reporting and information sharing should be strongly encouraged to keep company-wide knowledge up-to-date.

4.4.4 Evaluation of suggestions

This chapter discusses the suggestions presented in chapter 2. The chart below presents the suggestions in relations to the research model.

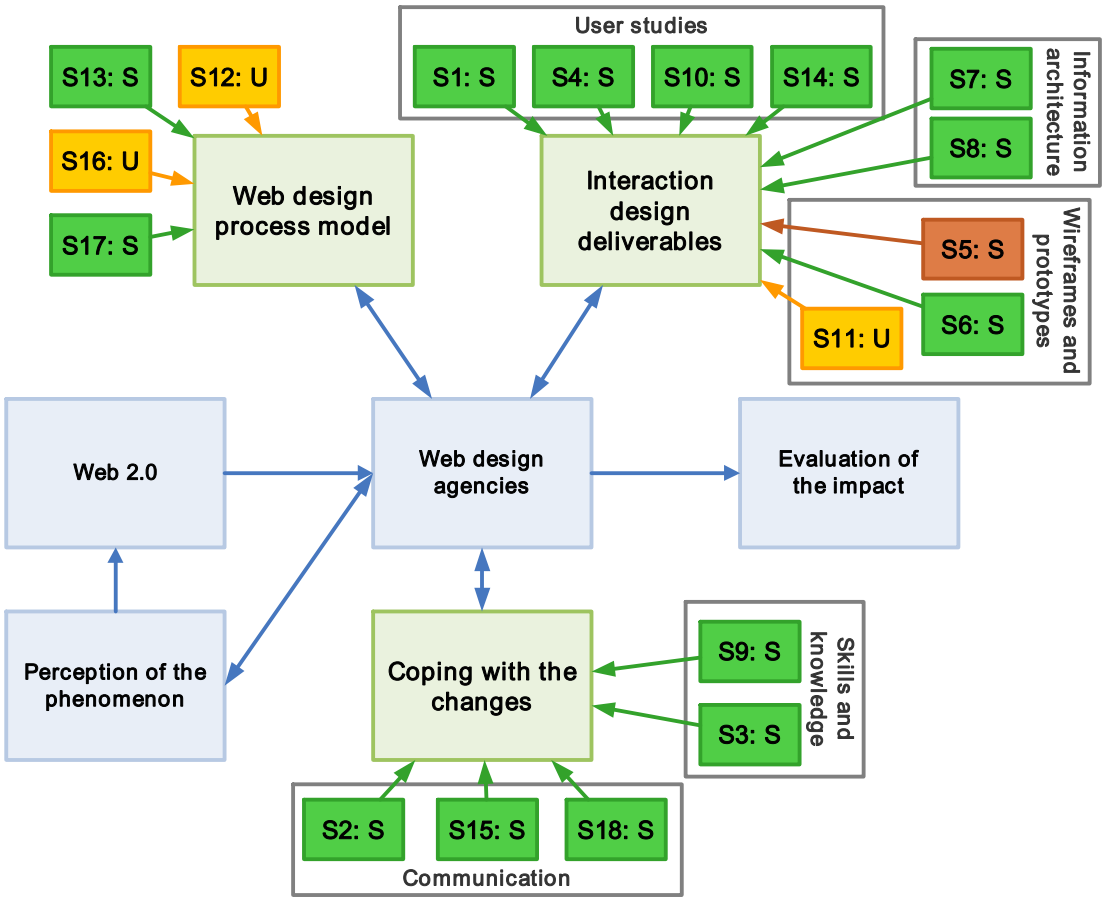


Figure 30: Research objectives: Evaluation of suggestions

Effects on the process model

My suggestions related to the process model stated that changes in Web 2.0 are not extreme enough to cause a real change in the design process. However, some phases in the design process may become longer due to the new elements and the problems they present. Two out of four suggestions were sustained.

The survey data and the interviews gave enough evidence to support or reject suggestions S12 (Sites with asynchronous communication and RIAs require more work from developers, as issues like Back button and bookmarking need to be solved) or S16 (RIAs and dynamic content make search engine optimisation more difficult, if not impossible). However, the theory supports both of these suggestions, so I have no reason to doubt them.

Table 13: Outcome of suggestions related to the process model

Suggestions	Outcome
S12: Sites with asynchronous communication and RIAs require more work from developers, as issues like Back button and bookmarking need to be solved.	**Unconfirmed**
S13: New, untested interaction models require more time to design and to develop.	**Sustained**
S16: RIAs and dynamic content make search engine optimisation more difficult, if not impossible.	**Unconfirmed**
S17: Even though JavaScript libraries and APIs make more sophisticated feasible, they	**Sustained**

create additional work for developers, as lot of issues have not yet been solved.	

Effects on deliverables

Based on the literature review, I gave suggestions stating that *there are some very concrete changes in the deliverables created by interaction designers*. The results of the suggestions are presented below.

User studies

My original suggestions related to user studies stated that *user studies themselves do not change, but as the user goals change, more user studies are needed to find out the altered goals*. In addition, I suggested that due to a change in user goals, *a new level of interaction design is created: designing interactions between users, mediated by the system*. All of the suggestions raised from the literature review related to user studies were sustained by the interviews and the survey data.

Table 14: Outcome of suggestions related to user studies

Suggestions	Outcome
S1: Even though the method of analysing users does not change, changes in the user behaviour require an enhanced focus on user studies.	**Sustained**
S4: Changes in technologies or approaches do not cause a change in the way user studies are conducted.	**Sustained**
S10: A change in user goals creates a new level of interaction to web applications: designing interactions between users, mediated by the system.	**Sustained**
S14: New user interface models require more time for usability testing.	**Sustained**

Information architecture

I gave two suggestions related to information architecture based on the literature review: *the basis of information architecture does not change, but the means to reach the wanted outcome changes*. In addition, *dynamic, user-generated contents create a shift in information architecture to creating a higher-level framework instead of creating strict categories.* All of these suggestions were sustained by the survey data and the interviews.

Table 15: Outcome of suggestions related to information architecture

Suggestions	Outcome
S7: Even though the basis of information architecture does not change, the used methods do change.	**Sustained**
S8: Creating an information architecture for a site with user-generated content changes from forming strict categories to creating a higher-level framework for information.	**Sustained**

Wireframes and prototypes

My suggestions related to prototypes that sprung from the literature review proposed that *wireframes need to change so that they can describe dynamic content*. To make presenting and testing the dynamic wireframes easier, *better and faster tools for creating dynamic*

prototypes are needed. I also suggested that *asynchronous communication requires additional visual cues to be implemented in the designs and the site*.

Only one of these suggestions was sustained by the interviews and survey data. Better and faster tools for creating dynamic prototypes are indeed needed. However, even though the interviewees noted that wireframing dynamic content requires additional work, they thought that the *changes are not significant enough to create a need to change the wireframes themselves*. Fieldwork did not give enough evidence to either sustain to reject the suggestion 11 related to asynchronous communication and the need of visual cues. As the theory supports the suggestion, I have no reason to doubt it. This issue should however be studied further alongside the process model –related suggestions 12 and 16 (presented above). The suggestions for future research are discussed further in chapter 5.

Table 16: Outcome of suggestions related to wireframes and prototypes

Suggestions	Outcome
S5: Wireframes need to change so that they can describe dynamic content.	**Rejected**
S6: Better and faster tools for creating dynamic prototypes are needed	**Sustained**
S11: Asynchronous communication requires additional visual cues to be implemented in the site.	**Unconfirmed**

Coping with the changes

I suggested in chapter two that to *cope with the changes presented by Web 2.0, interaction designers as well as other competences need new skills and more knowledge*. To achieve this, *communication needs to be improved between interaction designers and other competences*. These issues are discussed below.

Skills and knowledge

My suggestions related to new skills and knowledge stated that *new interface concepts, new technologies and user-generated content require new skills and additional knowledge from interaction designers and other competences.* The three suggestions I made related to skills and knowledge were all sustained by the interviews or the survey data.

Table 17: Outcome of suggestions related to skills and knowledge

Suggestions	Outcome
S2: New technologies, user-generated content and new interaction models require additional knowledge from interaction designers.	**Sustained**
S15: New user interface concepts require new skills from the designers and the developers.	**Sustained**
S18: Interaction designers need to have knowledge on how APIs and JavaScript libraries work and the skills to design within the techniques' limits.	**Sustained**

Communication

I suggested that in order to get more knowledge, *more communication is needed between interaction designers as well as within competences*. The two suggestions I made were sustained by the research process.

Table 18: Outcome of suggestions related to communication

Suggestions	Outcome
S3: New technologies and approaches require better communication between interaction design and other competences.	**Sustained**
S9: New, untested approaches require stronger communication between interaction design and other competences.	**Sustained**

The suggestions and findings presented in this chapter will be summarised in the following chapter. Based on the suggestions and findings, also conclusions and recommendations will be presented, as well as suggestions for further research.

5 Conclusions and recommendations

This chapter presents the conclusions and recommendations based on the research introduced in previous chapters. The first subchapter, 5.1 Conclusions, describes the main findings of the research as well as the conclusions drawn from these findings. The subchapter 5.2 goes over the answers to the research questions presented in the first chapter. In the third subchapter 5.3 Recommendations, the guidelines created through this research will be presented. In addition, this discussion on the validity of this research is done in the fourth chapter. Suggestions for future research are presented in the final chapter.

5.1 Conclusions

This subchapter presents the conclusions derived from the research presented in the previous chapters.

Conclusion 1: Web 2.0 has real effects on web agencies' work

Even though Web 2.0 is seen as a very strongly hyped phenomenon, web professionals think it has real effects on the work they do. New technologies and approaches also make more sophisticated user interfaces possible, but at the same time designing and developing websites becomes more complex. Even though the new techniques can create a better user experience, they also can have a harmful effect on the site if they are used wrongly. This requires designers to consider thoroughly the effects of using Web 2.0 ideas and technologies in their designs.

Conclusion 2: Web 2.0 does not change the design process

Even though web 2.0 is perceived to have clear effects on the work web professionals do, it does not change the design process. However, due to effects of Web 2.0 on individual deliverables, some phases of the process may become longer. The new, more intricate interfaces not only require more work from the designers fashioning them, but also from developers who then implement them. In addition, there is a need for more usability testing due to new interface concepts, as well as need for more user studies due to changes in user goals. The accurate changes in the process become visible only after a period of adaptation to Web 2.0. During the adaptation process, trial projects will slowly shape the process according to the findings in the projects.

Conclusion 3: Interaction design deliverables stay essentially the same, but many of them become more intricate

The deliverables interaction designers create stay do not change in essence – usability studies and wireframes are still done the same way. However, due to new technologies and new approaches, the possibilities interaction designers have increase. These new possibilities make the deliverables as well as creating them more complex; even though new technologies make it

possible to create dynamic contents on a website, it is not possible to illustrate dynamic content in a wireframe. Although dynamic content can be described in a separate section of a wireframing document, these documents are difficult to present to clients or to be used in usability studies. Thus, a faster way to create prototypes is needed. Albeit the methods of creating usability studies or end-user analyses do not change, the new user goals and more complex user interfaces create a need for more user studies.

Conclusion 4: Interaction designers need new skills and more knowledge to cope with the changes Web 2.0 presents

To cope with the new technologies and approaches Web 2.0 provides, interaction designers need new skills and additional knowledge, especially in the field of development. In order to make the development process easier and faster, the designers must be able to create technically feasible deliverables. Designers also need the understanding of the new elements to be able to create innovative designs that make use of the new technical improvements.

In order to improve the designers' skills, trial projects need to be done. This requires actively selling Web 2.0 elements and including them in the designs of new clients. It also requires improved communication between other designers as well as developers. The knowledge gathered from projects should be stored into an internal knowledge centre in order to preserve and share it.

5.2 Research questions answered

This chapter answers the research questions presented in chapter one.

Q1: How is Web 2.0 perceived by web design professionals?

Web 2.0 is quite well known across all competences. The phenomenon is seen as twofold: it denotes user participation and user-generated content, and a collection of new techniques and approaches. Even though it is seen as a very strongly hyped phenomenon, both *user-generated content and Web 2.0 elements are considered to have real effects on web agencies' work* – designing and developing websites. Web 2.0 increases the possibilities of web design, as *new interaction design models become possible as well as more flexible user interfaces*. Web 2.0 techniques can also be used to enhance usability, but also hinder it, when used incautiously. Web 2.0 is also perceived to make designing and developing more complex, so using Web 2.0 elements or user-generated contents require more work from both designers and developers. Thus, Web 2.0 elements should be used carefully, only if they add value to the client or to a site's users.

Q2: What effects does Web 2.0 have on interaction design deliverables?

Web 2.0 does not change the design process per se. However, *some parts of the process model may become longer* due to the effects of Web 2.0 on individual deliverables. As the sites grow more complex, more time is needed in designing them. The amount of work increases in also the development phase, as developers need to learn new skills and spend more time on testing and bug fixes.

Q3: What effects does Web 2.0 have on the process model used to create interaction design deliverables?

The way of conducting user studies does not change. However, *additional user testing is needed*, as new interface concepts have not been proven usable and need to be tested. Changes in user goals also call for an enhanced focus on user studies: the rise of user-generated content has caused a shift in user goals from interacting with the site to interacting with other users.

Even though wireframing dynamic content is not considered a significant change by web design professionals, *wireframes need to change so that they can better describe animations and new kinds of functionalities*. To be able to present the designs to clients, dynamic prototypes should replace static wireframes, and to achieve this, *prototypes need to become easier and faster to create*. This creates a need for better tools, but for the time being, no such tools exist.

The basis of creating an information architecture does not change, but the methods used to achieve that do change. To cope with user-generated content and an increased volume of information, new navigational models are also needed. Thus, *information architectures for sites with user-generated content change from forming strict categories to creating a higher-level framework* for information on the site.

Q4: How should web design agencies react to cope with the changes Web 2.0 has on interaction design to get the most out of it?

This question is covered in depth in the following chapter, 5.3 Recommendations.

5.3 Recommendations

In this chapter, the theoretical and practical recommendations issued from this research are presented. This chapter is divided into two subchapters, theoretical recommendations and practical recommendations, and they will be presented respectively.

5.3.1 Theoretical recommendations

The contribution of my research to the field of theory is threefold. Firstly, it supports using Unified Process -based process models also in the future in digital media design companies, as no objections rose against it from the theory, survey material or the interviews. *Therefore, it can be stated that the process model used in digital media design companies is still valid and workable.*

Secondly, the research contributes to building academic theory by evaluating the effects of Web 2.0 on interaction design. The model used in the research evaluates the effects of a phenomenon on a digital media competence, such as interaction design. The methods the model utilises – both qualitative and quantitative research – provide the research high internal and external validity. In addition, the model is generic and can easily be adapted to suit analysing the effects of other phenomena on diverse digital media competences. Thus, *the model is recommendable to be used in future research of digital media industry competences and emerging phenomena.*

Thirdly, *the research continues the discussion started by Tim O'Reilly on Web 2.0*. This supports the postulates of O'Reilly, and that Web 2.0 is not only a hype, but a phenomenon with real effects on everyday work of web design agencies, on all competences of a design company, from marketing to developing. However, this discussion should be continued in further studies, as the evolution of the digital media field is inevitable. Some suggestions for future research are presented in chapter 5.5.

5.3.2 Practical recommendations

New technologies make creating standardised, complex applications easier. However, it the exact feature wanted is not supported by a certain JavaScript library or an API by nature, creating it may require a lot of additional work. To create feasible designs, *interaction designers need more knowledge on the technical limitations* of Web 2.0. In addition, for designers to be able to create innovative designs, *designers need more information on the possibilities* of JavaScript libraries and APIs. To achieve this, *designers should be encouraged to educate themselves* on the issues, but also *active education sessions should be arranged*.

The *most important way of learning* to make use of Web 2.0 elements *is to do trial projects*. These projects should be actively promoted to clients. This requires new skills from client managers and clear selling arguments that can be rationalised to the clients. In addition to client-based trial projects, *more time should be allocated to non-profit trial projects and to creating innovations*.

To learn more about the technical aspects of Web 2.0, *designers need to interact more with developers as well as other designers*. To share and preserve the information gathered from trial projects, *a high-quality internal knowledge centre should be created. Online post-project reporting should be strongly encouraged* to keep the knowledge centre alive and up-

to-date. In addition to the knowledge centre, *formal post-project sessions*, as well as *informal knowledge-sharing events should be arranged*. The *company management needs to be more active* and more involved *in knowledge management*.

5.4 Validity discussion

The average turnout of the survey was over thirty per cent of the competences selected for the survey. The competences with the lowest turnout were graphical designers and art directors with a turnout rate of 17 per cent, but as the focus of this research is on interaction design, this can be considered not to affect the validity of this research. Without the Graphic group, the overall turnout rate was over 40 per cent, which can be regarded high enough for internally valid results.

The interviewees and the survey respondents that participated in this study were from two different countries and of multiple competences. This improves the external validity of this research, as the results are not dominated by a single group of professionals or by the working culture or technical level of single country. Out of the 202 people the survey was sent to, approximately 15 per cent were located in the Amsterdam office. Twelve people from the Amsterdam office participated in the survey, which is approximately 17 per cent of the 72 total respondents. It can thus be concluded that both countries were well represented in the survey.

It can be questioned whether I have been biased by my native presuppositions on the research subject. In the research phase, I created a series of suggestions, which I tried to prove right or wrong in the course of the research process. It is possible that I have found results that support my suggestions because I was looking for such results. However, the results I have acquired have been confirmed from two sources – both qualitative and quantitative. Hence, I have confidence in that my presumptions have not affected the outcome of this research.

This thesis has been the first study I have ever made. My inexperience in research methodology has thus inevitably influenced this thesis. Even though the research process could have been done in a simpler, more efficient fashion, I see no specific elements that would have undermined the external or internal validity of this research or the conclusions and recommendations presented in the previous chapters. However, to test my findings presented in this thesis, I propose further studies to be done on the subject.

5.5 Suggestions for further research

In this chapter, suggestions for further design are proposed. These research propositions have sprung up from brainwork during this research process.

Enhancing user interfaces through Web 2.0

To get more precise information on how the new elements Web 2.0 bestows upon user interfaces, a study should be conducted on how user interfaces can be enhanced and made

more intuitive through Web 2.0. The research could focus on issues such as the need of additional feedback needed to cope with asynchronous communication and the usage of transitions and animations in creating more intuitive and usable interfaces.

Usage of Web 2.0 in service design

This study could focus on how Web 2.0 can be capitalised in service design and in creating innovations. APIs offer the possibility to create quick prototypes and innovations without the need to create the services or the user-generated content from scratch. Using the Internet as a platform combined with mobility could result in innovations capable of changing the core processes of companies. The focus of this research could be on how to create service innovations out of existing services, using their APIs and the utilities they provide.

The effects of APIs and mashups on interaction design and the process model used by web design companies

Due to the limited experience in using APIs and mashups in the case study company, this study was not able to answer to the question what kind of effects do APIs and mashups have on interaction design and on the process model used by web design companies. These subjects should be studied more to determine how digital media agencies should react to the possibilities presented by these new approaches to building web applications. The research model used in this thesis (presented in chapter 3) could be utilised also in this study, presupposed that the case study company has enough experience in using APIs and mashups.

Presenting intuitive interfaces through graphics

As this study largely did not focus on graphical design, research should be conducted on how Web 2.0 affects graphical design – the typical reflection effects and beta-texts excluded. As Web 2.0 allows creating more complex interfaces that employ new technologies, research is needed on how these new interfaces with novel interaction models can be communicated to the user through graphics so that using the system becomes more intuitive and pleasant. In other words, the research could focus on how graphical design can be used to enhance usability and intuitiveness of a user interface.

List of references

Chan, A. 2006. A Social Interaction Design (SxD) Guide. Social Media, Social Practices, Social Content. First draft. Available online at http://www.gravity7.com/articles_whitepapers.html

Guldman, A. 2002. Building Rich Internet Applications with Macromedia Flash MX and ColdFusion MX. Available online at http://www.adobe.com/resources/business/sample_apps/customer/customer_app.pdf

Butler, J. & Holden, K. & Lidwell, W. 2003. Universal Principles of Design. USA: Rockport Publishers, Inc.

Horton, S. & Lynch, P. 2002. Web Style Guide: Basic Design Principles for Creating Web Sites. 2nd edition. USA: Yale University Press. Available online at http://webstyleguide.com/

Mayfield, A. 2007. What is social media? Available online at http://www.spannerworks.com/fileadmin/uploads/eBooks/What_is_Social_Media.pdf

Melakoski, C. & Sirkesalo, S. & Tirronen, H. 2007. ”Himottaa, mutta pelottaa?”. Suomalaisen sisältötuotantoalan näkemyksiä osallistumistaloudesta ja sosiaalisesta mediasta. PARTECO-hankkeen osaraportti. Available online at http://www.somelab.fi/

Moggridge, B. 2006. Designing Interactions. USA: The MIT Press.

Loranger, H. & Nielsen, J. 2006. Prioritizing Web Usability. USA: New Riders Press.

Patton, M. Q. 1990. Qualitative evaluation and research methods. USA: Sage Publications, Inc.

Pelkonen, T. 2003. Digimedia 2003 – Nykytila ja kasvunäkymiä. LTT-tutkimus. B-sarja, B169. Helsinki: Heseprint. Available online at http://digimaailma.spaces.live.com/

Rogowski, R. 2006. Web Users Want Rich Internet Applications. Forrester Research, Inc.

Satama Interactive Group’s interim report, January 1 – June 30, 2007. 2007. Available online at http://www.satama.com/en/investors/financial_info/reports_and_calendar/

Hakala, K. 2007. Pikku Kakkosen www-sivusto : käytettävyystestaus esikouluikäisten lasten kanssa. A thesis of Tampere Polytechnic University, School of Art and Media. Available online at https://oa.doria.fi/handle/10024/5682

Online articles

About Web 2.0 Summit. 2007. Retrieved on 25 April 2007. Available online at http://www.web2con.com/pub/w/62/about.html

Adobe - Mobile & Devices: Supported Devices: Handset Manufacturers. 2007. Retrieved on 2 May 2007. Available online at http://www.adobe.com/mobile/supported_devices/handsets.html

Adobe Apollo. 2007. Retrieved on 2 May 2007. Available online at http://labs.adobe.com/technologies/apollo/

Adobe Flash Player Version Penetration. 2007. Retrieved on 26 September 2007. Available online at http://www.adobe.com/products/player_census/flashplayer/version_penetration.html

Browser Statistics. 2007. Retrieved on 28 September 2007. Available online at http://www.w3schools.com/browsers/browsers_stats.asp

DoubleClick.com. 2007. Retrieved on 25 April 2007. Available online at http://www.doubleclick.com/

Firefox3/Gecko Feature List. 2007. Retrieved on 30 May 2007. Available online at http://wiki.mozilla.org/Firefox3/Gecko_Feature_List

Garrett, J. J. 2005. Ajax: A New Approach to Web Applications. Retrieved on 1 May 2007. Available online at http://www.adaptivepath.com/publications/essays/archives/000385.php

Google Maps API Terms of Use. 2007. Retrieved on 4 May 2007. Available online at http://www.google.com/apis/maps/terms.html

Google SOAP Search API Frequently Asked Questions. Retrieved on 27 September 2007. Available online at http://code.google.com/apis/soapsearch/api_faq.html#gen7

Gravity7 – Introduction. 2007. Retrieved on 29 May 2007. Available online at http://www.gravity7.com/

Harrington, C. M. 2005. Tag! You're It! Retrieved on 22 May 2007. Available online at http://blocklevel.com/weblog/information_architecture/tag_youre_it/

Harris, J. & Kamvar, S. 2006. We Feel Fine / Mission. Retrieved on 27 September 2007. Available online at http://www.wefeelfine.org/mission.html

MacManus, R. Mashup Business Models. 2006. Retrieved on 4 May 2007. Available online at http://www.readwriteweb.com/archives/mashup_business.php

Microsoft Silverlight Frequently Asked Questions. 2007. Retrieved on 4 May 2007. Available online at http://www.microsoft.com/silverlight/faq.aspx

Neuberg, B. 2005. AJAX: How to Handle Bookmarks and Back Buttons. Retrieved on 1 May 2007. Available online at http://www.onjava.com/lpt/a/6293

Neuberg, B. 2006. AJAX/DHTML Tutorial: Should I Render My UI On The Server or the Client? Retrieved on 1 May 2007. Available online at http://codinginparadise.org/weblog/2006/01/ajaxdhtml-tutorial-should-i-render-my.html

Nielsen, J. 2003. Usability 101: Introduction to Usability. Retrieved on 8 May 2007. Available online at http://www.useit.com/alertbox/20030825.html

Nielsen, J. Why No Graphics. 2007. Retrieved on 9 May 2007. Available online at http://www.useit.com/about/nographics.html

O'Reilly, T. 2005. What Is Web 2.0. Design Patterns and Business Models for the Next Generation of Software. Retrieved on 27 April 2007. Available online at http://www.oreilly.com/lpt/a/6228

O'Reilly, T. Web 2.0 Compact Definition: Trying Again. Retrieved on 24 April 2007. Available online at http://radar.oreilly.com/archives/2006/12/web_20_compact.html

OS Platform Statistics. 2007. Retrieved on 31 May 2007. Available online at http://www.w3schools.com/browsers/browsers_os.asp

ProgrammableWeb. 2007. Retrieved on 4 May 2007. Available online at http://www.programmableweb.com/

Reader's Comment on Peter Rip's article Some Problems with Mashups. Retrieved on 4 May 2007. Available online at http://earlystagevc.typepad.com/earlystagevc/2006/02/the_problems_wi.html#comment-14067038

Reimann, R. M. & Forlizzi, J. 2001. Interaction Designers - What we are, what we do, & what we need to know. Retrieved on 7 May 2007. Available online at http://rl.ixdg.org/uploads/aigaforlizzireimann.ppt

ReleaseRoadmap. 2006. Retrieved on 30 May 2007. Available online at http://wiki.mozilla.org/index.php?title=ReleaseRoadmap

Rettig, M. 2004. Interaction design in a teeny little nutshell. Retrieved on 7 May 2007. Available online at http://www.marcrettig.com/writings/rettig.interactionDesignHistory.v1.5.pdf

Saffer, D. 2001. A Definition of Interaction Design. Retrieved on 14 May 2007. Available online at http://www.odannyboy.com/blog/archives/001000.html

Sellars, P. 2006. MySpace cowboys. Retrieved on 7 May 2007. Available online at http://money.cnn.com/magazines/fortune/fortune_archive/2006/09/04/8384727

Sinha, A. 1997. User Interfaces: Survey Information and Thoughts. Retrieved on 8 May 2007. Available online at http://besser.tsoa.nyu.edu/impact/s97/Focus/Commerce/PROJECTS/aks/

Technorati: About us. 2007. Retrieved on 25 April 2007. Available online at http://www.technorati.com/about/

Terms of Service for Google Maps. 2007. Retrieved on 25 April 2007. Available online at http://maps.google.com/help/terms_maps.html

The State of the Live Web, April 2007. 2007. Retrieved on 25 April 2007. Available online at http://www.sifry.com/alerts/archives/000493.html

The Website Design Process – a Framework. 2004. Retrieved on 16 May 2007. Available online at http://web.archive.org/web/20070511003739/http://www.nmk.co.uk/article/2004/01/27/website-design-process

Tognazzini, B. 2003. First Principles of Interaction Design. Retrieved on 8 May 2007. Available online at http://www.asktog.com/basics/firstPrinciples.html

Traffic details for Wikipedia.org. 2007. Retrieved on 25 April 2007. Available online at http://www.alexa.com/data/details/traffic_details?url=wikipedia.org

Wang, D. 2007. Stuck in traffic? Retrieved on 25 April 2007. Available online at http://googleblog.blogspot.com/2007/02/stuck-in-traffic.html

Web 2.0 API listing. 2007. Retrieved on 4 May 2007. Available online at http://www.programmableweb.com/apilist

Web Services – Audioscrobbler - User Profile data. 2007. Retrieved on 4 May 2007. Available online at http://www.audioscrobbler.net/data/webservices/#User%20Profile%20Data

What is SourceForge.net? 2007. Retrieved on 25 April 2007. Available online at http://sourceforge.net/docs/about/

Yahoo! Developer Network Usage Policy. 2007. Retrieved on 4 May 2007. Available online at http://developer.yahoo.com/usagePolicy/

Zeldman, J. 2006. Web 3.0. Retrieved on 22 May 2007. Available online at http://alistapart.com/articles/web3point0

Wikipedia articles

ActionScript. Retrieved on 2 May 2007. Available online at http://en.wikipedia.org/wiki/ActionScript

Adobe Flash – History (Authoring tool). Retrieved on 2 May 2007. Available online at http://en.wikipedia.org/wiki/Adobe_Flash#History_.28authoring_tool.29

Ajax Programming – History. Retrieved on 1 May 2007. Available online at http://en.wikipedia.org/wiki/Ajax_%28programming%29#History

HTML. Retrieved on 9 May 2007. Available online at http://en.wikipedia.org/wiki/HTML

Interaction Design. Retrieved on 24 April 2007. Available online at http://en.wikipedia.org/wiki/Interaction_design

Internet. Retrieved on 9 May 2007. Available online at http://en.wikipedia.org/wiki/Internet

List of Wikipedias – Grand Total. Retrieved on 25 April 2007. Available online at http://meta.wikimedia.org/wiki/List_of_Wikipedias#Grand_Total

Metcalfe's Law. Retrieved on 9 May 2007. Available online at http://en.wikipedia.org/wiki/Metcalfe%27s_Law

Network effect. Retrieved on 24 April 2007. Available online at http://en.wikipedia.org/wiki/Network_effect

Occam's razor. Retrieved on 31 May 2007. Available online at http://en.wikipedia.org/wiki/Occam's_razor

Peer production. Retrieved on 24 April 2007. Available online at http://en.wikipedia.org/wiki/Peer_production

Permalink. Retrieved on 25 April 2007. Available online at http://en.wikipedia.org/wiki/Permalink

Rich Internet Application. Retrieved on 2 May 2007. Available online at http://en.wikipedia.org/wiki/Rich_Internet_application

The Long Tail. Retrieved on 27 Sept. 2007. Available online at http://en.wikipedia.org/wiki/The_Long_Tail

Unified Process. Retrieved on 26 May 2007. Available online at http://en.wikipedia.org/wiki/Unified_Process

Web 2.0 – Characteristics of Web 2.0. Retrieved on 24 April 2007. Available online at http://en.wikipedia.org/wiki/Web_2.0#Characteristics_of_.22Web_2.0.22

Web 2.0 Conference (2004). Retrieved on 24 April 2007. Available online at http://en.wikipedia.org/wiki/Web_2.0_Conference_%282004%29

Web 2.0. Retrieved on 27 Sept. 2007. Available online at http://en.wikipedia.org/wiki/Web_2.0

Wisdom of the crowds. Retrieved on 25 April 2007. Available online at http://en.wikipedia.org/wiki/Wisdom_of_the_crowds

World Wide Web. Retrieved on 9 May 2007. Available online at http://en.wikipedia.org/wiki/World_Wide_Web

Other Internet sources

http://del.icio.us/
http://docs.google.com/
http://www.digg.com/
http://www.twitter.com/
http://www.widsets.com/
http://www.zoho.com/
http://www.technorati.com/
http://www.wefeelfine.org/

Appendices

This last section of this thesis shows the appendices of this thesis. There are twelve appendices, which are presented in the table below.

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Appendix 1: History of interaction design

The term interaction design was created in 1980 by a British industrial designer Bill Moggridge[66], but similar disciplines have existed before. Marc Rettig divides the history of interaction design into six phases:

Designing to enable operating the machine

The first phase dates back to the age of first computers: huge machines that were operated by wires, switches and punch cards. The main point of design was to create a system that could be somehow operated.

Designing to enable using the software

At the end of the 1970s, first personal computers with useful software started to emerge. These pieces of software were quite complex to use, as they were often used with only the keyboard. The design of this era aimed to create an item of software that the user could focus on instead of focusing on operating the machine.

Designing to enable performing a task

After developing software that could be used, focus shifted to developing software that helped users accomplish a task – draw a picture, write a document and combine and print them. Complex keyboard operations changed into simple point-and-click systems – such as the first Macintosh.

Designing to enable experiencing: live, learn, work and play

Adding the context of usage to the equation of performing a task changed the point of view on design. Instead of creating pieces of software that would be easily operated in optimum circumstances and with specific tasks, design started to aim to satisfy latent or masked needs. According to Rettig, this is one of the current phases of interaction design.

Designing to enable connecting

As another aspect of modern design is the aim to enable connectivity between people. Instead of designing for interaction between a user and a computer, the machine is more and more in the role of an intermediary between people.

Designing to enable a dynamically enable system

Rettig describes the future of interaction design as designing for adaptable systems. Earlier designs have always needed users to work on the systems terms – learn how to use it, what to do with it and where to use it. Future systems would do the opposite: learn from the users,

[66] http://en.wikipedia.org/wiki/Interaction_design (24 Apr. 07)

adjust to what they want to do and where they want to do it. Instead of a user leaving from home and turning off the radio in the living room, and then turning it back on in the car, the system should follow the user and make the broadcast automatically follow the user.[67]

[67] http://www.marcrettig.com/writings/rettig.interactionDesignHistory.v1.5.pdf (7 May 2007)

Appendix 2: Aspects of interaction design

There are several aspects that an interaction designer must take into account when designing a system. As the main point of interaction design is to design products from the perspective of the user, also these aspects focus on users. In his article, First Principles of Interaction Design, Bruce Tognazzini of Nielsen Norman Group suggests focusing on among others, the aspects of Users' anticipation, user efficiency, user autonomy and consistency[68]. In addition to the aspects mentioned by Tognazzini, issues like accessibility and usability are vital for interaction design.

Users' anticipation

To understand what the users anticipate, interaction designer must have knowledge about human behaviour and human limitations. Among other things people are impatient, have limited memory, need motivation, resist change, act irrationally and make errors. (For a more thorough list of human limitations, see Anoop Sinha's "User Interfaces: Survey Information and Thoughts", where he quotes Michael Osofsky[69].)

Factors like culture, attitude, personality and context also affect the behaviour of the users. Some of these factors can be studied, but as Bruce Tognazzini points out, the only way to find out what users actually expect from specific systems in specific contexts is to do user testing[68].

User efficiency

Interaction design must focus on the efficiency of the user, not on the efficiency of computers, as the users' time is more valuable than the computers time. Even though an efficient system may results in higher productivity, if the user is not efficient, the productivity will inevitably go down.[68]

To maximise the efficiency of the user, also the system must be efficient; every moment the user spends waiting for the system to respond is a non-productive moment. High latency also causes user discontentment, which results in frustration towards the system. Tognazzini suggests reducing the user's experience of latency if latency itself cannot be affected by using multitasking, which allows the user to continue working on their work while the system finishes the task, and letting the user know what is happening via visual or aural feedback.[68]

User autonomy

To give the users a satisfactory feeling of freedom, constraints and restrictions are needed. Like children, adults do not enjoy too much freedom either. As Internet is immense, distinct guides and controls are needed to make the user feel safe; too much freedom results in the

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[68] http://www.asktog.com/basics/firstPrinciples.html (8 May 2007)

[69] http://besser.tsoa.nyu.edu/impact/s97/Focus/Commerce/PROJECTS/aks/ (8 May 2007)

user not knowing what to do or where to go. Thus the user should be given an easy path to accomplish the task they are trying to do, but not to control them too much. Trying to force the users to do something often backfires, resulting in them doing quite the opposite. If users do not want to do something, they will not.[68]

To create boundaries and to let the user know what is going on, clear status information should always be shown. The current location of the user, the amount of steps that need to be taken to finish the task and other options of what to do should always be visible to the user. It creates a safe environment for the user, where they feel that they can do safely the things they came there to do. Also an easy way out should always be provided, but it should be made even easier for the users to stay in.[68]

The user's work should always be protected. To allow users to roam freely without having to be constantly on guard, a way to undo their actions should be provided. In case of sudden network breakdown or computer malfunction, the users should not have to return to the beginning, but they should be able to start from where they left it.[68]

Consistency

According to Tognazzini, the most important form of consistency is the consistency with user expectations. A system should always work the way the user expects it to. However, it is also important to keep the system consistent with itself; buttons that do the same thing should look the same. In addition, the location of the buttons or other similar objects should be consistent. If possible, object locations should be standardised so the user will always know where to look for the object they need. To make it easy for the user to find the proper button or object, objects should not look the same, but each object should reflect its own functionality clearly and distinctively. Sometimes, also inconsistency can be important; if the system requires the user to act differently than usually, the system should also look different.[68]

To create a consistent user experience, the data of the service should be categorised as consistently and logically as possible. The art and science of organising and labelling content is called **information architecture**. Even though information architecture is its own discipline, interaction designers can sometimes also be responsible for it. Good information architecture is an important step in creating a learnable, consistent and usable interface.

Accessibility

Accessibility refers to the practice of making a system accessible to as many people as possible, especially to users with different kinds of disabilities. Accessibility often focuses on disabilities that affect vision, mobility, cognitive skills or hearing, or to disabilities that can cause seizures.

Usability

According to Jakob Nielsen and Hoa Loranger of Nielsen Norman Group, usability is a "*quality attribute relating to how easy something is to use*"[70]. Good usability has several benefits: when a system is easy to use, it is more productive, as users do not have to spend time avoiding or correcting mistakes. It also keeps users content, as it is more satisfying to use; users will not get so easily frustrated with the inoperable system. A highly usable system is often also easy to learn to use, because it works the way users expect it to.

According to Jakob Nielsen, usability consists of five components: learnability, efficiency, memorability, amount of errors and satisfaction.[71]

Learnability is defined by how easy it is for users to accomplish basic tasks the first time they use the system. A usable system is intuitive and easy to learn to use; the user should not be forced to first study the manual by heart before being able to use the system.

Efficiency is characterized by the speed users can accomplish tasks after they have learned how to use the system. The faster the users can operate the system, the more efficient it is.

Memorability means the easiness or difficulty of re-establishing skills in using the system after a break in using it. The easier the system is to remember, the more usable it is.

Errors are calculated based on the amount of errors, their severity and the easiness of recovering from the errors. The less there are errors and the less severe they are the better.

Satisfaction measures the pleasantness of using the system. A good design is enjoyable to use, or at least using it is not unpleasant.

Universal principles of design

Possessing the knowledge to employ universal principles of design is vital for interaction designers. These principles do not concern only interaction design or software development, but draw from a multitude of disciplines, such as visual design, architecture or psychology. These principles can be harnessed in designing interactions understandable and enjoyable to humans. The book Universal Principles of Design by William Lidwell, Kritina Holden and Jill Butler lists among others design principles that help understanding human behaviour (for example Mazlow's Hierarchy of Needs), give means to focus users' attention to certain points the design (Highlighting) or how to present information in a clear and logical way (Inverted Pyramid)[72].

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[70] Loranger & Nielsen 2006 xvi

[71] http://www.useit.com/alertbox/20030825.html (8 May 2007)

[72] Butler, Holden & Lidwell 2003.

Technical limitations and possibilities

To create feasible system designs, an interaction designer must know what possibilities and limitations the technique and platform designed upon hold. The limitations and possibilities the interaction designer must understand come from various sources: graphical design, database design and management, server-side scripting and client-side scripting to mention a few. Without the thorough understanding of the techniques used in development, the designs may turn out to be impossible or too costly to implement. Deep knowledge of the techniques in use gives the designer the tools with which to create the design.

Appendix 3: Web limitations and possibilities

Originally created by Tim Berners-Lee in 1990 by combining various technologies, World Wide Web, or as often referenced to, the Web, is a system of interlinked hypertext documents that exist in the Internet[73]. Internet itself is a network consisting of a large number of smaller computer networks[74]. The basis of the Web is HTML, Hypertext Markup Language, which is used to create the structure of text-based hypertext documents. HTML also offers some basic tools to format the contents of the document, but nowadays a more recommended method is to use CSS (Cascading Style Sheets) to apply formatting to the hypertext documents. The core characteristic of hypertext is the ability to interlink documents with hyperlinks. The original HTML format developed by Berners-Lee did not include the ability to add images to the document, but it was added to the later versions of HTML[75].

Server-side and client-side scripting

HTML creates an array of limitations that apply to designing websites. For example, HTML is static by nature, so all dynamic changes to the document must be done by modifying the actual hypertext file. This is usually achieved through server-side scripting such as JSP, ASP or PHP, which dynamically creates the HTML files. Still, dynamically HTML files created by server-side scripting are not themselves dynamic; they are still static HTML pages. To create dynamic HTML files, some client-side scripting must be added to the HTML file. Client-side scripting languages, such as JavaScript or JScript can alter the HTML document dynamically, based on for example environmental conditions, user input or other variables.

However, there are also limitations in using server-side and client-side scripting languages. Whereas server-side scripts are executed by the web server, producing the HTML, client-side scripting languages require the user's browser to be able to interpret the script. As browsers tend to interpret server-side scripts differently, developing client-side script that works the same way in all browsers can be quite tricky. In addition, approximately 10% of users use browsers that do not support server-side scripting, or have it disabled from their browser[76] [77]. Complex client-scripts also often increase latency, causing the website to load or respond slowly.

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[73] http://en.wikipedia.org/wiki/World_Wide_Web (9 May 2007)

[74] http://en.wikipedia.org/wiki/Internet (9 May 2007)

[75] http://en.wikipedia.org/wiki/HTML (9 May 2007)

[76] The amount of users with client-side scripting disabled has stayed in around 10% for the past five years, but W3Schools' statistics show that in the beginning of year 2007, the number has gone down to 6%. The decline may be a result of heightened amount of popular Web 2.0 sites, which often use Ajax or other dimensions of client-side scripting for a more dynamic user experience. Only time will tell if the decline is permanent.

[77] http://www.w3schools.com/browsers/browsers_stats.asp (9 May 2007)

Vector graphics, animations and multimedia

As HTML does not natively support vector graphics, animations or multimedia, they must be embedded by using client-side scripting or embedding objects or by using various plug-ins. JavaScript and other forms of client-side scripting can be used to add these elements to a webpage, but as different browsers interpret them differently, developing multiple-platform animations or multimedia can be very tricky. To produce animated or static vector images, a markup language called SVG can be used. This language is supported by most modern browsers, excluding Internet Explorer, which needs an additional plug-in to view SVG content.

As multimedia support of client-side scripting languages is quite incomplete, plug-ins are often used to create cross-platform multimedia presentations. Some web applications, such as Adobe Flash or Microsoft Silverlight can provide all of the above-mentioned features. In addition of vector graphics, animations and multimedia, web applications often include some form of scripting language, which allows creating functionality to the web applications. The plug-ins required to play Flash or Silverlight files can be installed to various environments, thus giving identical functionality and appearance in different browsers[78]. According to Adobe, a modern Flash plug-in is currently installed to 98% of Internet-connected computers in USA, Canada, Germany, France and Japan[79]. As Microsoft Silverlight is still in beta, its corresponding numbers are significantly lower.

Information, functionality and experiences

Webpages can be divided into at least three categories: functional websites, information websites and promotional websites. Functional websites – such as Gmail or Zoho – are the epitome of O'Reilly's software as service. They are used to access the functionality in them, as opposed to information websites, where the information in them is the main reason of usage. Promotional websites are often a mixture of these two, containing information of the promoted product or service for example in a game-like form.

Technical limitations

In addition to limitations caused by techniques used in web design, the hardware used to access internet is a source of limitations. As dial-up connections are giving way to broadband connections, the recommended webpage size maximum has grown from 3KB[80] to 200KB[81].

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[78] Silverlight runtime currently supports only Internet Explorer 6.0 and 7.0, Firefox 1.5 and 2.0 and Safari 2.0 for Windows and Macintosh environments. Additional platforms are being considered to be supported in following releases.

[79] http://www.adobe.com/products/player_census/flashplayer/version_penetration.html (26th September 2007)

[80] http://www.useit.com/about/nographics.html (9 May 2007)

[81] Loranger & Nielsen 2006, 87

Still, compared to desktop software, websites have very strict size limitations – a desktop program or a game can be up to several gigabytes in size.

Web possibilities

There are some definite upsides in web design compared to desktop application design. Web applications are constantly available, whereas desktop applications only exist on the specific computer they have been installed to. Web applications or websites do not need additional means for delivering them to the user – the Web provides it by nature. There is no need for users to update their software; once the site is updated, every user receives the same, updated content. In addition, as using the Web is nowadays common in almost all age groups, complying with the Web usability conventions often makes possible to create sites that users know how to use even on their first visit.

Appendix 4: Web 2.0 principles

After the initial Web 2.0 conference, O'Reilly published a more extensive article on Web 2.0, in which he defined the seven principles of Web 2.0. This chapter goes over the original principles of Web 2.0 by O'Reilly. The chapter is divided into seven subchapters, each explaining one of the Web 2.0 principles.

The Web as a Platform

Wikipedia explains "The Web as a platform" referring to applications that are entirely usable through a browser[82], such as Zoho online office suite[83] and Google Docs & Spreadsheets[84]. In O'Reilly's definition, "The Web as a Platform" represents a new approach of providing users with a product, as well as a change in business logic. The concept of using the Internet as a platform is based on providing software as a service, and making use of "the long tail".

Software as a service

Software as a service means providing users with an access to a service instead of offering them a piece of software. In the time of the intense struggle between Netscape and Internet Explorer in the late 1990s, Netscape's business model was to offer a free piece of software – the Netscape Navigator – and sell high-priced server products that worked seamlessly with the popular browser. Their desktop and server based installable software demanded continuous updating and releasing of new versions to their users. Google offers their search as a service instead of a piece of software. Users never actually install Google on their computers, but use the service online. Thus, Google does not have to worry about packaging or delivering their product. There are no scheduled software releases, just continuous improvement.

Making use of "the long tail"

The Long Tail is a concept term created by Chris Anderson in 2004 in Wired magazine[85]. The concept describes using niche markets to sell large amounts of items or articles. Instead of focusing on the 20% of articles that form 80% of the sold items, the Long Tail means focusing on the remaining 80% of articles. The Long Tail can be described as a business application of the Pareto principle.

DoubleClick is an Internet advertising company of the "Web 1.0 –era". Their business model is based on the Web being a publishing platform instead of a participatory platform, thus their clients are the large providers of content in the web.

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[82] http://en.wikipedia.org/wiki/Web_2.0#Characteristics_of_.22Web_2.0.22 (24 Apr. 07)

[83] http://www.zoho.com/

[84] http://docs.google.com/

[85] http://en.wikipedia.org/wiki/The_Long_Tail (27 Sept. 2007)

Google AdSense however focuses on the "long tail" of advertisers – the vast amount of small-time users, who put in only small amounts of money. The small amounts of money build up, in the end creating huge sums and a viable business logic. Where DoubleClick has over 1500 clients[86], Google AdSense may even have hundreds of thousands – although Google does not disclose this information.

Harnessing Collective Intelligence

Collective intelligence in this context can mean user generated content (YouTube, Wikipedia and blogs) metadata (social bookmarking and peer evaluation) or making the users the content (MySpace or Habbo Hotel). It can also mean such terms as peer production, wisdom of the crowds and the network effect.[87] These terms will be discussed more thoroughly in chapter Social media in Web 2.0.

Data is the Next Intel Inside

Many of the successful Web 2.0 services offer two things: a valuable set of data, and the means to control the data. The data they offer is their most valuable asset: Google would not exist without its database of websites and neither would YouTube with its user-generated videos it provides its users. Exclusions of this are previously mentioned web-based applications that offer only desktop-like functionality, such as text or image editing.

Even though data is a valuable asset, the example of YouTube shows that the ownership of the service provider does not necessarily need to own the data they provide. For example, even though Google owns the data they provide in their searches, Google Maps does not own the satellite imagery and the maps they provide the users[88].

A combination of data or functionality from multiple sources is called a mashup. To complicate the question of data ownership even further, many Internet companies nowadays offer APIs, or application programming interfaces. They offer individual developers either to take advantage of other people's or companies' data or functionality by creating mashups of their own data or functionality, or even multiple APIs. For example, Google offers a Google Maps and Google Search API, which allow users to generate their own maps and custom searches, and Amazon correspondingly offers an API for their data and customer reviews.

End of the Software Release Cycle

Whereas software developers release a newer version of their software every now and then, Web 2.0 services are in constant enhancement process. Web 2.0 services have to update their

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[86] http://www.doubleclick.com/ (25 Apr. 07)

[87] Fish & Jaokar 2006, 36–37

[88] http://maps.google.com/help/terms_maps.html (25 Apr. 07)

data frequently, or else it will lose its value. As the software is developed to handle the data and provide it to the users, when the data changes and updates, so must the software.

This is why Web 2.0 services are often in a state of constant beta, as they are continuously being developed both from the perspective of data and software, but never actually released. Because of the volatility of the services, the users are treated as co-developers. Users' actions are used in testing the new updates in the software and the users are often asked to give feedback or bug reports of the service.

Lightweight Programming Models

To gain maximal reusability of the software, the software designed for Web 2.0 services should be as loosely coupled as possible. This means that individual pieces of software should be as modular as possible, and as independent of each other as possible. This allows the re-use of the software in further development of the service and in offering highly usable APIs to other developers. Feed syndication is much used in Web 2.0 services, as it is simple to use, and it offers an easy way to syndicate data to other parties. Providing loosely coupled APIs gives new services a good change to create new applications by reassembling the pieces in new, innovative ways. This can also create business also for the original company providing the service, as the data they provide can also be licensed.

Software above the level of a single device

As more and more devices can access the Internet in a form or another, new services should be designed keeping this in mind. Services like Twitter[89] (micro-blogging via SMSs or a computer) or Widsets[90] (feed syndication for mobile phones) make the Web ubiquitous. The development is not likely to stop on mobile phones, but to expand to an array of devices. Already now, Google offers Google Maps for mobile devices with up-to-date traffic information[91]. It is only a small step away from adding live traffic information to GPS navigation systems in cars.

Rich User Experience

Rich user experience is described by O'Reilly[92] as the rise of rich Internet applications or RIAs, which are web applications that have some of the functionality of traditional desktop applications. In another words, these are audio-visually and functionally richer websites and applications, which often use modern web technologies, such as Ajax, Adobe Flash or Adobe Flex.

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[89] http://www.twitter.com/

[90] http://www.widsets.com/

[91] http://googleblog.blogspot.com/2007/02/stuck-in-traffic.html (25 Apr. 07)

[92] http://www.oreilly.com/lpt/a/6228

Appendix 5: Rich internet applications

The term rich Internet application or RIA was presented by Macromedia in a whitepaper in 2002[93] to market their newly published multimedia authoring tool, Macromedia Flash MX. Macromedia described RIAs as rich, thick clients that would improve the quality of end-user applications[94]. As the whitepaper was aimed to promote their new product, their definition of RIAs is somewhat slanted. However, it mentions many of the attributes also currently associated with RIAs.

Here are some of the most common properties associated with RIAs.

Running inside a browser, no need for installation

Although not specified in the above-mentioned Macromedia whitepaper, most RIAs run inside a browser and do not need to be installed to work[28].

Rich application

RIAs often offer functionality that is not possible when using only HTML elements. Qualities often associated with desktop applications, such as drag and drop, are often introduced in RIAs. The usage of audio and video is also common to create a richer user experience.

Thick client

Traditional web applications are usually operated through a thin client. This means that the client is only responsible for displaying the content retrieved from the server. One of the main features of RIAs is a thick client, responsible for generating the content from the data retrieved from the server and taking care of the (asynchronous) communication to the server. The thick client can be done with an array of techniques: it can consist of JavaScript and Ajax, or use for example Adobe[95] products, such as Flash or Flex.

Online and offline usage

Macromedia suggests in their previously mentioned whitepaper that RIAs should provide support for both online and offline usage[96]. However, no applications currently exist that enable this: RIAs typically run inside a browser and do not require a software installation. Adobe Apollo, a cross-operating system runtime scheduled for a release in 2007[97] and Java Web Start, a Sun Microsystems' framework, do support offline usage, but these applications are not typical RIAs, as they do not run inside a browser. They also need to be installed to

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[93] http://en.wikipedia.org/wiki/Rich_Internet_application (2 May 2007)

[94] Guldman 2002, 1

[95] Macromedia and its product families were acquired by Adobe Systems in December 2005. (http://en.wikipedia.org/wiki/Macromedia, 2 May 2007)

[96] Guldman 2002, 2

[97] http://labs.adobe.com/technologies/apollo/ (2 May 2007)

work, which contradicts the no-installation -postulate. According to Mozilla, their new Mozilla 3 –browser, using a new version of their Gecko engine, will support offline applications[98]. Mozilla 3 is due to release in November 2007[99].

Asynchronous communication

The usage of asynchronous communication is not compulsory with RIAs, but it often creates additional benefits for the user. Asynchronous communication often makes the system faster for the user, as the user does not have to wait for page loads. The system can also *prefetch* the data the user needs, cutting down the waiting time even more. As the system can load exactly the elements it needs from the server, entire pages do not need to be downloaded. This increases network efficiency by decreasing network traffic.

Cross platform

According to Macromedia, RIAs should be support a wide range of platforms: in addition to all popular desktop operating systems, also practically any device that can be connected to the Internet should be supported[100]. O'Reilly describes this in his definition of Web 2.0 as software above the level of a single device. In addition to enabling a system operable on multiple devices, this postulate states that RIAs should be operable with different web browsers within one computer.

RIA techniques

There is more than one way to create a RIA. In addition to Ajax, the most prominent techniques include using Adobe's authoring tools, such as Flash or Flex. However, also Microsoft publishing their competing software, Microsoft Expression Blend, as a part of their suite of design applications. In addition to the proprietary software, there are also open source options of developing RIAs, such as OpenLaszlo.

Adobe Apollo

Adobe Apollo is a runtime for various operating systems, which allows developers to use existing web development skills in creating rich web-based applications. These techniques encompass for example Adobe Flash and Flex, JavaScript, Ajax and HTML. As stated earlier, Adobe Apollo applications are not traditional RIAs as they do not run inside the browser, and they need to be installed before using them. However, Adobe Apollo supports also offline usage, which is one of the original RIA definitions by Macromedia in 2002[96]. Adobe Apollo is scheduled for publishing in 2007.

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[98] http://wiki.mozilla.org/Firefox3/Gecko_Feature_List (30 May 2007)

[99] http://wiki.mozilla.org/index.php?title=ReleaseRoadmap (30 May 2007)

[100] Guldman 2002, 3

Adobe Flash

Adobe Flash is a multimedia authoring tool for developing rich internet applications. The term Flash can refer to the authoring tool or the browser plug-in needed to display Flash presentations in various browsers. The newest authoring tool version, Flash CS3 Professional, was released on 16 April 2007[101], and in addition to creating vector graphics and animations, it fully supports video and audio. To control the functionality in Flash presentations, the newest version uses ActionScript 3.0, a scripting language based on ECMAScript[102].

Adobe Flex

Adobe Flex is a software development kit for an array of technologies for developing cross platform RIAs based on Adobe Flash. The current version, Adobe Flex 2, uses an Eclipse-based development tool to create Flash applications. These applications use ready, reusable MXML elements, which eases the development process.

ActiveX controls and user interface languages

ActiveX controls can be used to create powerful RIAs for Microsoft Internet Explorer. For example, the Adobe Flash plug-in for Internet Explorer in current versions is implemented as an ActiveX control. Similarly, user interface languages, like Mozilla's XML-based user interface markup language XUL, can be used to create browser-specific RIAs that take advantage of an array of common, reusable widgets. The problem with both ActiveX and XUL is that as neither Internet Explorer nor Mozilla Firefox is the *de facto* standard browser, neither of these techniques can be used without excluding a large portion of potential users. Of course, with web applications that target solely either Internet Explorer or Mozilla Firefox users, these techniques can also be used.

Java applets

Java applets run in HTML pages somewhat in a similar fashion than Flash elements. To run Java applets in a browser successfully, users need to have Java Virtual Machine installed on their computer. Java applets can use 2D and 3D graphics and audio.

Java Web Start

Java Web Start –applications are quite similar to Java applets, but they run outside the browser. Where Java applets run in a sandbox and thus have no access to local data, users can give permissions to Java Web Start applications to specified files stored on the client computer.

Microsoft Silverlight

Microsoft Silverlight uses XAML, an XML-based vector graphics markup language, to provide compatible browsers with vector graphics capabilities. Microsoft Silverlight offers similar

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[101] http://en.wikipedia.org/wiki/Adobe_Flash#History_.28Authoring_tool.29 (2 May 2007)

[102] http://en.wikipedia.org/wiki/ActionScript (2 May 2007)

functionality than Adobe Flash, with a few exceptions. Where Flash uses ActionScript to control its functionality, Silverlight is controlled by JavaScript. At its current beta stage, Silverlight supports only Windows and Mac OS X –operating systems as a platform for their browser plug-in, but additional platforms may be added later on. Microsoft Silverlight is scheduled for a release in the first half of year 2007.[103]

OpenLaszlo

OpenLaszlo is an open source platform for developing and delivering RIAs. It uses an XML and JavaScript –based description language called LZX, not unlike Mozilla's XUL or Adobe's MXML. When using an OpenLaszlo server, developers can create Java servlets to display dynamic content in a web browser. Developers can also choose to create standalone SWF presentation files. The SWF file format is created by Adobe to be used with Adobe Flash to display vector graphics, animations and functionality. OpenLaszlo SWF-files need the Adobe Flash player to be displayed in web browsers. The latest version of OpenLaszlo, version 4.0, supports creating DHTML in addition to SWF-files. The DHTML version of the application uses HTML and JavaScript to create similar functionality than the SWF-version, but without the need to use Adobe's Flash plug-in.

JavaScript and Ajax

JavaScript is an ECMAScript-based client-side scripting language originally created by Netscape in 1995. JavaScript is implemented to most modern browsers, excluding Internet Explorer, which uses Microsoft own ECMAScript variant, JScript. As with JavaScript and JScript, there are also differences in using Ajax in Internet Explorer and other browsers. Whereas JavaScript-using browsers use XMLHttpRequest for asynchronous communication between the client and the server, Internet Explorer prior to the version 7.0 uses XMLHttp, which has similar functionality. In this study, the phrase JavaScript is used also to refer to JScript, as the functionality of the languages is quite similar.

JavaScript is usually used to control various elements in the XHTML document. JavaScript can interact with the Document Object Model of the document, thus creating the possibility to change and edit the contents of different elements. JavaScript can also be used to create animations and react to the input given by the user via keyboard and mouse. As JavaScript handles video and audio quite poorly, JavaScript and Ajax –based RIAs often focus on simple animations and changing text and images dynamically.

[103] http://www.microsoft.com/silverlight/faq.aspx (4 May 2007)

Appendix 6: Tagging

CM Harrington of Blocklevel divides tagging to two categories: author-based tagging and user-based tagging[104]. Author-based tagging uses a controlled vocabulary, a list of predefined keywords, whereas user-based tagging lets the users create their own tags. Author-based tagging ensures some level of consistency within the site, but it has its problems. With a predefined list of keywords, the user tagging the content must understand the logic behind the keywords, so the keywords must be unambiguous to avoid misinterpretations. The tag vocabulary in use must also be as extensive and fine-grained as possible to allow tagging diverse objects with high precision, but at the same time be so concise that users can find the right tag with ease.

CM Harrington continues to divide user-based tagging into two smaller categories: private tagging and public tagging[39]. Private tagging is shown only to the person who has tagged them, creating a subjective categorisation that can help users classify the contents in the way they see fit. It also allows users to use their own logic and way of thinking when labelling them, giving additional freedom and flexibility. Public tagging allows other users see all the tags other users have applied to the content.

Public tagging also grants users freedom in labelling the content, but since each person tags the content using their own preferences, navigating through a publicly tagged environment can be troublesome. In addition, as most words have more than one synonym, similar objects are bound to be tagged in quite different words: for example, a picture of a dog could be tagged as dog, golden retriever, pooch or canine. Depending on the interpretation of the dog's antics in the photo, it could also be tagged as moving, running, jogging or hopping – or move, run, jog or hop. Because of this, finding specific content can turn out to be extremely hard. In addition, some words have more than one meaning, so a search on the word "bow" could return a photo of a crossbow, a bow of a boat, a bow tie, the river Bow in Canada or a person bowing. Tags can also be subjective, such as good, beautiful or interesting.

Public tagging has also its advantages: when the users do not have to find out the proper tags to embed to the content, adding content is easier for them, and the easier adding content is, the more likely it is that users will do it. Public tagging also allows a greater level of serendipitous browsing: the user may find their way to the content they are looking for wittingly or unwittingly. They also may stumble across something else that of their interest. Even though serendipitous browsing may be fun and give users the possibility to stumble upon interesting material, navigation based solely on public tagging is seldom a good solution.

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[104] http://blocklevel.com/weblog/information_architecture/tag_youre_it/ (22 May 2007)

Appendix 7: Social interaction design

As described in the history of interaction design by Marc Rettig, interaction design is shifting from creating interactions between a user and a computer system to creating systems that mediate human interaction[67]. Adrian Chan of Gravity7 has created a group of whitepapers focusing on a new approach to interaction design – social interaction design[105].

Chan describes social media systems as *talk systems*[106]. In these systems, users do not focus on fulfilling traditional, goal-oriented tasks – printing a page, creating a new post – but rather on creating continuous interaction with other users, much like in talk situations. Users do not think the site through terms of technology, but through terms of communication and relationships: instead of aiming to create a post, users aim at receiving comments to their post. Even though the aim of interaction design – to fulfil users' goals – does not change, the users' goals change, creating also a change to interaction design itself.

To fulfil a social goal of a user – for example receiving comments on their posts – actually two goals need to be fulfilled: the post still has to be created to receive comments to it. Thus creating interactions for a social network site is twofold: designing interactions between the user and the system, and designing interactions between users, mediated by the system.

This complicates interaction design, because in addition to traditional interaction design, where user interacts with the system, the system must also mediate interaction between users. Thus, interaction design for social sites can be divided to at least two categories: designing to facilitate using the site, and designing to mediate user interaction through the site.

Design to mediate user interaction

The user goals of traditional web applications are often very technically oriented: find contents, subscribe to a newsletter or create a new post. With user-generated content, users do not anymore see creating a post as a success; the success is that somebody comments on the post. Thus, designing to mediate user interaction must focus on facilitating and encouraging creating relationships between users.

User relationships on a website are diverse. A user often has relationships with other individual users, but they also have a relationship with the entire online community. The user can also be a part of a subgroup of the community, with its own relationships with the community, other individual users and subgroups. To be able to exist in the community, the users need to have certain pieces of information about the community and its members. Chan justifies this by referring to the symbolic integrationist Erving Goffman's principle, that in any

[105] http://www.gravity7.com/ (29 May 2007)

[106] Chan 2006, 8.

social situation, people need to know what is going on before engaging in to the situation, and while engaged in interaction, people need to know how they are doing[107].

What is the community like?

To understand how to interact in the community, users need to understand its basic rules: how do people act in the community? The formality of communication in the community, usage of real names and the main point of interest of the community all contribute to this. Without this knowledge, the users cannot know how to interact in the community, and thus cannot proceed in forming relationships. Users also need to know, what their limits in the community are: are they supposed to be extremely polite in their posts or use formal language, or is the community a more informal one. The actions the users also depend on the community's raison d'être: a dating site is bound to use a different kind of discourse than a business-oriented site. Some questions the users need an answer for are the following:

- What are the rules of the community?
- What is the community's raison d'être?
- How do people act in the community?
- What are the values of the community?

Who am I as a member of the community?

A user profile fulfils many goals: they are often the main means of relating to other people. A personal profile is an online reflection of the user. It allows the user to present themselves the way they wish. This can be significantly different to the offline-personality they have; online the user can be single, successful and outgoing, even though in their offline life they would be quite the opposite.

A user profile not only tells other users who this particular user is, it serves as the culmination point of the service to the user: it answers to the question who am I in relations to this service. The amount of online friends or contacts the user has, the activity of the user and the comments, recommendations or awards the user has received are also portrayed on their online profile page, letting the user know in-depth what their relationship is to other users and what is their status in the community. Whether it is the online profile or some another way, the user needs answers to the following questions:

- How am I perceived by others in the community?
- How many friends/contacts/colleagues do I have?
- What is my status in the community?
- What is my relationship towards certain individuals in the community?

[107] Chan 2006, 8-9.

Who are you as a member of the community?

Creating personal relationships in an online community is in a way private conversation in a public framework: everything done in the community is recorded and stored as a part of the users' profiles, deepening and broadening the profile. Not only does communicating with a person improve the one-on-one relationship, it also enhances the public profile of the user.

To engage in a relationship with another user in the community, the user needs to get to know the other user. Common interests, values, contacts or friends are valuable to the user in relations of forming a relationship or even contacting the other user. The user also needs to know what the other user's status in the community is: how many friends or contacts do they have, how active they are and how do they present themselves. The user needs to be answered to the following questions among others:

- What are you like?
- What is your status in the community?
- How do you relate with me?

Subgroups of the community

Subgroups in a community share many of the characteristics of both community and individual users. Users need to know understand the rules, values and reasons of existence of the group, but also the group's relationship towards the rest of the community. As an individual profile, the subgroup profile also provides information to the members of the group as well as other groups and users. The members need answers relating to subgroups in the following subjects:

- What is my status in the subgroup?
- How am I perceived as a member of the subgroup?
- How are we perceived as a subgroup of the community?
- What is our status in the community?
- How many members do we have in the subgroup?
- How active are our members?

At the same time, the same questions answered provide important information also for users who are not a member of the subgroup:

- What is this subgroup like?
- What is the raison d'être of the subgroup?
- How is the subgroup related to the community?
- How does the subgroup relate with me?
- How do people act in the subgroup?

Fulfilling non-social goals

Online relationships do not replace real-world relationships, but rather extend them. The users of an online community often look for an easy way to create or maintain existing relationships. If the online service is not easy and pleasant to use, the users will revert to the more traditional way of interacting with other people – doing it offline. Interaction between the user and the system is compulsory for the interaction between users to work, so the new goals of fulfilling social goals do not replace the goals of creating a viable system. Thus, fulfilling the users' goals in online communities requires even more work than fulfilling the goals of users in non-social websites.

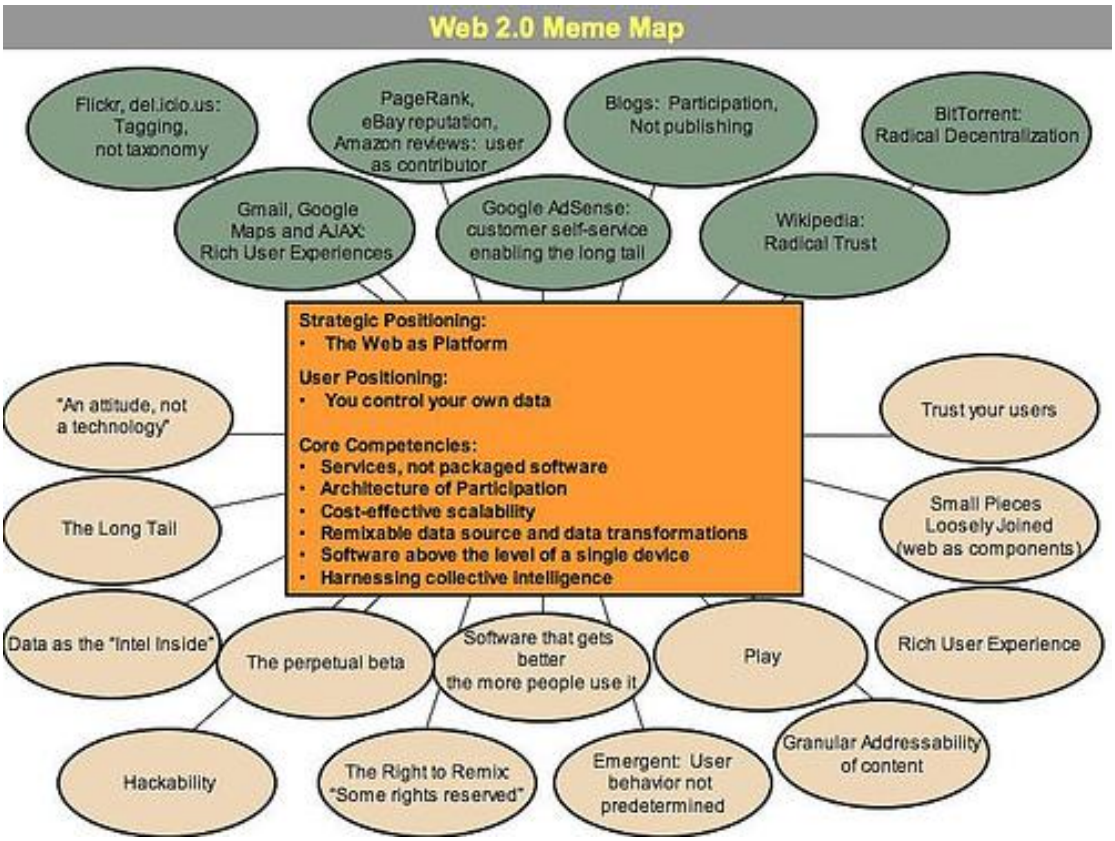
Appendix 8: Visual feedback

Bruce Tognazzini or Nielsen Norman Group suggests that users should receive feedback to their actions within 50 milliseconds. When the user has to wait longer than for two seconds, the estimated length of the wait should be displayed together with an animated progress indicator. Tognazzini also states that for waits between half a second and two seconds, an animated hourglass cursor should be displayed, but this contradicts with his statement that also multitasking should be allowed.[17] Displaying the hourglass cursor indicates that the system is performing actions, and thus no further actions can be done, until the cursor returns to normal. This may be in order when the system is performing actions that require the user not to do anything except wait, but with actions that can be processed on the background, using an hourglass cursor only disables multitasking.

According to the principle of proximity, elements close to each other are perceived to be more related than elements more apart[108]. When loading the whole contents of the page at once, there is no specific need to specify the area being updated, but when updating only a small piece of the website, the progress indicator should be as close or even atop the updated area. This way the user will understand the relationship better between the progress indicator and the area being updated.

[108] Lidwell, Holden & Butler 2003, 160-161.

Appendix 9: O'Reilly Meme Map



Appendix 10: List of interviewees

Table 20: Interviewees

Name	Title	Office
Gijs de Ridder	Senior Interaction Designer	Amsterdam
Jeroen van Vianen	Technical Consultant	Amsterdam
Maria Savolainen	Senior Designer	Helsinki
Martijn van Welie	Design Director	Amsterdam
Santtu Elsinen	Director Business Development	Helsinki
Tommi Pelkonen	Strategist	Amsterdam

Appendix 11: Survey

Attitude towards Web 2.0

Please rate the following statements. Do you agree or disagree?

In this questionnaire, user-generated content denotes all forms and shapes of content created by users, for example users as the content (MySpace), audio-visual or textual content created by users (YouTube or Wikipedia) or user-created metadata (tagging).The term Web 2.0 elements used in the questions denotes an array of new user interface ideas and techniques used commonly in Web 2.0 sites, such as drag & drop environments, autocompletes (Google Suggest) or elements using asynchronous communication with for example Ajax.

	Agree completely	Agree partially	Disagree partially	Disagree completely
I have a clear understanding on what Web 2.0 is.				
Web 2.0 is only a hype, and it has no real effects on designing or developing websites.				
Web 2.0 does not affect my work at all.				
The rise of user-generated content does not affect my work at all.				
Web 2.0 elements do not affect my work at all.				
I am personally passionate about Web 2.0.				
I do not have enough time to follow up on new Web trends.				
Satama offers me sufficiently opportunities to leverage my skills and knowledge in Web 2.0.				
No additional measures or steps should be taken to cope with Web 2.0.				
Satama is well prepared to the challenges posed by Web 2.0.				
The real change is caused by an increase in broadband connections and in their speed, not by Web 2.0				
Web 2.0 and user-generated content creates a shift from designing and developing websites				

that users interact with to websites that users use to interact with other users.				

What other thoughts or opinions do you have about Web 2.0?

Challenges of Web 2.0

Please rate the following statements. Do you agree or disagree?

	Agree completely	Agree partially	Disagree partially	Disagree completely
The tools designers use are not adequate to create good enough Web 2.0 designs.				
Designers need a thorough understanding on the limitations of Web 2.0 elements to create viable designs that are easy to develop.				
Designers need a thorough understanding of the possibilities of Web 2.0 elements to create innovative designs.				
More Web 2.0 projects are needed to learn from them.				
Designing sites with user-generated content differs significantly from designing traditional websites, as user goals are different.				
Designing and developing Web 2.0 sites is more complex than designing traditional websites.				

What other challenges does Web 2.0 pose for Satama?

What is your profession?

User interface designer or Interaction designer

Information architect

Interface programmer
Software developer or Software engineer
Software architect or Solution architect
Technical consultant or Technology consultant
Flash or Rich media developer or programmer
Art director
Concept designer
Graphic or Visual designer
Other _____

Questions for designers

Please rate your skills related to Web 2.0

	Excellent skills	Good skills	Adequate skills	Poor skills
How good skills do you have in using Web 2.0 elements in your designs?				
How good skills do you have in designing in designing websites focused on user-generated content?				

How experienced are you in Web 2.0?

Please rate your level of experience.

	A lot (5 projects or more)	Some (2 to 5 projects)	A little (1 or 2 projects)	No experience
How much experience do you have in designing websites that focus on user-generated content?				
How much experience do you have in using Web 2.0 elements in your designs?				

Please give an estimate of your colleagues skills

	Excellent skills	Good skills	Adequate skills	Poor skills
How good skills do you think other interaction designers or user interface designers in your office have in designing websites focused on user-generated content?				

How good skills do you think other interaction designers or user interface designers in your office have in using Web 2.0 elements in their designs?				
How good skills do you think developers in your office have in developing Web 2.0 elements?				
How good skills do you think Satama employees in general have in designing and developing sites with Web 2.0 content - Web 2.0 elements or user-generated content?				

How should Satama cope with the changes brought upon by Web 2.0?

Please rate the following statements. Do you agree or disagree?

	Agree completely	Agree partially	Disagree partially	Disagree completely
Communication and information sharing between designers must be increased				
Designers must be actively educated by arranging workshops and boot camps				
Designers must be passively educated by encouraging self-educating - reading articles, trying out web services etc.				
Trials and exploratory projects which use new techniques and ideas must be increased.				

Other steps should be taken, for example...

Questions for developers

How good skills do you have in developing Web 2.0 elements?

Excellent skills

Good skills

Adequate skills

Poor skills

How much experience do you have in developing Web 2.0 elements?

A lot (5 projects or more)

Some (2 to 5 projects)

A little (1 to 2 projects)

No experience

Please give an estimate of your colleagues skills

	Excellent skills	Good skills	Adequate skills	Poor skills
How good skills do you think other developers in your office have in developing Web 2.0 elements?				
How good skills do you think Satama employees in general have in designing and developing sites with Web 2.0 content - Web 2.0 elements or user-generated content?				

How should Satama cope with the changes brought upon by Web 2.0?

Please rate the following statements. Do you agree or disagree?

	Agree completely	Agree partially	Disagree partially	Disagree completely
Communication and information sharing between developers must be increased.				
Developers must be actively educated by arranging workshops and boot camps.				
Developers must be passively educated by encouraging self-educating - reading articles, trying out web services etc.				
Communication and information sharing between designers and developers must be increased.				
Trials and exploratory projects which use new techniques and ideas must be increased.				

Other steps should be taken, for example...

Questions for other competences

How good skills do you have in designing or developing sites with Web 2.0 content - Web 2.0 elements or user-generated content?

Excellent skills

Good skills

Adequate skills

Poor skills

How much experience do you have in designing or developing sites with Web 2.0 content - Web 2.0 elements or user-generated content?

A lot (5 projects or more)

Some (2 to 5 projects)

A little (1 to 2 projects)

No experience

How good skills do you think Satama employees have in general in designing and developing sites with Web 2.0 content - Web 2.0 elements or user-generated content?

Excellent skills

Good skills

Adequate skills

Poor skills

What kind of concrete steps should be taken to cope with the effects of Web 2.0?

Please rate the following statements. Do you agree or disagree?

	Agree completely	Agree partially	Disagree partially	Disagree completely
An internal knowledge centre (e.g. a wiki or a blog) should be created, where information can be collected and shared				
More formal events for sharing information should be arranged - for example post-project meetings or events, where colleagues can educate each other				
More informal events for sharing information and ideas should be arranged - for example events, where people present interesting sites and discuss them				

Creating online reports of the things learned in projects should be made compulsory				
Creating online reports of the things learned in projects should be encouraged, but not made compulsory				
More Web 2.0 projects are needed for designers and developers to learn. Thus, Web 2.0 must be actively promoted to clients.				

Other concrete steps should be taken, for example...

Appendix 12: Survey comments

Other concrete steps should be taken, for example...

We shouldn't push 'Web 2.0' selling to clients too much. This idea has it's place and we must learn to see where to use it and where not. Proper tools for proper needs. *(Technical Consultant, Helsinki)*

How-to-do-this-and-this Screencasts could be cool? *(Developer, Helsinki)*

Also, client should be educated about web 2.0. It starts with the selling... *(Technical Consultant, Amsterdam)*

At the beginning, there probably should be a dedicated Web 2.0 team in each office, much like the Flash Fabrieks. (A full designer-developer team.) *(Concept Designer, Helsinki)*

Blogs would be a good way (due to the informal nature that lowers the participating threshold) to share knowledge, ideas and even code.. *(Technical Consultant, Helsinki)*

Case reports should be compulsory when the project obviously deserves it. Many cool aspects of good projects go unnoticed internally (and, not to mention, by the public), since the arguments behind the concept and the design are not explicitly explained. *(Flash Developer, Helsinki)*

Company policy does not encourage employees to participate in neither formal nor non-formal (or any other) events if they are not billable. Professional development does not generate enough profit? *(Concept Designer, Helsinki)*

I think we already have a wiki for web 2.0 and the research blog for discussing about the new stuff *(Concept Designer, Helsinki)*

Overall there should me much more sharing information inside Satama. Creating reports that no-one has time to read is not as effective as face to face meetings and presentations. Maybe more semi-compulsory seminars with only project presentations(?) with educating aspect or something. *(Concept Designer, Helsinki)*

there is allready MST side blogs and wiki. But me never used it gather information because there is nothing for me. Im bored read blogs which gives links to other blogs... *(Developer, Helsinki)*

Other steps should be taken, for example...

Basically this has nothing to do with Web 2.0 only. *(Developer, Helsinki)*

Curiously enough, steps aforementioned are required for *every* project we do, not only Web 2.0. (Technical Consultant, Helsinki)Satama should analyze more current Web 2.0 success stories .Create Web 2.0 projects for Satama as business for content/profit, not only to Satamas customers. *(Software Architect, Helsinki)*

Spread more information about the ongoing/finalized projects *(Interface Programmer, Helsinki)*

Tie the project together more closely, so that all aspects are considered in all phases of the project. I don't want to say that all people are in for all the project life span, but that results of all phases are run through each section working in the project to confirm that all aspects match standards and requirements. *(Technical Consultant, Helsinki)*

We need to increase interaction in every possible way between designers and developers! *(Technical Consultant, Helsinki)*

What other thoughts or opinions do you have about Web 2.0?

Although there is no 'Web 2.0', the shift to user interactive content in websites has been a clear thing for a while now. Increased connection speeds support this and enable users to experience interactive content more seamlessly compared to earlier times, when the 'standards' that make 'Web 2.0' (AJAX, JavaScript, interactive user experience) were considered slow and bad user experience. Personally I think the idea of 'Web 2.0' concept is true and good, but the hype it has already driven me to the point where I consider it 'the rambling of myspace noobies'. *(Technical Consultant, Helsinki)*

I get confused every now and then by the dual meaning of web2.0. On the one hand it means user participation and user generated content, such as social networking and bookmarking. On the other hand Web2.0 is mentioned as the techniques that make all these new forms of internet usage possible, like ajax and flex and such. I think the focus at Satama lies in the latter, it's mostly about implementing the techniques and less about massive social user environments.But that might also have to do with the clients that we work for. *(User Interface Designer, Amsterdam)*

Poses great challenges on both UI design and tech implementations. *(Technical Consultant, Amsterdam)*

The main challenge for us is to find methods for increasing the speed of developing new businness models for our customers. This challenge requires deep understanding about the web 2.0 philosphy. Technology itself is not very promising for making business but business models for our customers which are based on web 2.0 will create more and more consulting and also implementing business. If we do not succeed beyond the public web 2.0 solutions, we

do not have enough competitive advantage for our own doing. *(Technical Consultant, Helsinki)*

The other part of Web 2.0 is the shift to more dynamic websites (AJAX, widgets etc.) and that's something that requires significant training of people at Satama. This is needed both to understand what the new possibilities and problems are, but also to actually be able to implement rich internet applications. *(Technical Consultant, Helsinki)*

We need to put more emphasis on business solutions and cases, what to present and offer to our customers. *(Technical Consultant, Helsinki)*

Web 2.0 is much more than just user generated content, think for example about mashups, new front-end technologies. *(User Interface Designer, Amsterdam)*

Web 2.0 is stupid name old technology. Only way it used change so i think web 2.0 is totally 'marketing hype'. Stupid say interact with website ... like old days we didn't interact with website? :) *(Developer, Helsinki)*

What other challenges does Web 2.0 pose for Satama?

Abandoning old methods and bringing all sides of the project to realize and visualize what is required to fill in the standards and what areas are the keys to a successful 'Web 2.0' site, since they're not 100% the same as they were before. *(Technical Consultant, Helsinki)*

I pointed out in last section that understanding of our customers businesses and ways that we can build more business for them will be crucial. Web 2.0 is not just user content production, it must provide solutions for companies and organizations to make more money... *(Technical Consultant, Helsinki)*

Interface Programmers (there are exceptions of course) currently lack the necessary skills to do rich internet applications at a competitive level. *(Technical Consultant, Helsinki)*

Satama should acknowledge that Web 2.0 is not a *new* paradigm but a *re-newed* one. From the glory days of NNTP people have been interacting, creating content (ca 1980 onwards). The biggest reason for web 2.0 to backfire is that insufficient stuff is packaged as Web 2.0 and presented with much hype. Web 2.0 is not really rocket science. *(Technical Consultant, Helsinki)*

Satama should get projects which allow us to build experience in the field *(User Interface Designer, Amsterdam)*

we need to find the real solutions and design applications that really bring value to the company. Not nearly all customes are ready to utilize and take these kinds of solutions into use *(Technical Consultant, Helsinki)*

Wireframing gets a lot more complex, since you have multiple options for every single page. Software needs to be able to create easy ways to make functional design, i think Visio is too limited, Axure might be better for web2.0 issues but it has other flaws. *(User Interface Designer, Amsterdam)*