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Web 2.0 User Experience: Social Media and Ajax Technology

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**Abstract text:**

The term Web 2.0 is a joint name for new technologies, business strategies, and social trends in the web. This study concentrates on social media such as user participation in the web content creation and social networking such as using Facebook. Another focus is on Ajax technology, which enables a rich user experience e.g. by letting the user drag user interface elements.

The study aims at finding out how users experience the Web 2.0 characteristics. User experience consists of much more than just usability, such as user's needs, expectations, and objectives. The focus of the study is on both social media and Ajax possibilities as well as on their usability. In addition, users' typical usage patterns and the differences between user groups are being studied. We also discuss what should be taken into consideration when exploiting Web 2.0 characteristics on web services.

The study methodology is based on Adage Usability's usability research process, which is a combination of usability's expert evaluation, usability testing, interview, and inquiry. The study was carried out with genuine web users who consisted of younger active users and older passive users. The applications under review were typical Web 2.0 applications: Google Maps, Wikipedia, Blogger, Google Reader and Facebook.

The results suggest that Web 2.0 applications are quite easy and pleasant to use even though it may take some time to learn to use them. Users seemed to exploit the content created by others quite actively, but the threshold for producing content is high. Users are not encouraged to participate due to difficult-to-use user interfaces and lack of recognition given to the users. Social networking offers many useful features such as new communication tools, but also unpleasant drawbacks such as lack of privacy. The difference between older and younger users is quite large. Older users often lack earlier knowledge and the will to try out new service features. In addition, they have different needs and usage habits. Users have needs and interest, but they may not have sufficient knowledge of the available services. Ajax features are quite useful, but their poor findability sets a challenge of its own for design. Hence Ajax and social media should be exploited with caution, because they do not fit in every environment.

**Keywords:** Ajax, Rich user experience, Social media, Social networking, Usability, User experience, User participation, Web 2.0

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**Tiivistelmäteksti:**

Web 2.0 -termi on yhteinen nimitys Internetin uusille tekniikoille, liiketoimintamalleille sekä sosiaalisille trendeille. Tämä tutkimus keskittyy sosiaaliseen mediaan, jolle on tyypillistä käyttäjien osallistuminen palvelujen sisällöntuotantoon sekä sosiaalisen verkostoitumisen tukeminen esimerkiksi yhteisöpalvelu Facebookin välityksellä. Tutkimuksen toisena kohteena on Ajax-tekniikka, joka mahdollistaa rikkaan käyttökokemuksen esimerkiksi antamalla käyttäjän raahata käyttöliittymän elementtejä.

Tutkimuksen tavoitteena on selvittää miten käyttäjät kokevat Web 2.0 -ominaisuudet. Käyttökokemus koostuu paljon muustakin kuin käytettävyydestä, kuten käyttäjän tarpeista ja odotuksista sekä käytetyn palvelun käyttötarkoituksesta. Tutkimuksen kohteena ovat sekä sosiaalisen median että Ajaxin tarjoamat mahdollisuudet kuten myös niiden aiheuttamat käytettävyysongelmat. Lisäksi tarkoituksena on selvittää käyttäjien tyypillisiä käyttötapoja ja käyttäjäryhmien eroja. Johtopäätösten perusteella selvittää, mitä kaikkea pitäisi ottaa huomioon hyödynnettäessä Web 2.0 -ominaisuuksia verkkopalveluissa.

Valitut tutkimusmenetelmät perustuvat Adage Usabilityn käytettävyyden tutkimusprosessiin, joka on yhdistelmä käytettävyyden asiantuntija-arvioinnista, käytettävyydestistä, haastattelusta ja kyselystä. Tutkimus toteutettiin todellisten verkkokäyttäjien kanssa, ja käyttäjät koostuivat nuorista, aktiivisista käyttäjistä sekä vanhemmista, passiivisista käyttäjistä. Testatut sovellukset koostuivat tyypillisistä Web 2.0 -sovelluksista: Google Maps, Wikipedia, Blogger, Google-syöteenlukija ja Facebook.

Tutkimustulosten mukaan Web 2.0 -sovellukset ovat melko helppoja ja miellyttäviä käyttää, vaikka niiden käytön opettelu saattaakin olla aikaavievää. Käyttäjät hyödyntävät muiden tuottamaa sisältöä varsin aktiivisesti, mutta sisällön tuottamisen kynnyks on suuri. Käyttäjiä on kannustettu liian vähän osallistumaan, mikä näkyy esimerkiksi vaikeakäyttöisissä käyttöliittymissä sekä annetun tunnustuksen puutteena. Yhteisöpalvelut tarjoavat monia hyödyllisiä ominaisuuksia, kuten uusia yhteydenpitovälineitä, mutta myös haittapuolia, kuten yksityisyyden puutteen. Nuorten ja vanhojen käyttäjien välinen ero on melko suuri. Vanhemmilta käyttäjiltä puuttuvat usein aiemmat tiedot sekä kokeilunhalu, minkä lisäksi heillä on erilaiset vaatimukset ja käyttötottumukset. Käyttäjiltä löytyy tarpeita ja mielenkiintoa palveluita kohtaan, mutta usein ongelmana ovat puutteelliset tiedot olemassa olevista palveluista. Ajax-ominaisuudet ovat varsin hyödyllisiä, mutta niiden huono löydettävyys asettaa oman haasteensa suunnittelulle. Ajaxin ja sosiaalisen median käytön suhteen tuleekin olla varovainen, koska ne eivät sovi kaikkiin ympäristöihin.

**Avainsanat:** Ajax, käytettävyys, käyttäjien osallistuminen, käyttökokemus, rikas käyttökokemus, sosiaalinen media, sosiaalinen verkostoituminen, Web 2.0

## Preface

User experience is a concept which links the designed service and the user to one another in a very interesting way. It is not enough that the service is good-looking and well-designed, but it also needs to fulfill user needs and expectations and be easy and pleasurable to use in order to produce a positive user experience. Web 2.0 is a broad concept and it took me quite some time to get an overall picture of it. Web 2.0 is though something that I run into everyday when I communicate with friends, read news online, or search for information.

During my studies at Helsinki University of Technology, I generated a deep interest in usability and user centered design, and I have been very lucky to work for a company which has given me the chance to study usability. I want to thank Adage Usability for offering me the opportunity to study such as interesting subject as Web 2.0 user experience. I want to thank several colleagues of mine who have given me tips and pieces of advice for my study.

I would also like to thank my instructor Raino Vastamäki for helping me to define the goals and the methodology of the study, and my supervisor Timo Korhonen for his good comments and tips about writing.

Special thanks go to my family and friends many of whom have participated in my study as test participants. I would especially like to thank my mum for supporting me financially and in many other ways during my studies, and Sakari who has been patient and always willing to offer his support.

Espoo, December 14, 2009

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## List of Abbreviations

Ajax	Asynchronous JavaScript and XML
API	Application Programming Interface
CSS	Cascading Style Sheets
GUI	Graphical User Interface
HTML	Hypertext Markup Language
P2P	Peer to Peer
RIA	Rich Internet Application
RSS	Really Simple Syndication / Rich Site Summary
UI	User Interface
URI	Uniform Resource Identifier
URL	Uniform Resource Locator
UX	User Experience
XML	Extensible Markup Language
YTV	Pääkaupunkiseudun yhteistyövaltuuskunta

## Key Concepts

Ajax	A combination of HTML, CSS, JavaScript and XML. Makes web faster, more interactive, and more user-friendly, e.g. by enabling refreshing only parts of web pages and more interactive user actions such as drag-and-drop.
Blog	A web communication tool in a form of a web site for publishing text together with images and links. Created with blogging software e.g. Blogger.
Facebook	The most popular social networking application. It enables e.g. creating your own profile, contacting friends, and sharing photos.
Long tail	The less popular products. Physical retail stores are only concentrating on the most popular products, but web stores such as Amazon with a global consumer base can offer also the less popular products.
Rich internet application	Work more like desktop applications than traditional web applications, e.g. webmail. RIA's are enabled by rich technologies such as Ajax which lead into faster response times and more interactive graphical user interface (GUI) elements, e.g. always visible floating menus, and controls, e.g. the dragging of GUI elements.
Rich user experience	A more pervasive, dynamic, and interactive user experience, which is achieved by rich internet applications.
RSS feed	A data syndication format RSS (Really Simple Syndication / Rich Site Summary) is used for collecting web content feeds e.g. from blogs and news services. Feed reader programs such as Google Reader check lists of syndication feeds and display all the updated content on one page.
Social bookmarking	Web users can tag, save, manage, and share web pages with other web users with the help of social bookmarking services such as Delicious and Digg.

Social media	Consists of user created web content (e.g. multimedia and texts), collaboration tools (e.g. wikis and social bookmarks), and communication tools (e.g. social networking applications, blogs, and forums).
Social networking	Online communities which are formed with social networking applications, which offer ways of finding people with similar interests, communicating with others, and expressing oneself. Facebook is the most popular application.
Syndication	Presenting data from various web pages on a single page. The most common syndication format is RSS.
Tag	Tag is a descriptive keyword that is attached to a digital object such as a web page, an image, a blog entry, or a video. Tags are facilitating search functions and the arranging of digital objects.
Usability	Is a part of user experience that measures how easy and pleasurable a product or service is to use.
User experience	Positive user experience is achieved when service's features and design meet user's needs and expectations in a usable and pleasurable way.
User participation	Users participate into the content creation and sharing in the form of text (e.g. blogs, wikis, and discussion forums), images (e.g. Flickr and Facebook) and videos (e.g. YouTube).
Web 2.0	A joint name for a collection of new technologies, applications, concepts, ideas, business strategies, and social trends in the web. Web 2.0 is more dynamic and more interactive than Web 1.0.
Web as a platform	Desktop-like applications are run on web browser window.
Wiki	A web-based tool for creating, modifying, and deleting web content collaboratively. Web-based encyclopedia Wikipedia is the best known wiki.



## 1. Introduction

The web is developing and expanding constantly. The concept of Web 2.0 is one of the most relevant concepts describing these new and developing trends in the web. Millions of web users run into Web 2.0 characteristics, such as social media and new web technologies, in their everyday web usage sometimes even without noticing it. Web 2.0 characteristics are self-evident to some users, and some users are not even aware of their existence. Therefore it is interesting and challenging to find out how people are experiencing the constantly evolving web and the Web 2.0 characteristics.

### 1.1. Purpose of the Study

The purpose of this research is to study Web 2.0 user experience and usability. The study aims at finding out what kinds of opportunities Web 2.0 offers and how the web users are exploiting them. The scope of the study includes several social media components, such as user participation in web content creation and social networking. Also the usability of a Web 2.0 technology Ajax is being studied. This study tries to research both the advantages and the disadvantages of Web 2.0 features and applications.

Very little research on Web 2.0 user experience has been published. User experience consists of much more than just usability, such as user's needs and expectations as well as service objectives. For example Hart et al. have studied the user experience of social networking application Facebook and noticed that a positive user experience is possible despite of usability issues [Har08]. Web technology Ajax also sets its own challenges to Web 2.0 user experience. The richness of applications provided by Ajax is still quite unfamiliar to many especially older users and Ajax also breaks users' mental model concerning web pages [Mau06]. Another Web 2.0 challenge seems to be the low participation rate of users in web content creation. According to Jakob Nielsen, only 1% of users are participating actively with another 10% participating sometimes leaving the majority of users only exploiting the content created by others.

In order to study user experience and usability, a user study with genuine web users is required. In this research, the user study consists of usability tests, interviews and inquiries. Besides testing five Web 2.0 applications' user experience and usability, users are interviewed about several other applications and Web 2.0 characteristics as well.

The results of the study will be utilized in marketing materials of Adage Usability which is a Finnish company specialized in usability research and user-centered design. Typical customers

of Adage Usability are companies offering web services to their own clients. The customers are not always aware of the possible Web 2.0 characteristics and the consequences of using Web 2.0 features on their web services. This study aims at describing the Web 2.0 characteristics and the matters that should be taken into consideration when planning to exploit them. Simultaneously with this study, a study on Web 2.0 best practices is being conducted by Adage Usability. Some results of that study are also exploited in this study and vice versa.

## **1.2. Research Questions**

All the research questions of this study concern Web 2.0 user experience and usability. The research questions are presented in order of importance.

### **1st Question: How is Social Media Used and Exploited?**

This study concentrates on social media which includes user participation in the web content creation and social networking. The main purpose of this study is to find out:

- What kinds of social media applications and characteristics are being used, and how the users are utilizing these applications?
  - Are users just exploiting the content created by others or are they also participating in the content creation process?
- Why certain applications are being used and others are not?
  - Have social networking applications and other relatively new communication tools changed the ways in which users communicate with each other?

Determining the advantages and disadvantages of social web applications helps web site developers to understand in what kinds of contexts certain Web 2.0 characteristics could be exploited.

### **2nd Question: What are the Opportunities of Rich User Experience?**

Rich user experience enabled by Ajax is another focus of this study. The purpose is to find out:

- What are differences between the user experiences produced by rich (in this study enabled by Ajax) and traditional internet applications?
- Are the rich user interface elements and controls easy to notice and find?
- Are the rich user interface elements easy and pleasant to use?

Determining the advantages and disadvantages of Ajax helps web site developers to understand where Ajax fits and what needs to be taken into consideration when Ajax is used.

### **3rd Question: What are the Typical Web 2.0 Usability Problems?**

In addition, usability of Web 2.0 applications is studied. The purpose is to find out:

- What are the typical usability problems with Web 2.0 applications and characteristics?
  - Besides users' general dislikes towards applications, are there some usability related issues that might prevent users from using the applications?

Knowing the typical usability problems helps web site developers to avoid them and develop better solutions to replace them.

### **4th Question: What Kinds of Differences are there between User Groups?**

Another interesting points concerning web site design are the differences between different user groups. In this study, users from very different age groups and social media backgrounds are used. The two user groups consist of young, active social media users and old, passive social media users. The purpose is to find out:

- How these two user groups differ from one another, e.g. in their opinions and usage manners?

After finding out the differences between the user groups, it is possible to give recommendations on what should be taken into consideration when designing Web 2.0 applications for a wide range of users.

## **1.3. Structure of the Thesis**

The structure of this master's thesis is the following. Literature overview concentrates on determining the Web 2.0 concept, characteristics, and features as well as the user experience point of view from earlier research. The research chapter describes the used research methods, test users, and tested applications. The results of the study are presented in their own results chapter both with text and descriptive diagrams. The analysis of the results concentrates on answering the predetermined research questions [see section 1.2. Research Questions]. At the end of the thesis, conclusions of the study and final results are presented. Finally possible future research is discussed.

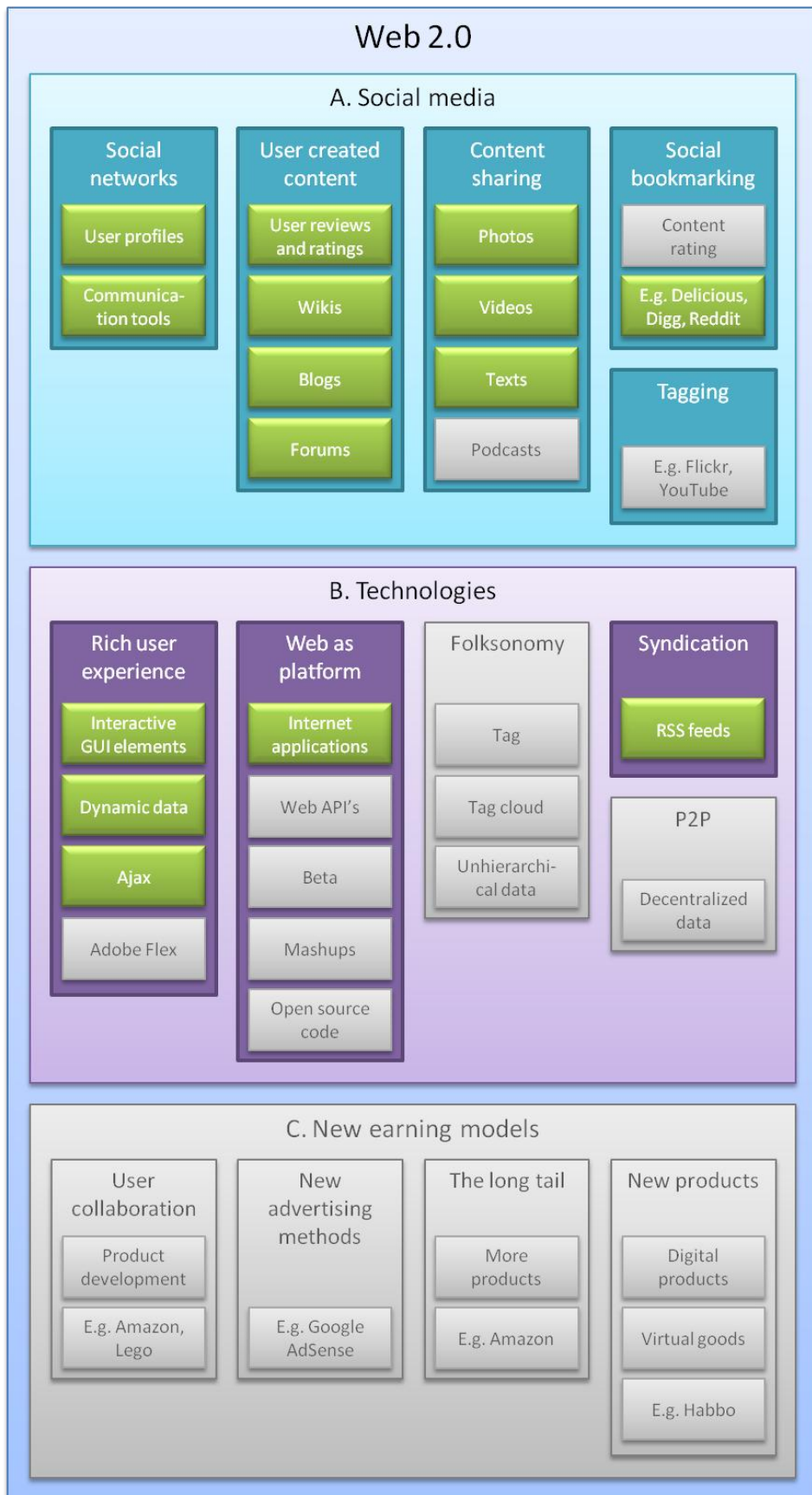
## 2. Literature Overview

In this chapter the concepts of Web 2.0 and user experience are defined. The two main characteristics of Web 2.0 concept, social media and the enabling technologies, are also introduced in detail.

### 2.1. Web 2.0 Definition

The concept of Web 2.0 was first introduced in 2004 by Tim O'Reilly and MediaLive International. There is no single definition for Web 2.0, but the definition seems to change slightly with every author. The Web 2.0 concept was developed to express the new evolving trends of web [Hin07]. It can be considered to be a joint name for a collection of new technologies, applications, concepts, ideas, business strategies, and social trends in the web [Mur07]. Web 2.0 has also been called wisdom web, people-centered web, participative web and read/write web [Mur07].

Figure 2.1 presents the main characteristics of Web 2.0 concept. Technology point of view consists of rich user experience, the usage of web as a platform, syndication, peer-to-peer, and folksonomy (a way for presenting nonhierarchical data). Social web is the broadest Web 2.0 characteristic, and it includes user participation and social networking. Web 2.0 can also be seen as a basis for new web-based earning models which may be based on user collaboration, new advertising methods, exploitation of the long tail, or new types of products, such as digital products (e.g. music) or virtual goods (e.g. virtual community Habbo's furniture). [Hin07] [O'Re05]



**Figure 2.1:** Web 2.0 features. The features discussed in this study are highlighted and indicated with green. Based on [Hin07] and [O'Re05].

### **2.1.1. Comparison between Web 2.0 and Web 1.0**

Web 2.0 is the successor of traditional web which is often called Web 1.0. Web 2.0 differs from Web 1.0 in several ways: Web 2.0 is more dynamic and more interactive [Mur07]. New development technologies such as Ajax and Adobe Flex enable Web 2.0 user interfaces to be richer and more responsive than Web 1.0 interfaces. Web 2.0 concentrates on collaborative content creation and modification and connects people with similar interests through social networks [Mur07]. Web 2.0 has changed the ways in which especially young and technology-oriented users interact with each other and also the content of web [You07] [Pil08].

Figure 2.2 presents a comparison between Web 1.0 and 2.0. Typical for Web 1.0 is that it is mostly used by professionals, e.g. journalists and encyclopedia authors, to create content to the web. Web 2.0 has distributed the content creation process to practically any web users who are able to participate, e.g. by sending own photos to newspapers or by editing articles in Wikipedia. Traditional web applications have also turned into rich internet applications. Web 2.0 also includes new social and business trends when compared to Web 1.0.

### **2.1.2. Comparison between Web 2.0 and Web 3.0**

Web 3.0 is still quite a new concept with very little published material. The line between Web 2.0 and Web 3.0 is rather unclear, but everything that goes beyond Web 2.0 seems to be placed under the Web 3.0 concept. Figure 2.2 presents a comparison between Web 2.0 and 3.0.

One of the Web 3.0 focuses can be considered to be mobile revolution [Mar06]. It means that the current and future web applications will also be used on mobile devices in increasing numbers. Web 3.0 is also believed to change the characteristics of web applications. Future applications might e.g. be faster and smaller and possible to run on different platforms [Sch07].

Intelligent search is also considered to be part of Web 3.0 concept [Mar06]. Recently released Wolfram Alpha answers users' questions by collecting data from different web sources and presenting the data e.g. as diagrams and tables [Wol09]. Semantic web is also closely related to intelligent search [Mar06]. A suggestive search can also be considered to be intelligent. For example Apple.com's search field suggests possible products and Facebook's search field possible friends while the user is typing into them.

Another social Web 3.0 characteristic is localization [Mar06]. Applications, such as Jaiku, Google Latitude, and Nokia Ovi Lifecast, are used for sharing location information such as the user's current location. With Google Latitude and Nokia Ovi Lifecast it is possible to see friends' locations on a map [Goo09a] [Nok09].

Other Web 3.0 characteristics include appearance related trends such as customization and 3D [Mar06] [And07]. iGoogle is a customizable Google search page into which users can choose their favorite portlets, such as news and weather portlets [Goo09b]. 3D internet would try to merge the best parts of virtual worlds, such as Second Life, with web making it more visual [And07]. Web 3.0 views also include a Web 2.0 backlash. As a Web 2.0 backlash, Web 3.0 would include clean up services which would be used for erasing users' digital paths and identity management [And07].

Web 1.0	Web 2.0	Web 3.0
<b>Traditional / Present</b>	<b>Present</b>	<b>Present / Future</b>
<b>Professional content creation</b> Personal web sites Online newspapers published by journalists Online encyclopedias	<b>User content creation</b> Blogs Users participating into content creation (e.g. photos) Wikipedia	
<b>Traditional web applications</b>  Webmail HTML maps	<b>Rich internet applications</b> (more dynamic, interactive, responsive and richer) Gmail Ajax maps	<b>Improved applications</b> (smaller and faster) New platforms (e.g. mobile devices) Intelligent search
	<b>Social trends</b> Social networking Collaboration (e.g. wikis)	<b>New social trends</b> Localization
	<b>Other characteristics</b> New business strategies (e.g. long tail)	<b>Other characteristics</b> Facilitating tools (e.g. Identity management, Digital path eraser) Appearance (e.g. Customization, 3D internet)

**Figure 2.2:** Comparisons between Web 1.0, 2.0 and 3.0. Based on [And07, p. 52] [Mar06] [Mur07, p. 34-35] [O'Re05] [Pil08, p. 239] [Sch07] and [You07, p. 2].

## 2.2. User Experience

User experience (UX) has several definitions. According to Hassenzahl et al., UX consist of user's internal state, the characteristics of the designed system, and the context of use. User's internal state on the other hand includes everything from the user's predispositions and expectations to his needs, motivations, and moods. UX covers the designed system's purpose, functionality, and usability. The context stands for both the environment and the setting of use. [Has06]

Usability is thus a part of user experience, and good usability with e.g. pleasurable design often results in good user experience [Sin08]. Usability has several definitions of which Jakob Nielsen's is probably the best known. According to Nielsen, usability consists of the following features of the product or service: learnability, efficiency, memorability, error avoidance, and satisfaction [Nie93]. Besides these, findability of service features can be seen as an important usability characteristic. Basically a product, which meets good usability standards, is often easy and pleasurable to use.

In literature, very little research on Web 2.0 user experience and usability has been reported [Pil08]. The rush to adopt new Web 2.0 aspects has resulted in many developers to overlook the principles of good design and usability [Pil08]. A design and development dilemma between fast and easy design and well designed has also emerged [Mur07].

## 2.3. Social Media

Part A of Figure 2.1 presents some of the most important social media characteristics, which include user participation and social networking. User participation means that web users are participating in the web content creation, tagging, and sharing. Social networking includes e.g. creating user profiles to social networking applications and communicating with other web users through those applications.

### 2.3.1. User Participation

One of the most important Web 2.0 characteristics is user participation in web content creation and modification even though that it has been reported that only 1% of users participate actively, 9% sometimes and the rest 90% never [Nie07b] . Nearly all the content the users have created is shared with others such as a small group of friends or the whole web community.

Besides creating and sharing web content, users can recommend it to one another. With social bookmarking web services, such as Delicious and Digg, users can store, organize, and search



bookmarks of web pages usually with the help of tags [see section 2.3.4. Tagging and Social Bookmarking].

According to a research made by Netpop Research, the most active Web 2.0 users are somewhat young and they tend to keep in contact to several hundred people per day and they are connected to the Internet with several different devices, such as work computer, home computer, and mobile phone, on a daily basis. [Sto09]

### 2.3.2. User Created Content

The new kinds of opportunities provided by the new Internet technologies and new applications are making users more influential for example by letting the users to create content to the web [O'Re05]. The role of the user is no longer just a consumer, but more like a contributor and collaborator. By taking into account usability point of view, user should be treated as a partner who possesses rights to his own content. The user as an equal collaborator should have the rights to decide to whom their content will be presented and to remove the content they have created [And07]. Web content creation tools should also be as easy as possible to use because this would encourage the users to participate more actively [And07].

Services tend to get better while more users adopt them, e.g. the more users are using Wikipedia, the faster the factual errors get corrected [And07] [Bes06] [Hin07] [O'Re05]. In addition, the content increases and the reachability of people becomes easier when more people join the services, e.g. Skype [Hin07].

Some companies, like web store Amazon, have outsourced some of their content creation processes, such as writing of product reviews, to regular web users [Hin08]. In addition, e.g. newspapers are exploiting the photos taken by readers [Mäk08]. Sometimes information on major accidents and catastrophes, e.g. Indian Ocean tsunami in 2004 and school shootings, can be received faster from other web users than from the media [Mäk08].

### *Wikis*

Wikis are web-based tools for creating, modifying, and deleting web content collaboratively [Mur07]. Anyone has a right to participate in the writing process with the help of Edit tool [And07]. The hierarchy and structure of wikis is flat, and the pages are linked to one another [Mur07]. The opposite of the flat structure is e.g. a tree structure which is often used for presenting hierarchical data. The typical problems with wikis are content accuracy, consistency, reliability [Mur07], and vandalism [And07]. However the large number of users corrects the mistakes quite rapidly. The *History* function also enables reviewing of previous

versions of the page [And07]. Wikis work especially well in intranets where everyone has the same goals [Nie07a].

Web-based encyclopedia Wikipedia is the best known wiki [see section 3.4.2. Wikipedia]. Wikipedia offers an opportunity for anyone to share his information with all web users. Even though Wikipedia nowadays includes only a small amount of factual errors, it has been criticized of having quality problems with the content clarity and usability [Nie06]. One of the best features of Wikipedia has been reported to be the cross linked hypertext which enables users to find a lot of information not only about the suggested topic, but also about any topic related to that [Nie06].

### *Blogs*

Blogs are two-way web-based communication tools with whose help anyone can enter their thoughts and comments to be seen by a limited group or by the whole web community [Mur07]. A blog is the simplest way to keep your own web site in the form of a diary [Nie05]. Besides text, a blog entry can include images, links, and even videos.

Blogs are created by using one of the many blogging softwares, e.g. Blogger which is owned by Google [see section 3.4.3. Blogger]. Blog entries are presented in a chronological order and they are referred to with tags [see section 2.3.4. Tagging and Social Bookmarking][And07]. Blog entries often include links to other blog entries, related articles, and web pages [Bes06]. The readers of blogs can search for interesting blogs with the help of various blog search engines such as Technorati or Feedster [Mur07]. They can also subscribe to a blog by using RSS feeds and comment on the entries [And07]. One of the main problems of blogs is reliability and time dependency of the content [And07].

### *Other Applications*

YouTube provides a simple way for distributing home made movies and other videos to the rest of the web. Almost every news paper has a forum, and readers are actively encouraged to discuss the topics. Virtual communities and social networks also provide plenty of opportunities for the web users to participate. The Finnish eat.fi service allows users to write reviews and rate restaurants which are presented on a Google Maps map [see section 3.4.1. Google Maps].

### **2.3.3. Content Sharing**

Web offers countless opportunities for anyone to share information and content e.g. in the form of text, image, or video with other web users. It is usually possible to decide with whom the content is shared. The most popular forms for sharing text are blogs, wikis, and discussion

forums. Photo web sharing services include e.g. Flickr, Picasa and Facebook, and video sharing services include, e.g. YouTube and Vimeo.

#### **2.3.4. Tagging and Social Bookmarking**

A tag is a descriptive keyword that is attached to a digital object such as a web page, an image, a blog entry, or a video [And07]. The tag can describe either the content or the context of the object. Several tags can be attached to one object [And07]. Typical applications exploiting tags include blogs, photo sharing service Flickr, video sharing service YouTube, and social bookmarking service Delicious. Tags are facilitating search functions and the arranging of digital objects.

A tag cloud presents a long list of tags usually in alphabetical order and highlights the most popular tags by enlarging the font size of those. In earlier research, tag clouds' usability has been reported to be quite poor since e.g. visual comparison between the tags of similar size is difficult to make [Hea08]. Also the connection between tags with similar semantic meaning, but situated far apart, is difficult to perceive [Hea08]. A tag cloud is also a difficult navigational tool because in the worst case the user needs to go through the whole tag cloud before he finds the appropriate link.

Delicious is one of the most popular social bookmarking web services with which users can tag, save, manage, and share web pages [Del09]. The most important feature of Delicious is adding tags to web pages: it helps users to remember interesting web pages [Por06]. As a by-product other users gain social value from the tags because they enable other users to find interesting web pages that some users have already found and tagged [Por06]. Other similar social bookmarking web services include e.g. Digg and Reddit. Their main functionality is recommending news, images, videos, and articles to friends and other web users [Mäk08].

#### **2.3.5. Social Networking**

Web 2.0 has changed the ways in which especially technology oriented and young people communicate [And07]. Community and social networking applications offer inspiration to action, ways of expressing oneself, and ways of communicating with others [Bak07]. It has also been stated that social web enhances human connectivity and sociability [Har08]. Virtual communities and social networks make it possible for anyone to find people with same kinds of interests [Har08]. Web communication tools have become more important than phone to some people [Leu08]. Users of social networks are primarily 18-30 year olds [Dwy07]. Social networking applications often require a log in and the creation of your own user profile.

There have been several social networking success stories in recent years [Har08]. Applications, such as Facebook (3<sup>rd</sup>) [see section 3.4.5. Facebook], MySpace (11<sup>th</sup>), and Twitter (13<sup>th</sup>), fall into the category of world's most popular web sites [Ale09]. These applications are used e.g. for forming and managing social capital [Eli07] and for intensifying offline relationships [Har08]. Rewarding and ranking are important aspects of these kinds of applications because recognition is an important encourager [Bak07].

## 2.4. Web 2.0 Technologies

Part B of Figure 2.1 presents the Web 2.0 technology characteristics which include using the web as a platform, rich user experience, syndication, folksonomy, and peer-to-peer. Web applications are often exploiting technologies such as Ajax in order to make the user experience richer. Web 2.0 technologies are also used for data management: Syndication is used for data gathering, and folksonomy is a way for presenting nonhierarchical data. Peer-to-peer refers to decentralizing data to the edges of the web in a way that makes web clients into servers. [O'Re05]

### 2.4.1. Web as Platform

Using the web as a platform usually means that applications are run on web browser window and that they communicate with the web and remote servers [And07]. There is already a wide range of web-based desktop applications, e.g. for email, text editing, and calendar.

#### *Beta Label*

The publication of applications has also changed dramatically with Web 2.0 since already beta versions of different applications are published [And07]. With the use of beta versions, application developers can easily test different kinds of solutions and get rapid feedback from users. Even though that some applications like Google Gmail have been out for years, they still carry the Beta label. Gmail just recently removed the Beta label after using it for five years [Col09]. Beta label often refers to the fact that the application is constantly revolving, e.g. in the form of new features.

#### *Mashups*

A mashup is a web page or web site that combines services and information from multiple sources on the web [Mur07]. Application Programming Interfaces (APIs) and Web feeds enable the construction of mashups [And07]. With the help of an API an already coded application element can be used inside another application [And07]. E.g. Google Maps API has been used inside many other applications such as Housing Maps and Earth Measurements. Other typical APIs include weather, calendar, and search function APIs [Mur07].

One of the most important advantages of mashups is that the whole application does not need to be coded from scratch thus making the creation process easier and faster [Mur07]. One downside of mashups is user confusion due to one web site representing several brands [Nie07a] such as Housing Maps which presents Craigslist housing information on a Google Maps map. Previous usability testing has also proven that customized maps are more useful on business sites, because they can give more precise information to the user than a Google Maps API [Nie07a].

#### **2.4.2. Rich User Experience**

Rich user experience means that applications are more pervasive, dynamic, and interactive. Rich internet applications (RIA) work more like desktop applications than traditional web applications as for example webmail and static mapping applications. This is enabled by new technologies, such as Ajax and Adobe Flex. RIAs show the states of the application and the progress of the tasks better than these traditional web applications [Bes06]. RIAs also have faster response times [Bes06].

In traditional web applications, interaction has been limited to a small amount of controls, such as check boxes, radio buttons, form fields, and buttons. RIAs use a wider range of controls making the interaction with the interface and the whole user experience better. With RIA the user interacts directly with the page elements, e.g. by drag-and-drop method. Instead of reloading the whole page like in traditional web applications, with RIA only part of the page is updated. Also user feedback and error messages are provided within the page. [Mau06]

#### ***Challenges with RIA***

RIAs are also risky to produce when especially older people have not been used to interactive web pages and new kinds of page elements such as draggable elements. That is why it is important to add richness to the applications slowly and only to the places where it significantly improves the usability. The meaning of the new page elements and their usage should also be communicated to the user. The better the page elements mimic the physical world, the easier they are to understand. A small in-page tutorial animation to show the interactions on the first time use might be useful in many cases. [Mau06]

With RIA, changes on the web page may happen without any user actions, but most people are used to changes happening only after their actions. Therefore the usage of movement or high color contrast can be used to draw user's attention to the updated part of the page. Movement and high-contrast elsewhere on the page should be avoided. Feedback messages

should also be shown in places where the user is looking at, e.g. right by the clicked button, and only one update at a time should be shown. [Mau06]

In general, people have a mental model of a web site according to which every click takes you to a new page and clicking the *Back* button takes you to the previous page [Mau06]. With RIA the *Back* button of the browser does not always work as expected because it does not necessarily cancel the previous action or take the user to the previous state [Bes06] [Gib06] [Klu07]. Therefore customized functions for *Back* and *Forward* are needed [Klu07] and a new page should be put anywhere where a user might need a *Back* button [Mau06]. Also the navigation to individual pages should be separated from in-page navigation [Mau06].

Best practices have still not been born and therefore RIAs are risky [Nie07a]. Linking to a certain state of the page is nearly impossible, because the page's URI or URL does not change when new information gets updated, and thereby a link to the current state cannot be saved to bookmarks or send to a friend [Bes06]. A possible solution for this is an in-page link anchor symbol # which is added to URL address field and a couple of identifiers behind it [Klu07].

### *Ajax*

Asynchronous Java Script (Ajax) is not a new technology, but it is a combination of already existing web technologies such as HTML, CSS, JavaScript and XML [Gib06]. The term *Ajax* was introduced by Jesse James Garrett in 2005 [Gar05]. Ajax has similar functionalities as Flash, but it does not require a browser plug-in [Bes06]. Ajax technologies have been said to make web faster, more interactive, and more user-friendly [Klu07].

Ajax engine, which works synchronically between the server and the user, enables refreshing only parts of the web page [And07] [Gib06]. Refreshing is done dynamically and in real time, and Ajax engine reduces the number of queries from the server because the whole web page does not need to be refreshed [And07] [Gib06]. It is also possible that the page does not need to be refreshed at all after user action because JavaScript is already downloaded before the page can be used, and that is why some actions can be completely performed on user's computer [Bes06]. For example Gmail's user account page already includes all the information that different user actions, such as reading new mail, require [Bes06]. The reduced number of server queries speeds up the use of the web pages [Bes06].

Ajax enables more interactive user actions, such as the drag-and-drop of user interface elements [Bes06]. Ajax also enables mashups [see section Mashups] and dynamic information gathering [Gib06]. Many Web 2.0 companies and web sites are exploiting Ajax even though its

usability has been studied very little [Klu07]. Typical applications using Ajax technology include Gmail, Google Maps, iGoogle and Flickr [Bes06] [O'Re05].

The main advantages of Ajax include e.g. short page download times, smooth and interactive user interfaces which increase user satisfaction, a user interface that is always on view, transparent data transfer e.g. in the form of showing download progress, new kinds of interaction methods, and convenience-increasing functions such as predictive text input in text fields [Klu07].

The main disadvantages of Ajax include e.g. accessibility issues due to JavaScript [Bes06] [Klu07]. All web browsers, such as text based browsers and mobile device browsers, and assistive technologies, such as screen readers [Klu07], do not support JavaScript. Standards, e.g. Role Taxonomy for Accessible Adaptable Applications [w3c05], have been developed to ensure the accessibility of RIAs [Gib06]. To ensure accessibility, the web site should also work properly even though if JavaScript is turned off. Ajax can also be used just to enrich a normal HTML site [Klu07]. Rich user interfaces work better in actual applications than on normal web pages because their features are rarely needed on regular web pages [Nie07a].

### *Flex*

Adobe Flex is an open-source platform and component library for application development [Fra08]. Flex is based on Flash technology, and therefore Flex applications can be deployed on Adobe Flash Player [Mur07] [Fra08]. Like Ajax, Flex enables web applications to be more like desktop applications [Fra08].

### **2.4.3. Syndication**

Syndication as a concept refers to presenting data from various web pages on a single page. Data syndication format RSS is used for syndicating content from blogs or other web pages such as news sites and weather pages [Bes06] [Mur07]. Feed reader programs such as Google Reader [see section 3.4.4. Google Reader] check lists of syndication feeds and display all the updated content to the user on a single page [Mur07]. The main advantage of syndication is the possibility to subscribe to different pages and get all of their updates on one page without having to visit all individual pages [O'Re05] [And07]. Feed reader programs typically just show the headers of the feeds, and thereby descriptive headers are important in web content creation [Nie05].

### **3. Research**

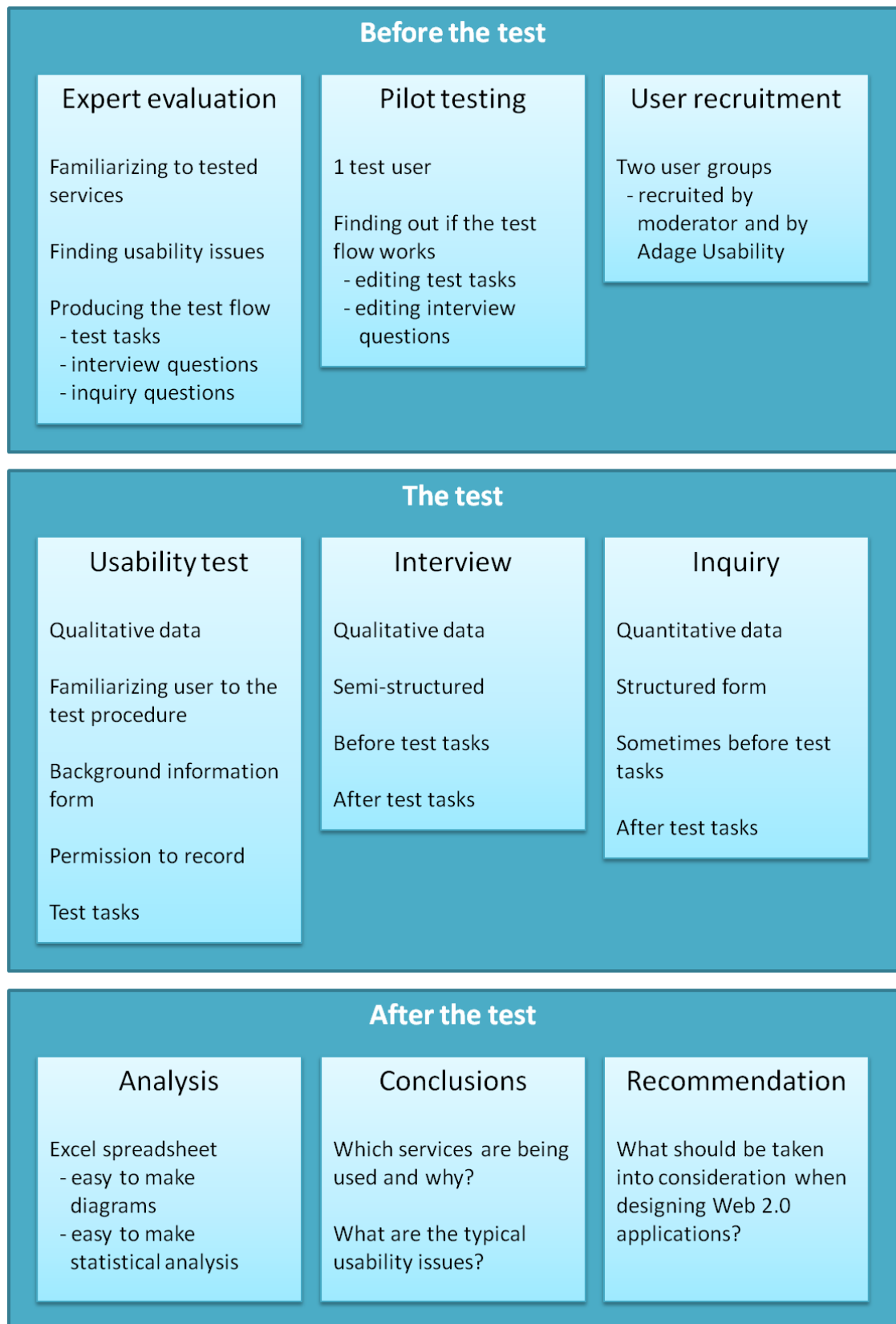
The main focus of the study was chosen to be on social media since it is expanding and constantly becoming more common. Figure 2.1 presents the scope of the study which included most of the characteristics of social media in web ranging from user created content and content sharing to social networking, social bookmarking, and tagging. From technology point of view, Ajax and its GUI elements, internet applications, and RSS feeds were included in the scope of the study. New earning models were left out from the scope of the study.

The study concentrated on researching the user experience produced by the applications. The most important UX features to be tested were usability and users' expectation and needs towards the applications. Usability testing was concentrated on general ease and pleasantness of use as well as on the findability of application features. The emphasis was on typical Web 2.0 features and characteristics. The usability of the applications was studied with several usability and other research methods [see section 3.1. Research Methods] and user expectations and needs were investigated by interviews [see section 3.1.3. Interview].

#### **3.1. Research Methods**

The methodology used in the experimental part of this study is based on Adage Usability's usability research process which is presented in Figure 3.1. The process is a combination of usability's expert evaluation [see section 3.1.1. Usability Expert Evaluation], usability test [see section 3.1.2. Usability Test], interview [see sections 3.1.3. Interview], and inquiry [see section 3.1.4. Inquiry]. After the research part, the results are analyzed and conclusions and recommendations are made.





**Figure 3.1:** The usability and user experience research process of this study.

### **3.1.1. Usability Expert Evaluation**

Usability expert evaluation is a qualitative usability research method. It is a combination of heuristic evaluation, cognitive walkthrough, and a comparison between the tested services and existing design guidelines, good practices, and evaluator's expertise gained from earlier usability research projects. [Ada09a]

Heuristic evaluation is usually made by one or several usability experts who go through the evaluated service individually and compare it to usability heuristics. The method is used for finding out both the positive and negative qualifications of the service. Heuristic evaluation is usually quite fast and inexpensive, but it often produces only a small number of major usability issues and surprises which can only be discovered in a realistic usage situation. [Nie93]

In cognitive walkthrough, an expert goes through the evaluated service and simulates the usage of the service. The expert evaluates how well the service meets user needs and serves users' typical tasks. [Usa02]

In this study, usability expert evaluation was conducted before the usability tests in order to familiarize to the applications and the possible usability issues which the users might confront. In the evaluation, the tested applications were gone through based on typical tasks which the users might perform with the applications and compared to usability guidelines. The evaluation facilitated the forming of usability test tasks and interview and inquiry questions.

### **3.1.2. Usability Test**

Usability test is a qualitative usability evaluation method which is realized with genuine users. The purpose of a usability test is to find both the positive and the negative qualities of the tested services. It is a very good method for detecting applications' and their user interface elements' typical usability issues. [Ada09b]

It is conducted with the service's genuine users who are asked to perform typical tasks with the service [Ada09b]. According to Jakob Nielsen, five is an adequate number of users, because after that only a few new usability problems can be found [Nie00]. However, in this study 20 users were recruited in order to make statistical analysis more reliable and the results more credible.

In this study, the tests were conducted at Adage Usability's premises and at moderator's place. The tests were recorded with the permission of users in order to facilitate the analysis of the results. The users were asked to think out loud during the test and share all of their opinions

on the tested applications. The test flow consisted of a background questionnaire, test tasks, interview questions and inquiry questions.

The test tasks were built around the typical tasks performed by users with the applications and the central functionalities of the tested applications. The emphasis was on Web 2.0 characteristics. The test included five main tasks and a number of subtasks. Several test tasks concerned Ajax features and their findability, ease of use, and pleasantness of use. A couple of test tasks concerned rich text editors and the rest of the tasks social networking. The list of test tasks is presented in Appendix A: Test tasks.

### **3.1.3. Interview**

Interviews are a qualitative research method which is used for finding out the kinds of aspects of usability and user experience which cannot be discovered with usability testing such as user opinions and attitudes. [Nie93]

In this study, semi-structured interview was used for finding out users' earlier experiences and knowledge about the tested applications and their opinions and attitudes towards them. In the test, interview questions were presented to the users before and after the actual test as well as before and after each set of test tasks concerning one tested application.

Interview questions were designed based on the goals of the study, and they concerned e.g. users' earlier social media experiences, the applications that they usually use, and their favorite applications. Before the test tasks, the users were interviewed about their expectations and predispositions towards the tested applications. After the test tasks, their opinions and feelings as well as needs towards the tested applications were also canvassed. The list of interview questions is presented in Appendix B: Interview questions.

### **3.1.4. Inquiry**

Inquiry is a quantitative research method, and in this study it was used for collecting numeric data, e.g. about the ease and pleasantness of use, in addition to the qualitative data, such as free form user comments, collected with usability testing and interviews. In this study, the inquiry was implemented as a user evaluation form which is presented in Appendix C: User evaluation form.

The results of the inquiry were analyzed with paired t-test which is used for analyzing the statistical differences between the averages of two groups [Tro06]. A confidence interval ( $p$ ) of 95% was used for determining whether the differences in the results reached statistical significance. T-test was chosen because it is the statistical test that is often used in usability

testing to determine whether the differences in results are real or just a consequence of random variation [Sin02].

In the test, users were asked to fill in questions in the form after each set of tasks and sometimes before a task set. The questions before the test tasks were designed to uncover users' predispositions towards the applications. After the test tasks, users were asked to evaluate applications' ease and pleasantness of use. The evaluation scale consisted of 6 choices e.g. varying from 1 being "Strongly disagree" to 6 being "Strongly agree". The scale lacked a neutral middle choice, which forced the users to choose either a positive or a negative opinion score. The evaluation form is based on Adage Usability's usability test evaluation form, but edited in order to meet the goals of this study.

### **3.1.5. Analysis Methods**

After the tests, the results were analyzed based on the test notes and test recordings. The results were transferred to an excel spreadsheet because the number of participants was so large (n = 20). Excel also facilitated the making of diagrams and statistical analysis. Other possible analyzing softwares would have been e.g. SAS and SPSS. In the analysis, the usability issues as well as the good qualities of the applications were documented. Based on the analysis, conclusions and recommendations were developed.

## **3.2. Pilot Testing**

Pilot testing is usually made in order to determine whether the test flow works or not. The test tasks should be tested in order to find out if they are understandable for users and useful for finding out answers to research questions. It is also useful to test that the tasks and interview questions can fit in the planned duration of the test. Usually one or two pilot users are enough, and these users should be taken from the same user groups as the test users. [Nie93]

In this study, one pilot test was realized well in advance before the actual tests with a pilot user representing the younger and more advanced user group. After the pilot, some changes to the test tasks and interview questions were made.

Weather service, emailing and iGoogle tasks were removed after the pilot test because they did not fit the scope of the study. Weather service tasks were planned to compare Flash and HTML applications, but Flash was decided to be left out in this study because Ajax was chosen to be the main focus from Web 2.0 technologies. Email tasks were planned to compare traditional webmail to Ajax emailing application Gmail, but the comparison between Ajax and HTML was decided to be tested only with mapping applications. iGoogle tasks were planned to test Ajax and especially portlets' usability, but in the final test they were tested with Facebook

and Google Maps instead. After the pilot, tagging related questions were removed from the interview, because tagging was decided to be left outside the scope of the study in order to give more emphasis on the more essential Web 2.0 characteristics.

After the pilot, the order of test tasks was edited in order to make the test flow more pleasant and clearer. Initial interview questions concerning users' social media experiences were also edited slightly: more social media examples were added and some interview questions were edited. Some interview questions were also corrected and made easier to interpret.

After the pilot, a few new test tasks and a user evaluation form were added. The new test tasks included a blog entry writing task, which enables the comparison between a rich text editor of Blogger and the text editor of Wikipedia. Another new test task set concerned Facebook with which Ajax and social networking were tested. The user evaluation form's purpose was to gather user opinions in a structured way and to facilitate the statistical analysis of user opinions [see section 3.1.4. Inquiry].

After the first two usability tests also some minor changes to the test flow were made because the test turned out to be a little bit too long. After moderating numerous usability tests, usability experts usually notice that 1.5 hours is usually the maximum time that a user or the moderator can stay focused at once. Ajax menu task concerning apple.com's search field, a third mapping application task, and some of the Facebook tasks were removed.

### **3.3. Test Users**

The total of 20 users participated in the tests, and they were recruited from two user groups: younger, technically oriented users and older, less technically oriented users. These two user groups were chosen because they differ from one another dramatically and they enable the comparison between two very different kinds of groups.

The younger group consisted of users aged between 20 and 30 who use social media often or quite often (daily or at least weekly). The older group consisted of users aged between 40 and 60 who use social media very little or never (occasionally or not at all). All users were required to use Internet and email daily or nearly daily. Users' experiences on social media were surveyed by asking them questions about their social networking application, blog, wiki, and multimedia content usage. The background information of all users is presented in Appendix D: User background information.

### 3.4. Tested Applications

The tested applications were chosen from a wide range of different kinds of Web 2.0 applications. The possible applications included mapping applications (e.g. Google Maps, Earth Measurements, Housing Maps, and Eniro), wikis (e.g. Wikipedia, intranet wikis, and hobby-related wikis), blogging softwares (e.g. Blogger, Tumblr, and Windows Live Spaces), content sharing applications (e.g. YouTube, Flickr, Picasa, and Odeo), social networking applications (e.g. Facebook, MySpace, LinkedIn, Friendster, Orkut, IRC-Galleria, and Habbo), email application Gmail, and a customizable search page iGoogle.

Ajax features were decided to be tested with mapping application Google Maps and social networking application Facebook because they both include several features produced by Ajax. The rest of the test concentrated on social web applications. These applications were chosen to be wiki-based encyclopedia Wikipedia, blogging application Blogger, RSS feed reader Google Reader, and Facebook because they represent some of the most common social media features.

#### 3.4.1. Google Maps

Google's mapping application Google Maps includes the world map. With Google Maps it is possible e.g. to search for places and routes on the map. Ajax technology enables e.g. moving the map with drag-and-drop method and zooming the map by using the mouse wheel. With Google Maps it is also possible to move the route on the map by drag-and-drop method. The map can also be moved with the help of arrow buttons and zoomed by clicking the zooming axel or by double clicking the correct place on the map.

In usability testing, Google Maps was compared to the HTML map of YTV's Journey Planner. It reloads the whole Web page when the user interacts with the map e.g. by moving or zooming it. The map includes a limited number of zooming levels which are selected from a zooming axel. The map is moved by clicking the arrow buttons on the sides of the map or by clicking the correct place on the map. The applications were tested in a counter-balanced order in which half the users started with Google Maps and the other half with Journey Planner.

#### 3.4.2. Wikipedia

Wikipedia is a wiki-based encyclopedia, which can be edited by any web user with the help of Wikipedia's own text editor [see section Wikis]. Wikipedia includes 13 million articles from a wide range of topics [Wik09]. The articles have been cross-linked to one another and also linked to external web sources. Wikipedia's articles can often be found in several languages. Wikipedia has articles written in 267 different languages [Wik09].

### **3.4.3. Blogger**

Blogger is a blogging application [see section Blogs] owned by Google. It enables the writing of blog entries directly to a web form without having to use HTML code. With Blogger the user can also edit the text and add photos and videos to the entry.

### **3.4.4. Google Reader**

Google Reader is a web feed reader which enables subscribing to different kinds of web content feeds. Google Reader collects all the subscribed web feeds of e.g. news and blogs to one place. The feeds of news services show just the header or also the first line of the news article, but blog entries are fully shown.

### **3.4.5. Facebook**

Facebook is the world's 3rd popular web site and the most popular social networking site [[Ale09]]. Facebook has 300 million registered users worldwide [Zuc09]. It enables e.g. creating of your own profile, making contact to friends, and sharing photos, videos, and links. Joining groups, playing games, and answering quizzes are also possible. Most Facebook users are young, but the fastest growing demographic is over 35-year-olds. In Facebook, Ajax technology has been used to make the user experience richer, e.g. by enabling draggable elements such as portlets, a floating always visible menu, and a possible search words suggesting search field.

In earlier research, it has been noted that Facebook performs poorly when compared to usability heuristics. However, users have considered it to be quite easy to use, and it produces both positive experiences in the form of fun and curiosity and negative experiences such as frustration and embarrassment [Har08].

## 4. Results

The results of the study will be presented application by application according to the order of test flow. The results will include the recognized usability problems and user opinions on the applications. The results of the two user groups have often been separated in order to make the comparison between the groups easier.

### 4.1. Ajax Map vs. HTML Map

YTV's Journey Planner was familiar to both user groups, and only three users from the older user group had not used it before. Google Maps was familiar to all young users, but only to three older users. The majority of the older user group (6 out of 10) was still used to using paper maps such as phone book map. All younger users preferred electronic maps such as Google Maps, Journey Planner and Eniro.

#### 4.1.1. Zooming the Maps

The results of the zooming task have been presented in Figure 4.1. As can be seen from the figure, younger user group did not have any trouble with zooming the maps of Journey Planner and Google Maps. Though it must be noted that 4/10 users did not know how to use the wheel of the mouse for zooming Google Maps and two of them had trouble finding any zooming functions at first.

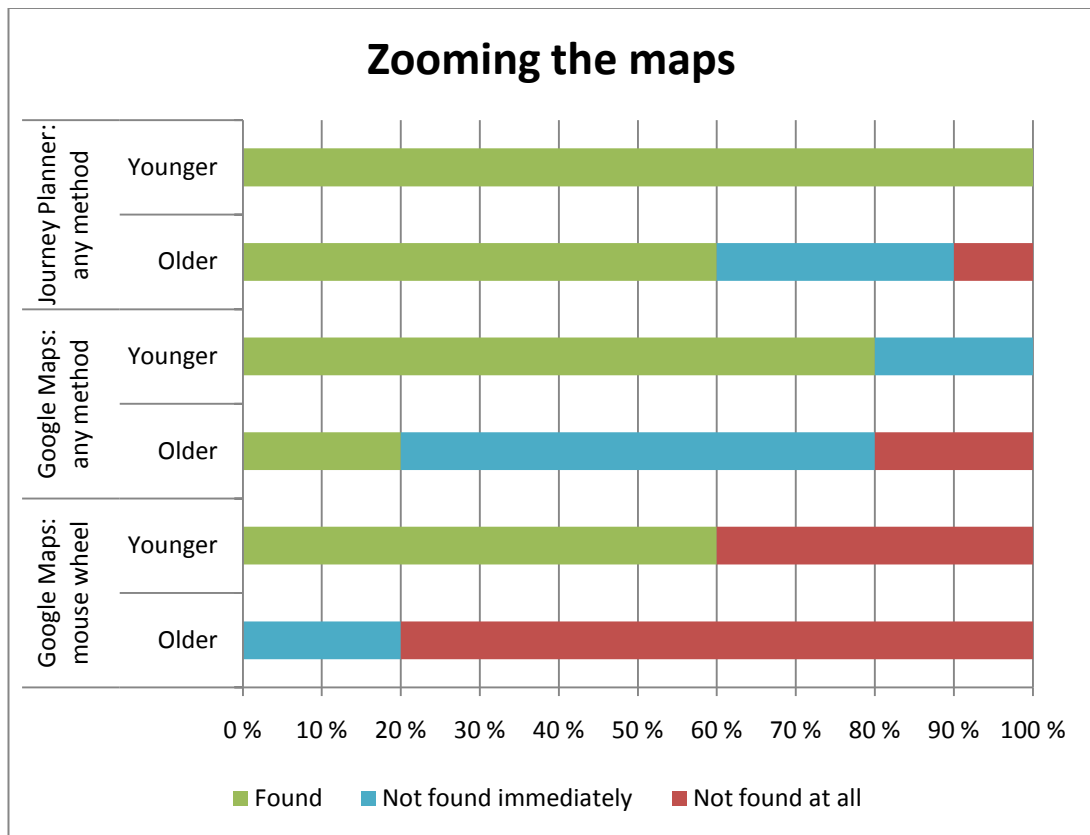
As Figure 4.1 illustrates, slightly over half of the older user group (6/10) was able to zoom Journey Planner's map without any difficulties, but only two users were able to zoom Google Maps without difficulties. One user did not find the zooming function of Journey Planner and two users missed all the zooming possibilities of Google Maps. Only two older users knew how to use the wheel of the mouse for zooming Google Maps, but it took them a while to notice the function first.

Most users (18/20) felt that zooming of Google Maps is easier or at least as easy as zooming Journey Planner's map. Journey Planner's map has only four zooming levels as opposed to Google Maps' 19 zooming levels. Even on Journey Planner's biggest zooming level the streets are not shown clearly enough. In addition, Journey Planner's route is not shown clearly on the map.

Zooming with the mouse wheel was perceived as a very good and handy function by both user groups even though most users (12/20) missed it. Users considered the zooming icons on Google Maps to clearer than on Journey Planner's map. Although it must be noted that some users had trouble distinguishing the zooming and moving icons from Google Maps because



they are situated on top of the map. In Journey Planner, they are situated on white background outside the map and are that way easier to notice. Other advantages of Journey Planner were the links to the beginning and to the end of the route.



**Figure 4.1:** Zooming the maps.

#### 4.1.2. Moving the Map

The results of the moving task have been presented in Figure 4.2. As the figure illustrates, generally the younger user group did not have trouble moving the maps. One user tried to drag Journey Planner’s map, another user had trouble finding Google Maps’ drag-and-drop function, and a third user did not find it at all.

As Figure 4.2 illustrates, majority of the older user group had trouble moving both of the maps. 6/10 users tried to drag Journey Planner’s map before finding the arrow buttons on the sides of the map. Three out of these six users had used Google Maps right before using Journey Planner in the test. Half the users (5/10) found a way to move Google Maps immediately. Only 3/10 found Google Maps’ drag-and-drop function immediately, but as many as half the users (5/10) missed it totally. One user was not able to move Journey Planner’s map and two users Google Maps at all. Surprisingly, older users had more initial trouble moving Journey Planner’s map than Google Maps.

Users were also asked to change the route on Google Maps. Majority of the younger user group (8/10) was able to move the route without difficulties, but only three older users were able to do it without difficulties. The tooltip *Drag to change route* which appears every time the user takes the pointer to the top of the route helped several users to find this feature.

Both user groups seemed to learn drag-and-drop feature of Google Maps very well. All users felt that Google Maps was easier to move or at least as easy as Journey Planner’s map to move. Majority of the users considered drag-and-drop of Google Maps a very useful and good feature. Without moderator’s help 6 users would have missed this feature totally.

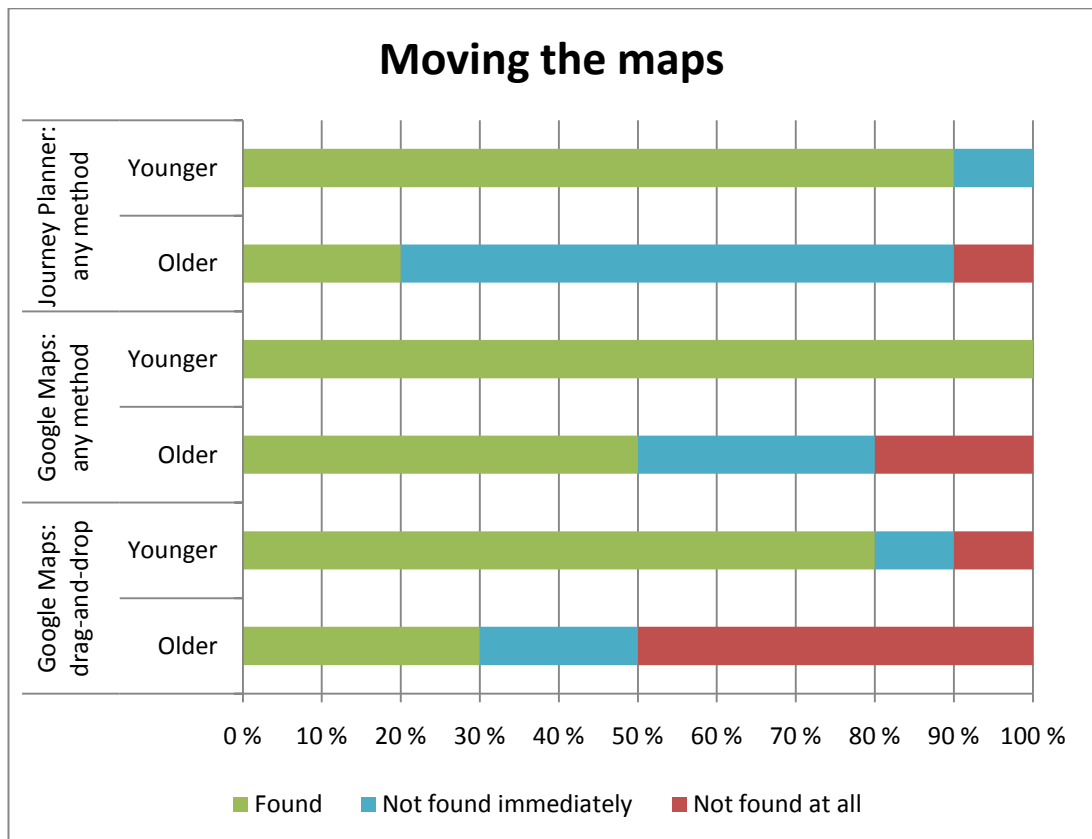
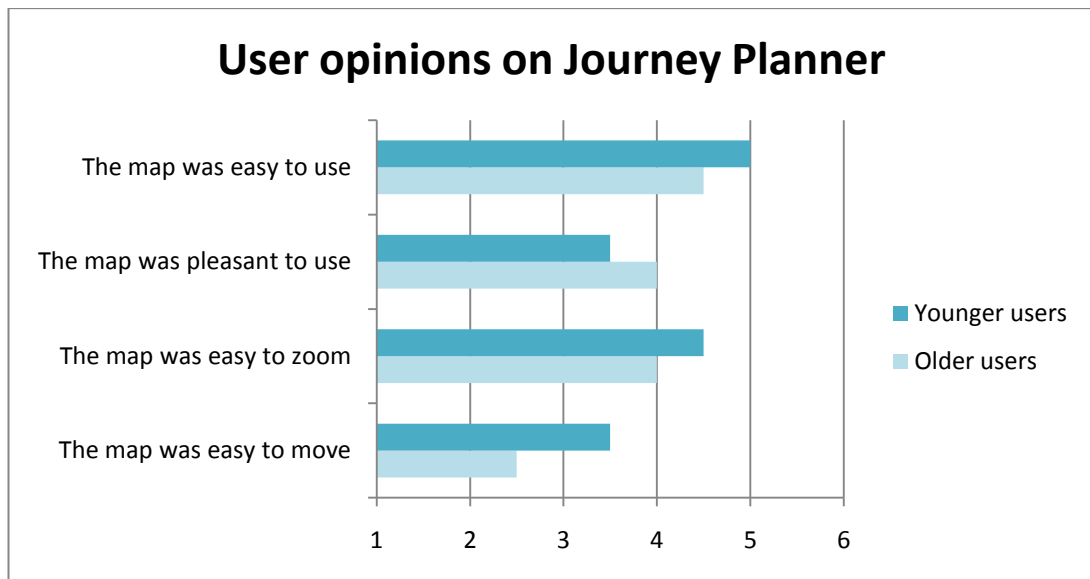


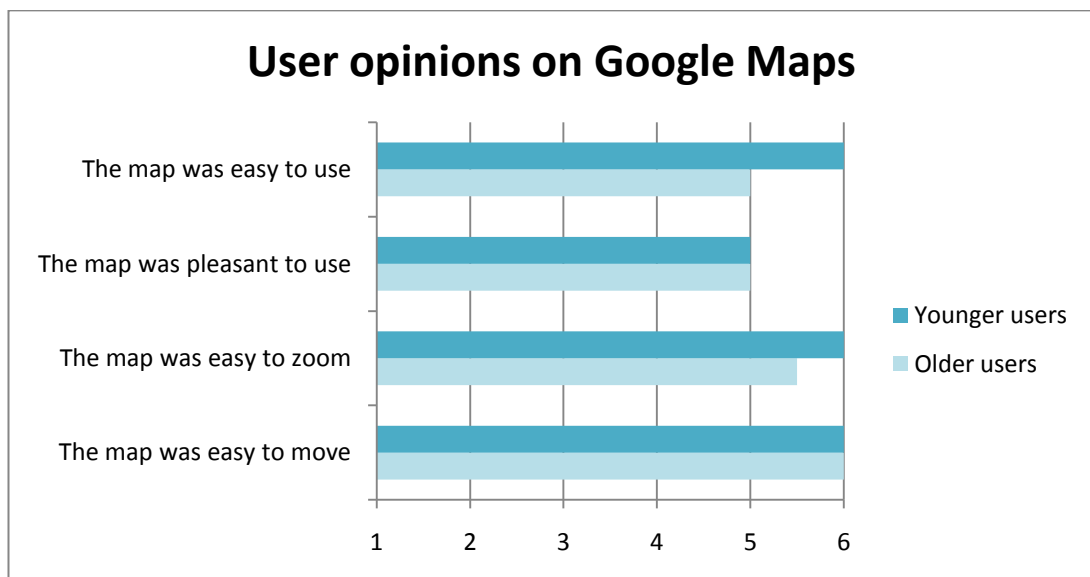
Figure 4.2: Moving the maps.

### 4.1.3. User Opinions on Mapping Applications

Figure 4.3 and Figure 4.4 are presenting the medians of user opinions on Journey Planner’s map and Google Maps. Vast majority of users (16/20) considered Google Maps to be easier to use or at least as easy to use as Journey Planner’s map. Google Maps was considered to be significantly more pleasurable to use than Journey Planner’s map ( $p < 0.05$ ). Users also rated Google Maps’ zooming and moving methods to be significantly easier to use than Journey Planner’s similar functions ( $p < 0.05$ ).



**Figure 4.3:** User opinions on Journey Planner’s map (medians).



**Figure 4.4:** User opinions on Google Maps (medians).

#### *Journey Planner*

Users reported the advantages of Journey Planner’s map to be the links to the beginning and end of the route and the simplicity of use. Some users also felt that Journey Planner is safe to use because it is familiar to them. The disadvantages were said to be the lack of drag-and-drop feature, the unclear map markings, the slowness of use, too small size of the map, and the insufficient number of zooming levels. Journey Planner’s map also requires a lot of clicking.

#### *Google Maps*

Google Maps’ advantages were considered to be presentation of the map with its large size, pleasant colors, and clear markings. Ajax features, such as zooming with the mouse wheel and

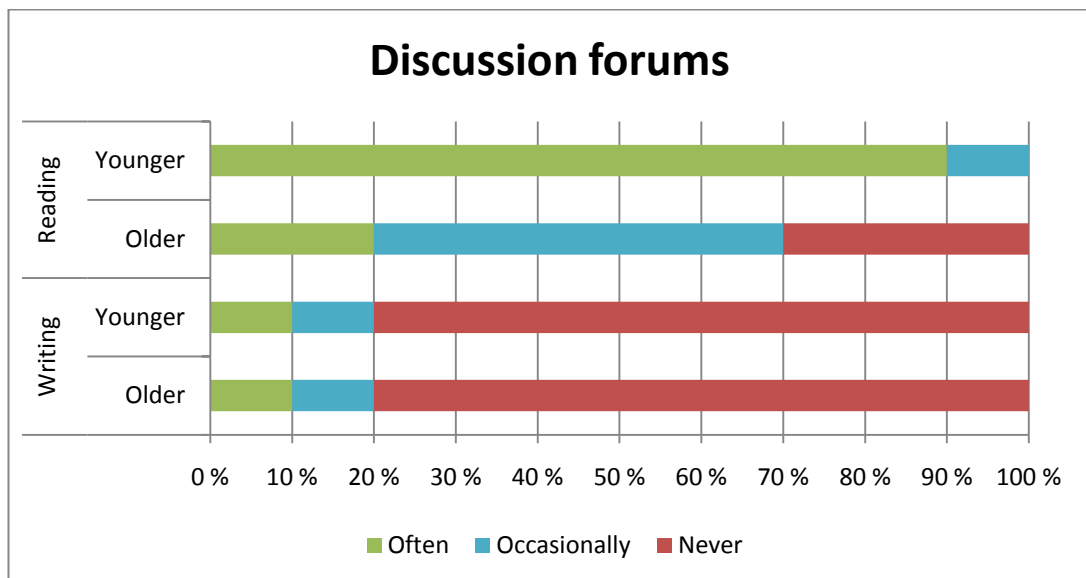
drag-and-drop in moving the map and changing the route, were also perceived useful. Users also felt that Google Maps is user-friendly and easy to use. It also enables tracking the travel kilometers. Users reported the disadvantages of Google Maps to be the lack of public transportation and instructions on how to use it.

## 4.2. Social Media

The users were interviewed extensively about their social media usage. They were e.g. asked to tell about the applications that they are currently using and about their opinions towards demonstrated applications [see sections 3.1.3. Interview and Appendix B: Interview questions].

### 4.2.1. Discussion Forums

Figure 4.5 presents the results of the interview concerning the usage of discussion forums. The majority of users (17/20) had at least occasionally followed discussions of discussion forums. The most popular discussion forums were turned out to be newspapers' Internet forums, such as HS.fi Keskustelut, and hobby-related forums, like sports, handicraft, and pet forums. In addition, some users said to search support for work and computer-related problems. Only one user said to write to forums quite often and two others occasionally. The vast majority of users had never written any comments, but some reported enjoying reading other's comments occasionally. Most users did not have a need or a will for sharing their opinions with other web users.



**Figure 4.5:** Discussion forum usage: Reading and writing.

### 4.2.2. Wikis: Wikipedia

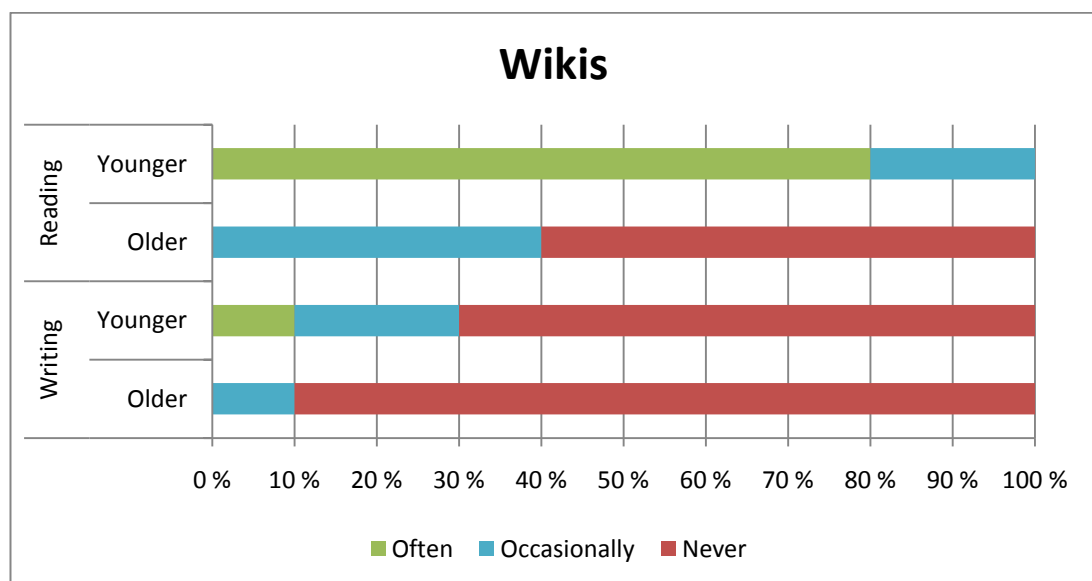
Before the test tasks, users were interviewed about their wiki usage. The results are presented in Figure 4.6. The vast majority of users (18/20) had at least once used Wikipedia. Most of the

young users (8/10) were active Wikipedia users, and the rest two occasional users. None of the older users were active Wikipedia users, and only four of them were occasional users. One user had never even heard of Wikipedia. Besides Wikipedia, users were interviewed about other wikis. Half the users had never used any other wikis. Typical other wikis included intranet wikis and study wikis.

The most common way to land to a Wikipedia page is through a Google link. Younger users also reported to search for information directly from Wikipedia. Besides using Wikipedia for leisure purposes, the younger user group utilizes Wikipedia also in their studies and at work, though only a few use Wikipedia as a reference. The older user group except for one user told to use Wikipedia only on their leisure time.

In the test, users were first asked to go through a couple of Wikipedia articles. None of the younger users had any trouble browsing Wikipedia. Four older users had trouble understanding that all the blue texts in Wikipedia are links, and thereby they had some trouble with navigation.

After the warm-up task, users were asked to edit Wikipedia's article. Users were also interviewed about their previous wiki-editing experiences and the results are presented in Figure 4.6. Only three users had previously edited Wikipedia or other wikis. One of them was an active wiki editor. Several users told that they do not have an interest in editing wikis and that the threshold for editing a wiki is quite high.



**Figure 4.6:** Wiki usage: Reading and writing.

## Editing Wikipedia

Figure 4.7 presents the tested and the most difficult user interface elements of Wikipedia's text editor. The majority of users (14/20) found the *Edit* link from the top of the Wikipedia page without difficulties. The text editor seemed to look confusing to many especially older users, who were unsure about where to make the editing and where the edited texts would eventually appear. Editing buttons on top of editing field also looked confusing to some users. Four younger users and all older users had trouble finding the *A* button which is used for adding headings. Most of the older users had trouble understanding that pressing enter/return key once in the editing field does not result in a new line in the published text.

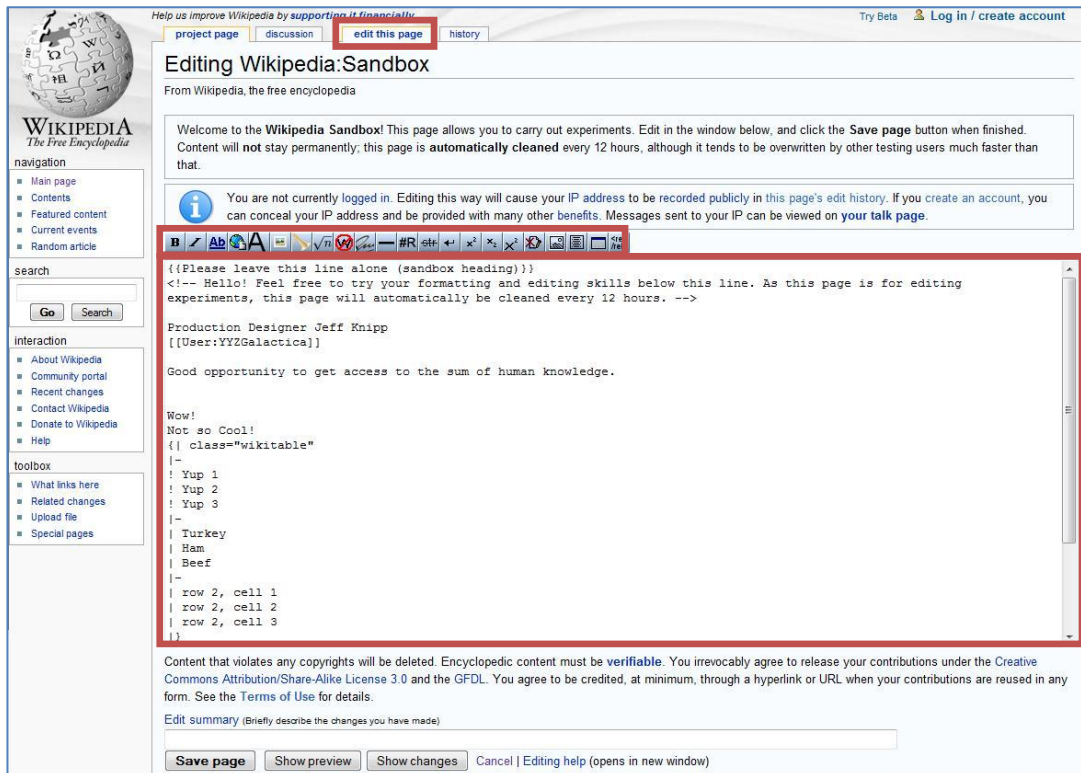


Figure 4.7: Wikipedia's editing page's difficult UI elements.

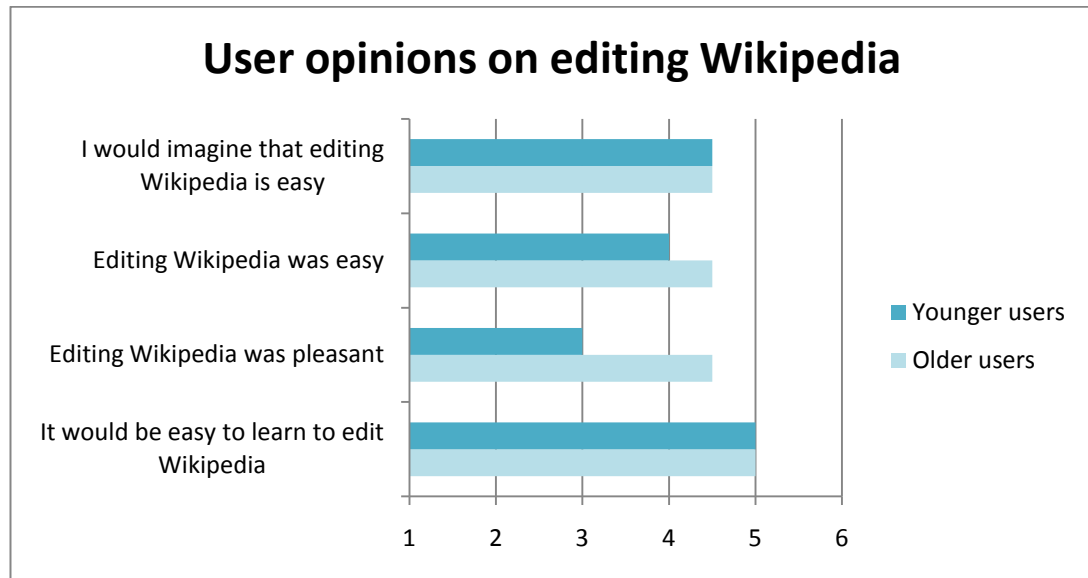
[<http://en.wikipedia.org/w/index.php?title=Wikipedia:Sandbox&action=edit>]

## User Opinions on Editing Wikipedia

Users said that editing Wikipedia was difficult and that it requires reading the instructions. Some users found the editing instructions in Wikipedia and considered them to be good and clear. More complicated actions such as attaching images and text boxes were imagined to be very difficult.

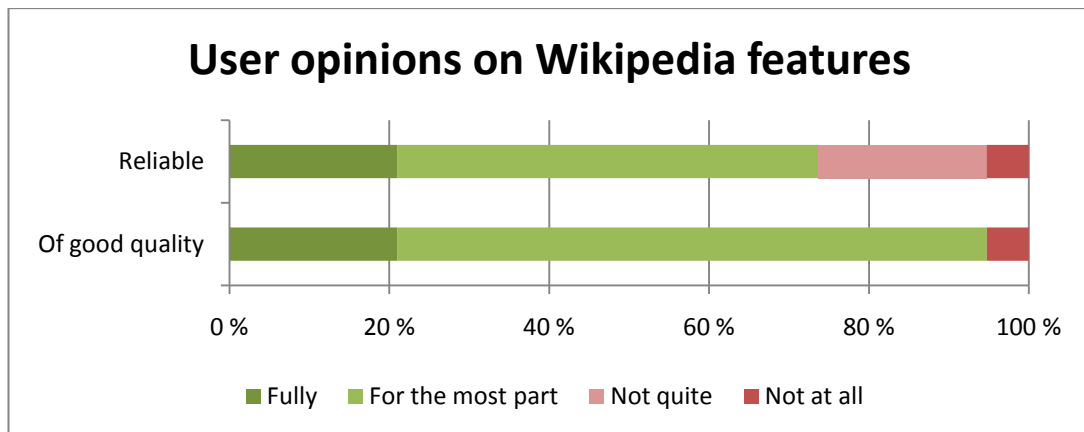
Users were asked to evaluate Wikipedia's editing with an evaluation form, and the results are presented in Figure 4.8. Users evaluated that editing Wikipedia was more difficult than they had expected. Younger users evaluated editing to be slightly unpleasant whereas older users

evaluated it to be quite pleasant. One possible reason for this is that older users more easily settle for what is being given to them and do not understand to ask for anything better than that. The majority of users thought that it would be easy to learn to edit Wikipedia after editing it a few of times.



**Figure 4.8:** User opinions on editing Wikipedia (medians).

The advantages of Wikipedia were considered to be the quick access to information which is presented in a quite simple form. In addition, Wikipedia’s articles give a general view of the subject – new or old to the reader – easily. Users were also asked about their opinions on Wikipedia’s reliability and quality. The results are presented in Figure 4.9. The majority of users (14/19) considered Wikipedia as a quite reliable source of information. Young users considered Wikipedia a little bit more reliable than older users did. Some younger users justified Wikipedia’s reliability with the permission that they have gotten from their school to use it as a reference. Users also felt that the articles are of good quality for the most part, though the quality tends to vary between subjects and languages. Some articles were considered to be too long, others too short.



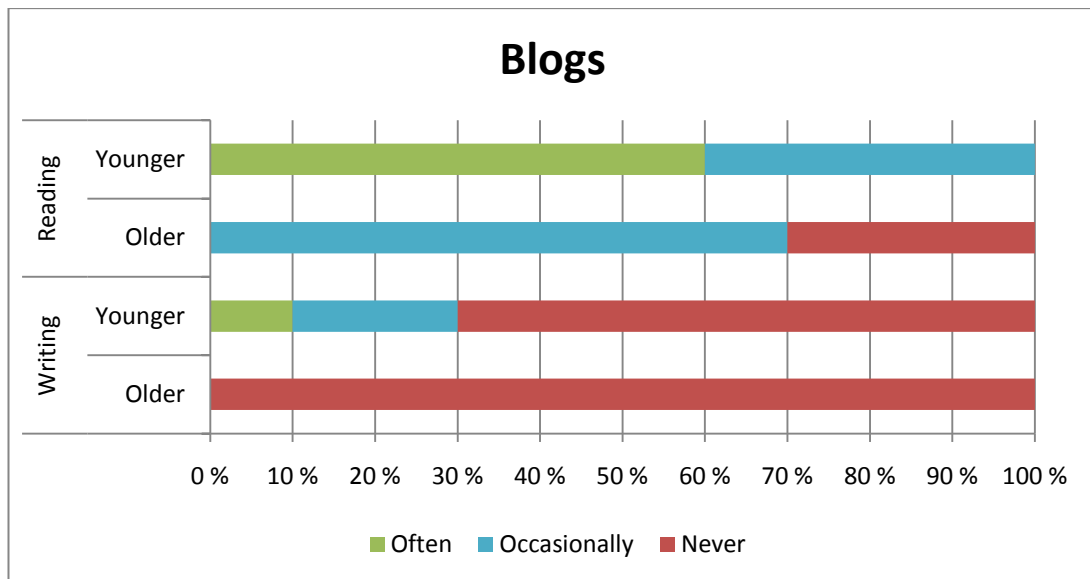
**Figure 4.9:** User opinions on Wikipedia features (n=19).

### 4.2.3. Blogs

Before the test tasks, users were interviewed about their previous experiences with blogs. The results are presented in Figure 4.10. All users from the younger user group had been reading blogs at least occasionally. The majority of older user group (7/10) had at least once read some blog. One user was not familiar with blogs at all. The majority of younger users (8/10) had been reading a friend’s blog. In addition, both user groups (7/20) reported to read hobby-related blogs, such as sports, handicraft, pets and cooking blogs, occasionally. A few users (4/20) had been reading politicians’ blogs especially around the elections. Some users (3/20) had also read work related blogs for finding solutions and instructions for work related challenges. The majority of users (10/16) felt that the information presented on blogs is quite reliable. Especially different kinds of working instructions and blog entries written by well-known writers were considered as reliable.

Only one young user had been publishing an own blog regularly. In addition to him, two other young users had been publishing a blog occasionally, and one user had once tried out writing a blog. Typical blog publishing forms turned out to be a diary, professional forum, and a home-page-like info channel.





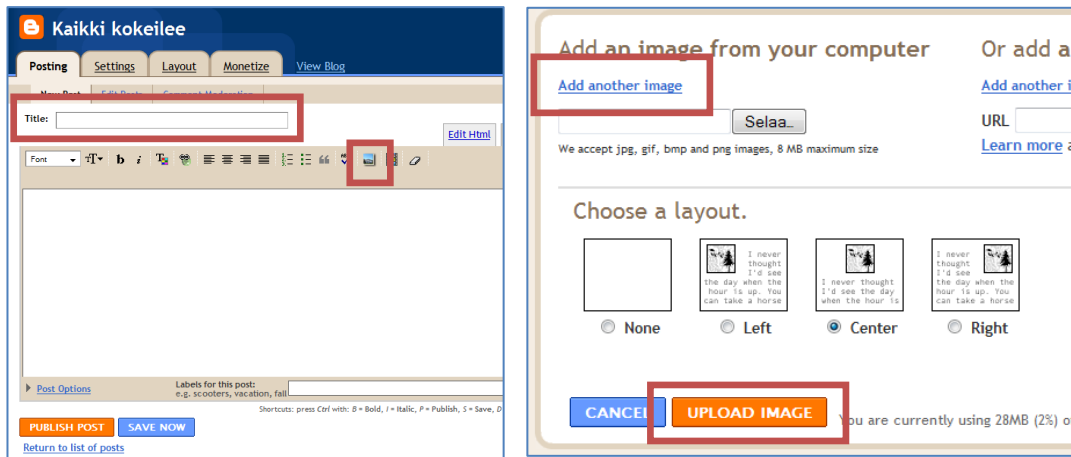
**Figure 4.10:** Reading and writing blogs.

### *Writing a Blog Entry*

All users found the button *New post* from Blogger’s home page easily or at least quite easily. Surprisingly many users (8/20) had trouble finding the title field which is situated above the text editor field. Both fields are presented in on the left side of Figure 4.11. Nearly all users were able to write and edit the text well. However, users felt that the possibility of editing the blog entry after its publishing is difficult to find.

All users were able to upload and add an image to the blog entry, but especially older users ran into some trouble when adding the image. Many users felt that the *Add image* icon, which is presented on the left side of Figure 4.11, was difficult to find. Some users confused the link *Add another image* with the button *Upload image* in the image uploading window, which is presented on the right side of Figure 4.11.

Fine-tuning of the image is somewhat inconvenient. It is very difficult to know the difference between the large and the medium sized image without trying it out. Adding an image to a certain place into the middle of the text is also difficult. A new image is always automatically added to the upper edge of the text editor. Moving a large image in the text editor is also quite troublesome because the editor is so small in size.



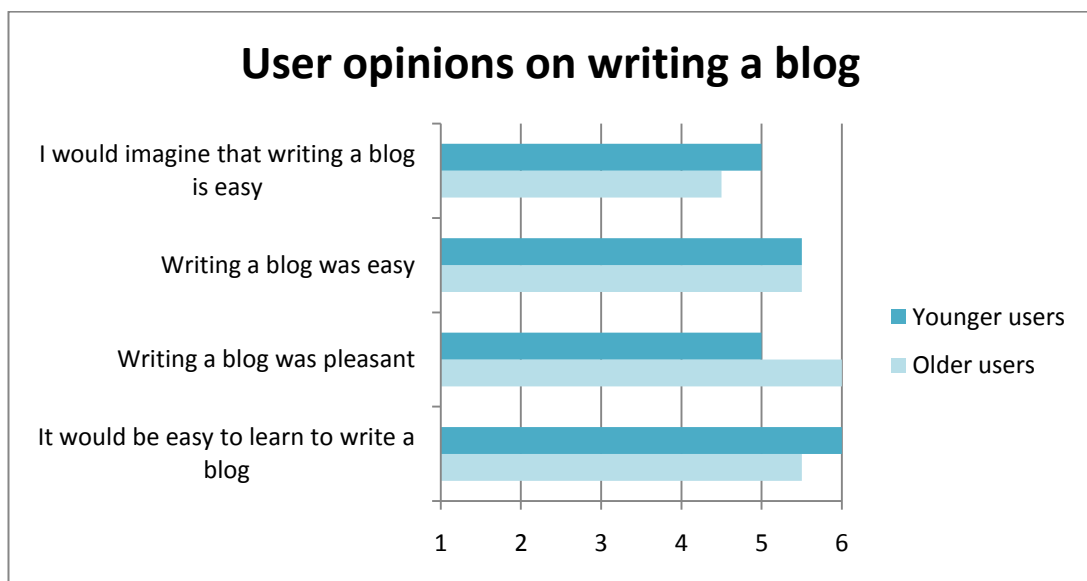
**Figure 4.11:** Blogger’s text editor’s and image uploading page’s difficult UI elements.

[<https://www.blogger.com/>]

### *User Opinions on Writing a Blog Entry*

User opinions on writing a blog are presented in Figure 4.12. Users thought that writing a blog entry is easy and even easier than they had expected. In addition, users felt that writing a blog entry is pleasant and very easy to learn. The users who had previously written blog entries commented that sometimes they had been forced to use HTML in order to make the text appear in a wanted way. Adding links had also proven to be inconvenient.

The majority of users (15/19) thought that they could consider publishing their own blog one day based on this experience. The biggest obstacle for publishing an own blog was considered to be lack of time. In addition, a few users thought that they would not have anything to write about in the end.



**Figure 4.12:** User opinions on writing a blog (medians).

#### 4.2.4. RSS Feeds

RSS feeds were unfamiliar to the majority of users (15/20). Based on moderator's explanations and the test tasks, most of these users (11/15) considered RSS feeds to be a good and useful service. Five users were used to reading RSS feeds daily, most of them with Google Reader. Nearly all of these users (4/5) had subscribed to different news feeds e.g. of news papers and other news services. In addition three users had subscribed to blogs and some users also to podcasts and to Flickr accounts. One user had used Friend Feed service which collects feeds from e.g. social networking applications. Thereby with Friend Feed it is possible to see e.g. friends' updates from Facebook and micro-blogging service Twitter in one place.

#### Subscribing to Feeds

The results of the usability test concerning RSS feeds are presented in Figure 4.13. All users were able to read the latest news of Helsingin Sanomat with Google Reader. Nearly all younger users (9/10) were able to add a subscription without difficulties. Two older users did not find *Add a subscription* button at all, and two other older users confused the text fields on top of the page with one another (see Figure 4.14). Unsubscribing turned out to be quite difficult to find. Over half the users (12/20) had trouble finding it and eight users were not able to find it at all. Several users had trouble connecting the button *Feed settings* to unsubscribing and most users missed the *Manage subscriptions* link at the bottom of the page (see Figure 4.14).

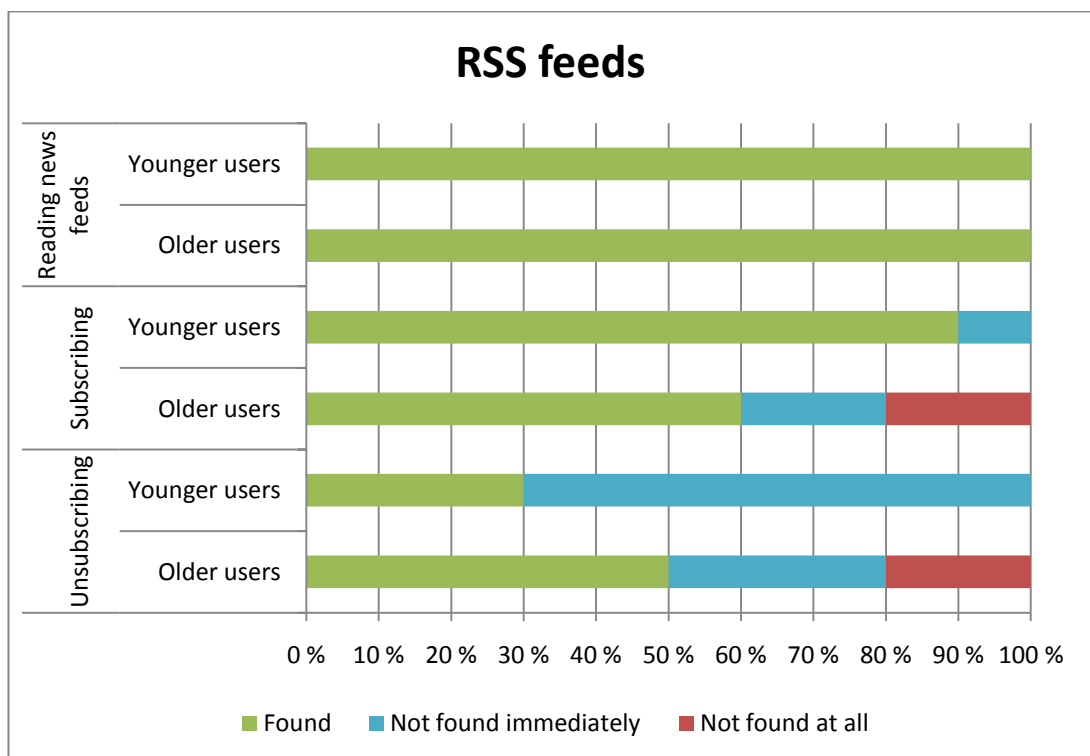
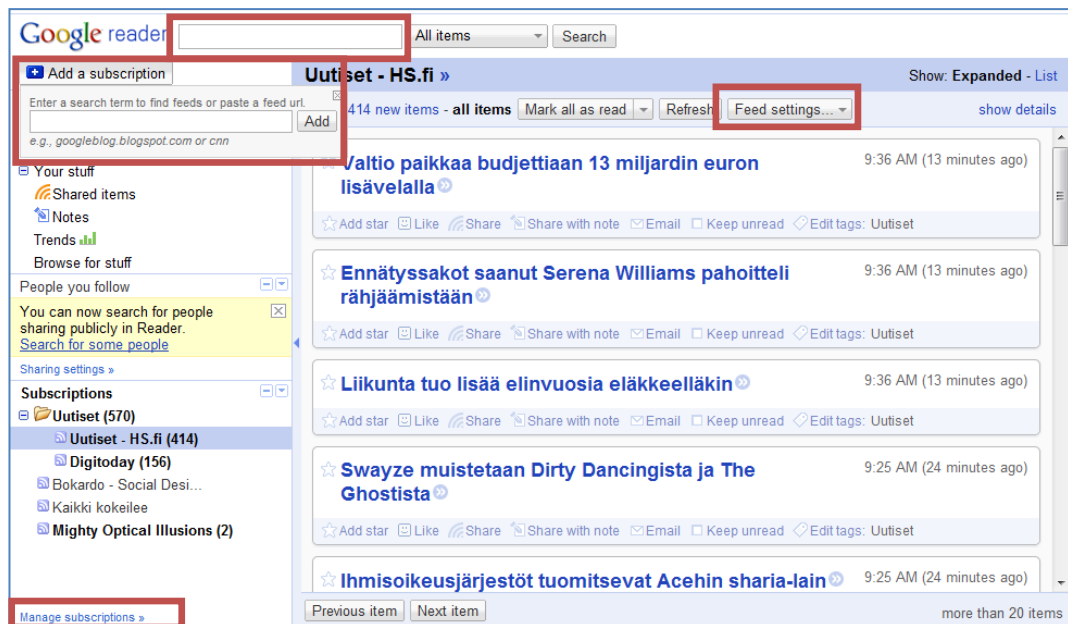


Figure 4.13: Reading news feeds, subscribing and unsubscribing to feeds.



**Figure 4.14:** Google Reader's difficult UI elements. [<http://www.google.fi/reader/>]

### *User Opinions on RSS Feeds*

The majority of users (14/20) considered RSS feeds an interesting service. It was evaluated to be e.g. a handy and fast way for following news because the news can be collected to one place. Six users would have still preferred reading the news from the original news services' web sites. Some users did not like the appearance of Google Reader and the layout which only shows the headings of the news articles. On the other hand, some other users liked the headings-only layout because it enables a longer list of news articles at a glance.

### **4.2.5. Social Networking Applications: Facebook**

Users were interviewed extensively about their social networking application usage, but the focus was on Facebook usage since it is the most popular social networking application [[Ale09]]. Facebook was also the only social networking application which was familiar to all users at least on some level. The majority of young users (6/10) were active Facebook users and the rest four had at least sometimes visited Facebook. Only one older user had a Facebook account, though he had never really used it due to lack of Facebook friends. The majority of older users (8/10) had at least once checked e.g. their friends' public Facebook profiles.

Facebook users told that they typically check the news feed from Facebook's home page to see their friends' status updates and new photos. Occasionally, they also check notifications, their inbox, and profile page. Users felt that Facebook offers an excellent way for keeping track of friends' doings and for communicating with friends, both new and old and the ones that live abroad. Photo sharing was also considered to be a very useful feature. The disadvantages of

Facebook were considered to be forced friend invitations and the increasing amount of unnecessary information. The lack of privacy, embarrassing photos, wasting of time, and social pressure were also considered to be Facebook's drawbacks. Some older users were also worried about increased crime rates due to identity thefts and other misuses of information. A couple of older users also showed concern over children and the youth who do not necessarily understand that some kinds of contents are unsafe to publish on web. In the study by Hart et al. (2008) the interviewees mentioned similar kinds of negative experiences with Facebook, such as embarrassment and social pressure [Har08].

### *Using Facebook*

The results of the usability test concerning Facebook are presented in Figure 4.15. Nearly all users (18/20) managed to hide an unwanted friend from home page's news feed by using the *Hide* button which appears to the right side of the feed when the user takes the pointer on top of the feed (see Figure 4.16). Some users though were unsure about whether their action would hide that particular piece of news or all future news of the hidden person. It was also unclear to many users where one could undo the action. However after the tests in spring 2009, Facebook added a feedback message which tells the user that the person has been hidden from future news feeds, and a link to *Edit Options* is provided.

The floating menu bar at the bottom of the page (see Figure 4.16) confused several users. The seeking of important information from the bottom of the page felt unnatural to many users. A floating menu was unfamiliar to most users because it is still an uncommon user interface element. Approximately half the users had trouble finding information from the menu e.g. about Events or Chat. Even some active Facebook users had trouble with the menu. The study made by Hart et al. (2008) also suggests that Facebook has problems with user interface consistency and standards. According to their study, Facebook also violates the usability heuristics of error prevention and recognition rather than recall [Har08].

In this study, the majority of users (17/20) were able to edit the Friends element (see right side of Figure 4.16) on profile page without difficulties. Several users thought that a pen works very well as an editing symbol. Nearly all younger users (9/10) succeeded in dragging the profile page box elements, but only less than half the older users (4/10) were able to drag the boxes without difficulties. The arrow symbol, which represents the possibility of dragging, was unfamiliar to many older users.

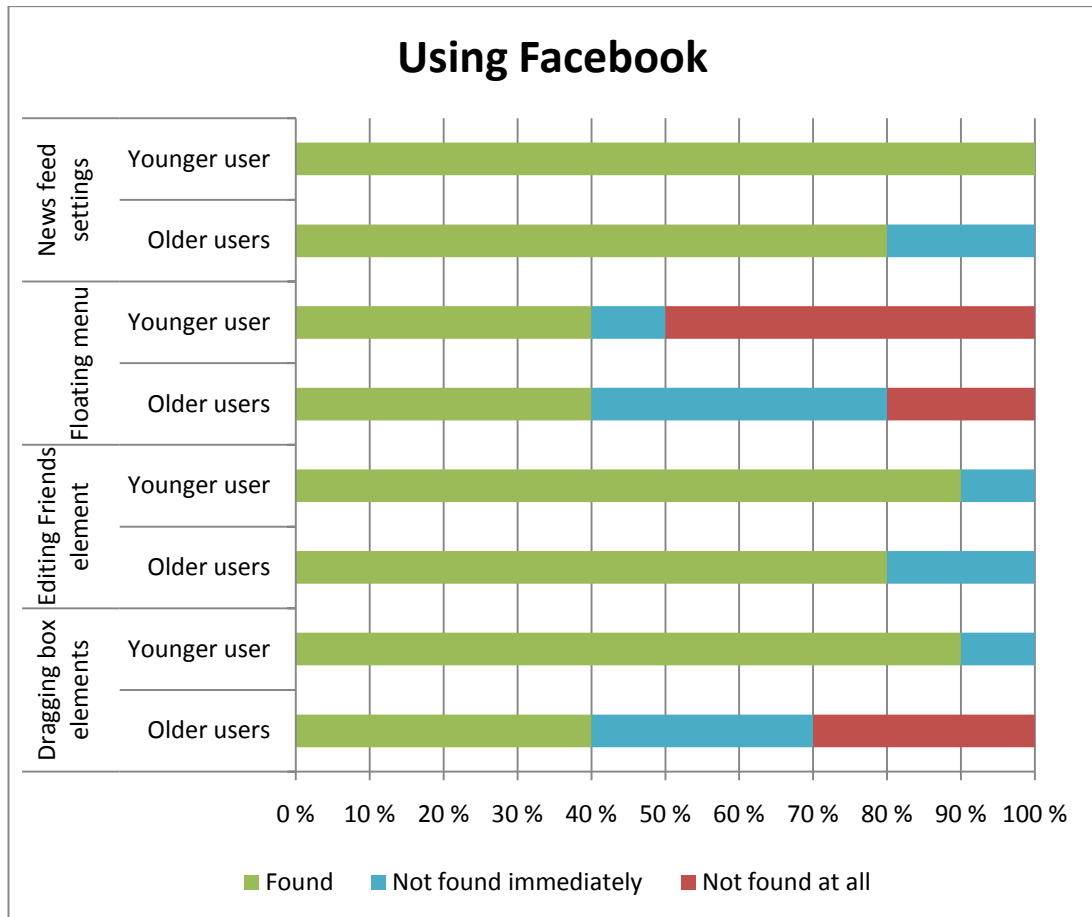


Figure 4.15: Using Facebook.



Figure 4.16: Facebook’s home page’s news feed and floating menu, and profile page’s tested UI elements. [http://www.facebook.com/home]

### User Opinions on Facebook

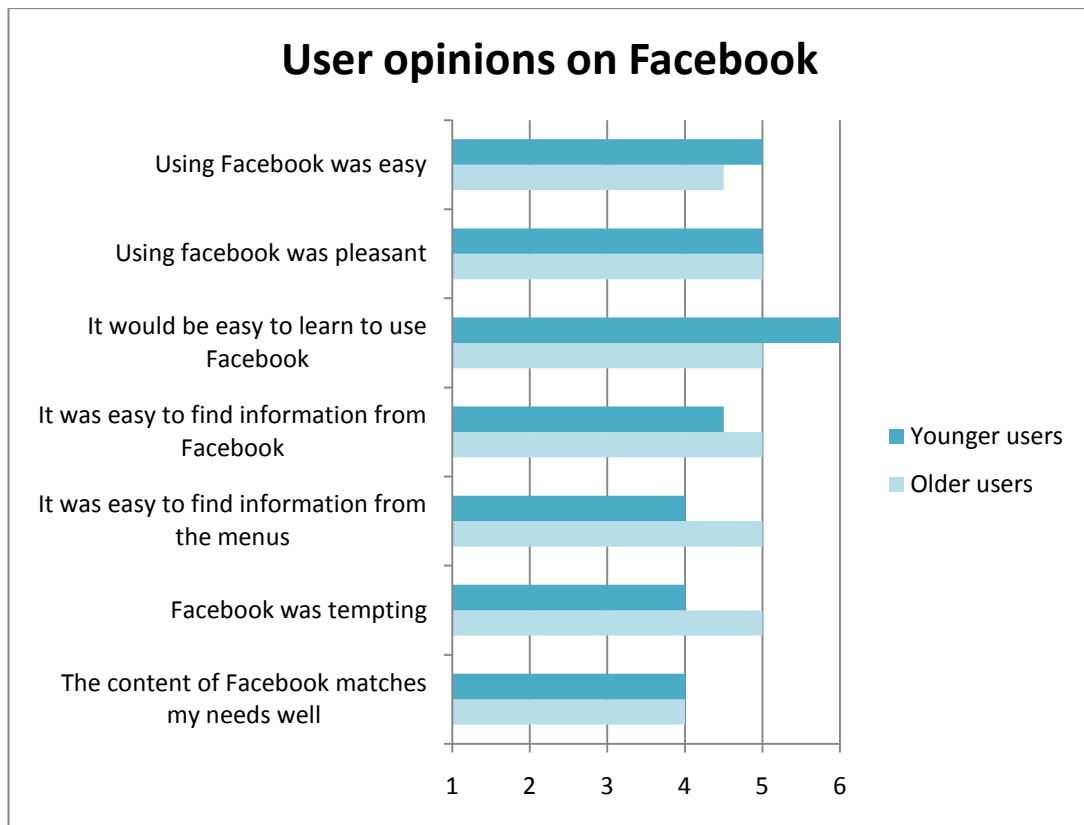
The majority of the users who did not have their own Facebook profile (9/13) considered their Facebook experience to have been quite positive. They got especially interested in following friends’ status updates and photos and also keeping in contact with friends through Facebook.

In addition, Facebook was considered to be versatile and fun to use. The study by Hart et al. (2008) suggests similar results according to which users considered it interesting to be able to see what friends are up to and also communicating with friends in several ways [Har08].

A few retirees considered themselves too old for Facebook. One retiree said that the threshold for joining Facebook is especially high for older people because they do not have friends and that way any content on Facebook. In addition, he would have needed initial guidance in the beginning of use.

After the test tasks, users were asked to fill in a user evaluation form whose results are presented in Figure 4.17. Users felt that Facebook is quite easy and pleasant to use and also very easy to learn to use. In general, it is quite simple to find information on Facebook, but some users considered the menus on Facebook to be inconvenient to use. Surprisingly in the user evaluation form, older users considered Facebook to be more tempting than the younger users did. No further questions about the reasons were asked from the users, but one possible reason is that many younger users see Facebook as self-evident every-day thing and not as a tempting new thing. Facebook was considered to match user needs to some extent, but a few users felt that Facebook does not meet any of their needs.

In the study by Hart et al. (2008) existing Facebook users were interviewed about the usage of Facebook. The results also suggest that users consider Facebook to be easy and fun to use even though heuristic evaluation found several usability problems. However in their study, some existing Facebook users also felt that Facebook is sometimes frustrating and even boring to use. [Har08]



**Figure 4.17:** User opinions on Facebook (medians).

#### 4.2.6. Other Social Networking Sites

Six users had a LinkedIn profile, but its usage had been quite passive. The majority of older users group (9/10) had never even heard of LinkedIn. The majority of younger user group said to use MySpace for listening to music occasionally. Only one older user had browsed MySpace.

The Finnish social networking site IRC-Galleria was familiar to nearly all users (19/20) at some level. None of the users had an own profile there, but majority of younger users (6/10) had browsed through their friends' profiles. To older user group (9/10) IRC-Galleria was familiar from the media.

One younger user turned out to be a very active social networking applications' user. He had been using eight different applications. As a drawback of using so many applications he considered to be the overlapping between applications. In addition, it has been challenging to remember in which applications to find certain friends. As an advantage of using several different applications he considered to be the refreshing impact of variety. Besides, it is nice that if some older application, like Facebook, gets boring it is easy to move to another one.

The majority of users (16/20) felt that besides the social networking applications that they are already using they do not have a need for other such applications. Several older users said that



they would rather meet their friends face to face than through web. However the communication manners of majority of users had changed during the past few years in some way. The more commonly used communication means turned out to be email, Facebook and Skype.

#### **4.2.7. Other Social Media**

##### ***Social Bookmarking***

Social bookmarking proved to be still quite unfamiliar to most users. Only one user had been using social bookmarking services, such as Delicious and Reddit, regularly. Even though the majority of users had never even heard of social bookmarks, many considered them to be a good idea because it is difficult to find interesting content from the overflowing web.

##### ***Sharing Videos***

YouTube was familiar to all users on some level. Younger users tended to watch YouTube videos quite often, some even daily. Also two older users had been watching YouTube videos quite often, and six had even once watched some video. YouTube is mostly being used for listening to music and watching entertaining videos of e.g. TV series and sports events. A few users had also used other video sharing services such as Vimeo, Magavideo and Russian and Chinese YouTube clones. Only one user had added own skateboarding videos to YouTube.

##### ***Sharing Photos***

All younger users had at least sometimes watched their friends' photos on web e.g. in Facebook, Picasa or Flickr. The majority of young users (8/10) had also added their own photos at least to Facebook and some also to Flickr or Picasa. The majority of older users (6/10) had at least sometimes watched their friends' photos on web e.g. on friends' home pages or in Kuvaboksi or Picasa. Only one older user had added own photos to Kuvat.fi service. Photo sharing services were considered to be very useful, because they prevent the jamming of email inbox where the photos used to be sent to.

##### ***User Reviews***

The majority of younger users (8/10) had at least sometimes read other web users' product reviews from Amazon or Hintaseuranta.fi. Only three older users had read user reviews from Vertaa.fi, Hintaseuranta.fi or Amazon.

## 5. Answering Research Questions

In the beginning of this thesis, research questions were defined [see section 1.2. Research Questions]. Based on the conducted research and the results presented in chapters 3 [see section 3. Research] and 4 [see section 4. Results] the research questions will now be reviewed.

### 5.1. 1st Question: How is Social Media Used and Exploited?

In this study, four major social media usage phenomena emerged: users tend to exploit social media content instead of creating it, social networking is considered to have two faces, users have insufficient knowledge of available services, and social media has slightly changed users' communication manners.

#### 5.1.1. Exploitation Instead of Creation of Social Content

According to the interview results, users tend to exploit the social web content diversely. The content created by other web users, such as blogs, discussion forums, wikis, and photos, are read and exploited. Social content is regarded positively for the most part, and the content is considered to be quite reliable and of good quality. Especially younger users exploit social media, such as Wikipedia, discussion forums, and blogs, quite actively not only on their leisure time, but also in their studies and at work. In every day information search, e.g. Wikipedia, blogs, discussion forums, YouTube, and photo sharing applications are becoming more and more common. The advantages of social media were seen to be easy and fast sharing of content, new information search possibilities, and more versatile communication ways.

However, only a small minority of users participate in the web content creation process just like Jakob Nielsen has stated before [see section 2.3.1. User Participation]. The usage threshold seems to be quite high. E.g. users seemed to be afraid of editing a Wikipedia article since it requires learning to use the uncomfortable text editor of Wikipedia and actually knowing about the edited article's subject. Users seemed to be shy about publishing their own writings on the web. In addition, many users felt that publishing their own thoughts and opinions on web is unnecessary and uninteresting because the majority does not have a need for expressing themselves to a large audience, and they can think of a lot of more interesting hobbies than that. The lack of time also seemed to be factor.

In order to encourage more users to participate, the application should be easier and more fun to use. Offering users simple ways for participating, such as comment fields and simple content rating possibilities [Tal09], encourages the users to start participating. Also if the user created content of the application is interesting and well-produced, the user will likely

continue reading or following it. It is also possible that in time he will start commenting and even creating his own pieces [Tal09]. Recognition is also a major part of the encouragement. It can be realized e.g. in the form of rewarding users by presenting them in a ranking list and giving them merits in the form of titles [Tal09].

### **5.1.2. The Two Faces of Social Networking**

Users were familiar with Finnish social networking applications and Facebook at least on some level because they have had media coverage. Younger users were familiar with some other foreign applications as well. Social networking was considered to be both a positive and a negative phenomenon.

The advantages of social networking include easy communication ways concerning communicating with old and new friends as well as friends who live close by and far away. Another advantage is the sharing of photos on web. Social networking applications also offer interesting and fun features and opportunities for spending time. Even though Facebook includes various usability issues, users considered it to be versatile and fun to use. Similar results have been reported by Hart et al. in 2008. The major finding of their study was that traditional usability methods, such as heuristic evaluation, are not applicable for some new web applications, e.g. Facebook, which are designed for hanging around on the web instead of for users who have specific goals and productivity on mind [Har08]. Therefore, pleasurable design sometimes overrides the importance of usability. New design guidelines, which would better address the needs of modern and rich user experience, should be developed [Har08].

Besides being fun to use, social networking applications arouse some unpleasant feelings and concerns. Unwanted friend requests, information overflow, waste of time, social pressure, and lack of privacy were considered to be some of the biggest drawbacks of using Facebook. Facebook is no longer as tempting to younger users as it was in the beginning because it has become self-evident and even boring to some younger people. The results of the study by Hart et al. (2008) also suggest that Facebook sometimes induces negative feelings of frustration, embarrassment, boredom, and of social pressure [Har08].

Other disadvantages of Facebook include the possible misuses of information and increasing crime rates. Many people are also concerned about children who do not necessarily know what kind of information is safe to publish. Just recently several warnings for children have been presented e.g. by President Barack Obama. Children need education and supervision by their parents and school in order to become responsible social media and social networking

users. E.g. Stanford University has started to teach a course about Facebook to the parents [Fog09].

The communication ways of people seem to be changing slowly towards web related communications manners, such as email, Facebook, and Skype. However, several especially older users still prefer communicating with their friends face-to-face. Users also do not seem to have a need for several social networking applications, since one makes the communication concentrated and easy.

The competition between social networking applications might tighten up. Every one of them should try to stand out from the rest in some way, e.g. with innovative communication and customization possibilities. In the study by Hart et al. (2008) a major advantage of Facebook was considered to be the innovative ways of interacting with friends, e.g. through games or by sending electronic gifts [Har08]. Customization is important since social networking applications' profile pages often work like people's home pages with background information about the person and content created by him. The results of Hart et al.'s (2008) study suggest that some of the important features of Facebook include the possibility to express oneself, e.g. through creating a personal profile, and to reflect one's values, e.g. through publishing own photos and joining different interest groups [Har08].

### **5.1.3. Users' Insufficient Knowledge**

Users did not seem to know enough about the available social media services. Users showed interest and needs towards several services which they had not heard of before. E.g. RSS feeds were considered to be a useful service since they enable following news and other content updates fast from one place. Social bookmarks were also considered to be a good idea because they facilitate the finding of interesting information from the constantly increasing mass of web content. Some older users had never used Google Maps before, but got very interested after the test.

Some users were very disappointed that no-one had ever told them about the existing applications which could make their lives easier in some way. The awareness of the existing services tends to spread from a friend to friend. People with less technically oriented friends and with the lack of genuine interest towards technology might never find out about new services. Employers and schools could serve as mentors for users of this kind, such as Stanford University which teaches a course about Facebook to the parents [Fog09]. New services would also need more media coverage in order to find the big masses of users.

#### 5.1.4. A Slight Change in Communication Manners

The communication manners of users had changed slightly over the past couple of years. However, the manners between younger and older users seemed to differ from each other at least to some extent. Both user groups had started to communicate via email the most. Phone still seemed to be an important communication tool, but email has changed most users' communication manners and Facebook several young users' manners. With younger users, Facebook has e.g. replaced some text messages sent by phone or instant messaging services. The popularity of Skype also seems to be increasing continuously, while slightly decreasing the importance of the phone. New kinds of web communication tools which are free of charge and simple to use are very welcome.

### 5.2. 2nd Question: What are the Opportunities of Rich User Experience?

Rich user interface features seem to improve the user experience by making the operations easier and faster to perform even though they might be initially difficult to notice. The following rich user experience phenomena emerged in the study: drag-and-drop and some other rich features are very useful, and there are great differences between rich text editors.

#### 5.2.1. Useful Drag-and-Drop Feature

The drag-and-drop method of user interface elements was considered to be a very good user interface feature. The possibility to drag objects decreases the number of clicks the user has to perform notably and enables a smoother use of the application. Drag-and-drop is a familiar feature for many users from many desktop applications and file managing. But especially for older and more inexperienced users it is a fairly unknown feature in web environment like Mauer (2006) has also reported [see section Challenges with RIA] [Mau06]. Also without instructions, the feature might also get missed by more experienced users. Due to these difficulties, Mauer suggests that richness should be added slowly and only to the kinds of places where it improves usability [Mau06].

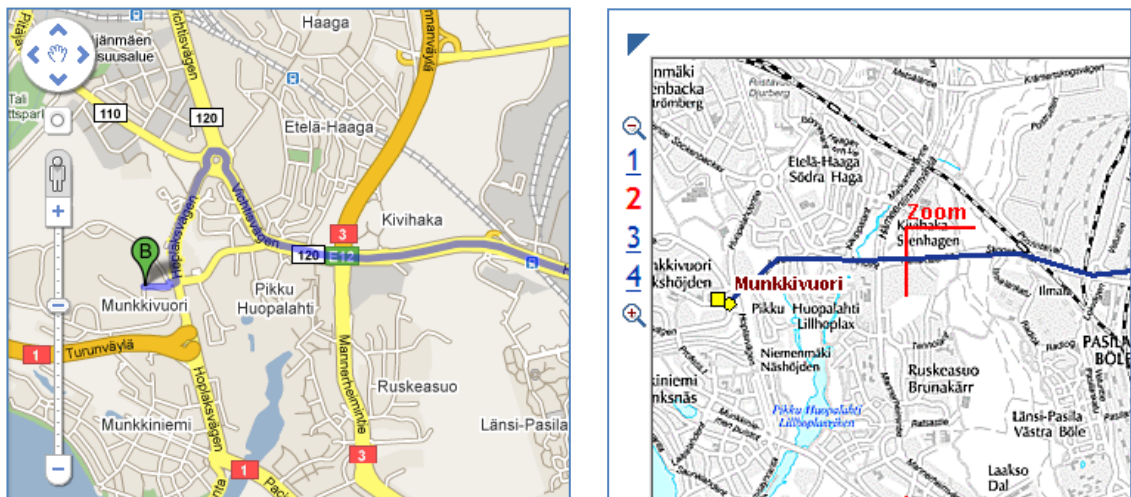
Several users would have needed quick instructions on how to use the new features and controls. The instructions could be shown to first time users e.g. with a non-lock dialog box pointing at the instructed element on the web page. Non-lock dialog boxes do not cause the web browser to lock, but enable users to use the web page normally [Tal09]. The instructions should be at hand also later if needed. Short instructions or tips may help more users to find the features. Mauer (2006) has also suggested using small in-page tutorial animations in the beginning of use to communicate to users what can be done with the new page elements [Mau06]. Google Maps' tool tip instruction *Drag to change route* on how to change the route

on the map worked quite well because several users noticed it and were able to change the route based on the tip.

Drag-and-drop method is a very useful feature in many contexts. It is especially useful in maps, customizable pages, such as iGoogle, and on pages where the user needs to change the order of objects, e.g. photos in Flickr.

### 5.2.2. Other Useful Rich Features

Google Maps offered more versatile zooming functions and opportunities than Journey Planner's HTML map. Figure 5.1 presents the zooming axels of both tested applications. Besides having more zooming levels, Google Maps also has more zooming controls and zooming opportunities than Journey Planner's map. Zooming slider enables the user not having to press one precise spot on the zooming axel like on Journey Planner, thus making the usage faster [Mah06]. It enables the user to either drag the slider's switch or to click the wanted level on the slider or to click the + and – symbols on each end of the slider.



**Figure 5.1:** Zooming axels of Google Maps and Journey Planner.

[<http://www.google.fi/maps>] [<http://aikataulut.ytv.fi/reittiopas/en/>]

It is usually wise to offer the user both rich and traditional features side by side. Thus users with different kinds of experience levels will be able to use the application. In Google Maps it is possible to move and zoom the map both with rich and traditional-like UI controls.

Even though the users might not know how to use the rich features at first they like the applications with rich features more than traditional-like applications. Rich features seem to make the usage easier and more pleasant after the user has learned to use them. Quick instructions and tips are a good way for facilitating the learning process of usage. Dolson (2007) suggests that users should be informed about the additional functionalities e.g. by using

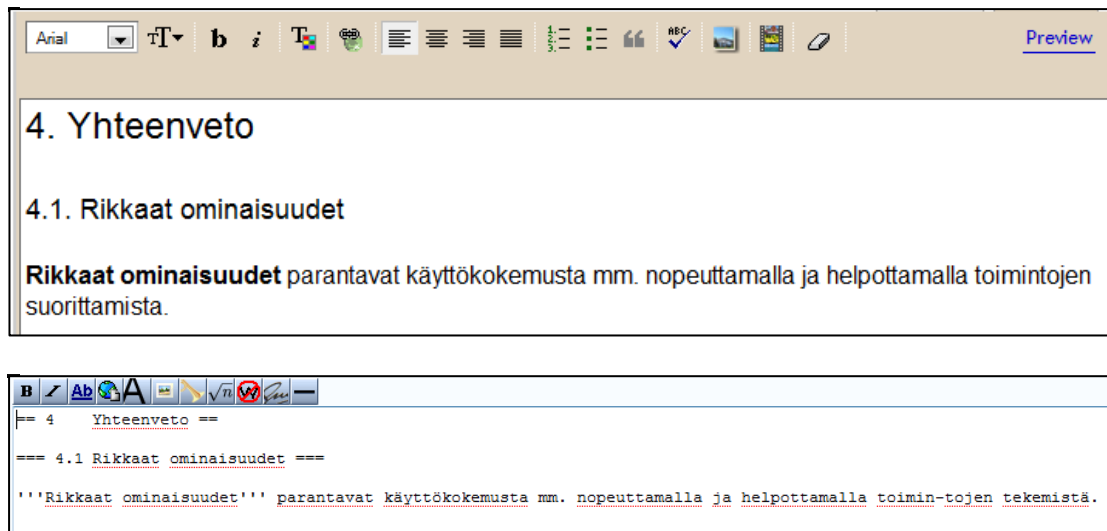
tool tips, subtle graphic indicators, and other changes triggered by mouse hover action [Dol07]. In time when Ajax has become even more popular, more users will probably learn to use the new kinds of rich features provided by it.

Facebook was considered to be easy to learn to use, even though it includes usability issues. Facebook is continuously improving the features and functions by making them easier to notice and use. After the tests in spring 2009 e.g. the Chat menus in the floating menu have been clarified significantly. It is often useful to tell the user about the improvements or other changes to the user interface e.g. with a non-lock dialog box pointing at the improved element because if the user has once noted that the element is difficult to use, he might try to avoid it also in future.

### **5.2.3. Significant Differences between Rich Text Editors**

In this study, it was discovered that there are big differences between rich text editors. The users considered Blogger's text editor significantly easier and more pleasant to use than Wikipedia's text editor ( $p < 0.05$ ). However, it must be noted that counterbalanced order was not used with Wikipedia's and Blogger's test tasks, and therefore all users were using Wikipedia's text editor before Blogger's. Wikipedia's text editor exploits code-like editing, whereas Blogger's text editor resembles Word's text editor which many users are familiar with. It is often wise to mimic the kinds of applications that are already familiar to most users.

With Blogger's text editor, it is possible e.g. to choose the font, font size and color, as well as add images and bulleted lists with the help of icons on the top bar. Blogger's text editor seemed to be quite a good tool also for inexperienced text editors. On the contrary, Wikipedia's text editor turned out to be quite cumbersome and difficult to use especially without instructions. However, it has been stated that Blogger's kind of rich text editors are a great tool for nontechnical users, but they might slow down power users [Mah06]. Figure 5.2 presents both text editors, Blogger's on top and Wikipedia's at the bottom.



**Figure 5.2:** Blogger's text editor on top and Wikipedia's text editor at the bottom. [https://www.blogger.com/] [http://en.wikipedia.org/]

### 5.3. 3rd Question: What are the Typical Web 2.0 Usability Problems?

Typical Ajax-related usability problems include the poor findability of rich features that are previously unfamiliar to users [see section 5.2.1. Useful Drag-and-Drop Feature]. The biggest usability issue with social media is the lack of encouragement which would make the users to participate more actively. Encouragement includes both technical issues such as poor text editing features [see section 5.2.3. Significant Differences between Rich Text Editors] and psychological issues such as the lack of motivation and recognition [see section 5.1.1. Exploitation Instead of Creation of Social Content].

### 5.4. 4th Question: What Kinds of Differences are there between User Groups?

The younger and older user groups turned out to differentiate from one another in several ways. The two groups had very different knowledge levels and requirements for applications. Older and younger people also tend to exploit the applications in different ways.

#### 5.4.1. Differences in Knowledge and Precaution

Younger users were more aware of the typical Web 2.0 applications than older users. Several older users were annoyed that no-one had ever told them about new useful applications such as Google Maps and taught them to use those efficiently. Since older users are less reluctant to try out new applications and features than younger users, they often miss the new and more efficient ways to perform the needed operations. Many older people need to be taught and instructed by another person in order to learn.



#### **5.4.2. Different Requirements**

Some older users tend to be happy on what they are offered easier than younger users. They often do not understand to demand more, such as easier application. E.g. in the test, older users evaluated Wikipedia's text editor to be easier to use than what younger users did, even though the older users had more difficulty using it. Younger users understand to demand something better and more, e.g. customizable applications, in order to make the applications more pleasant to use. The applications that seem like new and interesting to older users might already feel like old and boring to younger users.

#### **5.4.3. Differences in Exploitation**

Young users know how to exploit social media and are not afraid to use it on free time, at work, or at studies. Older users in general seem to have a bigger threshold for trying out new things and applications than younger users. Even though that social media offers a lot of activities and useful features for e.g. retirees, it is difficult to encourage them to participate. One of the biggest issues is that the older users do not know how to use social media applications, and therefore they would need initial help. Another issue with social networking is the lack of the friends on the web. E.g. in Facebook if one does not find friends, there is only a small amount of content.

## **6. Conclusions**

One of the main purposes of this study was to find out what should be taken into consideration when exploiting Web 2.0 characteristics in designing web service [see section 1.1. Purpose of the Study]. These important matters will be discussed under the Exploiting the results heading. At the end of the chapter, the challenges of the study are discussed and the research process will be evaluated. The possible future work is also discussed.

### **6.1. Exploiting the Results**

The results of this study will be used in Adage Usability's marketing materials as a reference study. The results also suggest important matters that should be taken into consideration when exploiting Web 2.0 characteristics in web applications and services. The most important thing is to know the service's users and serve them as well as possible. Another important challenge is to stand out from the mass of services.

#### **6.1.1. Knowing the Users**

Users' needs, expectations, and characteristics, such as earlier knowledge and skills, should be taken into consideration in the design process. Ajax technology should only be used in a way which extends usability and especially supports ease and pleasantness of use. Mimicking the physical world and the kinds of applications that are already familiar to most users helps the user to understand how the user interface works. Rich features should be added slowly and presented side-by-side with traditional features. The features of the user interface should also be communicated to the user e.g. with the help of quick instructions and tooltips. Letting the user give feedback and improving the usability based on user feedback and user testing easily improves the service's reputation as a modern and constantly developing service.

With social media characteristics, users should be encouraged to participate in the content creation process e.g. with easy-to-use user interfaces and by giving recognition to users. It is also important to realize that social media is often used for information search due to which search functions should work well.

If many different kinds of user groups need to be served, customizability of the user interface may be useful. In order to prevent the older users to feel like outsiders, applications designed specifically for them might be useful. Older users would also need courses, mentors, and encouragement.

#### **6.1.2. Standing out from the Mass**

In order to attract users, the service needs to stand out from the rest of the services. The ease and pleasantness of use are important, but the usage also often needs to be interesting and

fun. Innovative design and media coverage are just a few examples of how to attract users' attention. For example customizable user interfaces and innovative communication tools are especially welcomed by many users.

Services also need to be free of charge and easy to join. A few possible earning model examples include offering both chargeable and free services such as Habbo, Skype, and Flickr do. Social networking application Habbo provides free chatting possibilities, but additional services such as decorating a virtual room is chargeable [Hin07]. Skype also offers free chatting and Skype-to-Skype calls, but calling a phone or a mobile is chargeable [Sky09]. Using Flickr for sharing photos is free of charge, but if the user wants a limited amount of storage space for the photos a small charge needs to be paid. It is enough if one user out of hundred pays the fee in order to give the service for the rest 99 users for free [Kur08, p. 52]. Service providers can also own the rights for the content created by users and reuse it for their own purposes [Hin07], e.g. Google has a license to modify, publish, and distribute the content produced with Google products for the purposes of distributing and promoting Google services [Goo09c].

## **6.2. Challenges of the Study**

The biggest challenge of this study was to become acquainted with the Web 2.0 concept and decide the scope of the study. Web 2.0 is a broad concept without a precise definition and therefore at first it was quite difficult to form an overall picture of the concept. Kari A. Hintikka and San Murugesan have divided the concept into three distinct categories: technologies, social trends, and business models [Hin07] [Mur07]. The inventor of Web 2.0 concept, O'Reilly Media, just recently defined it as technologies, business models, and philosophies of openness, collective intelligence, and transparency [O'Re09]. However, Hintikka's and Murugesan's categories were used as a basis in the study since they reflect well the mental model developed after reading a lot of material about Web 2.0 concept.

Determining the scope of the study based on the three categories (technologies, social trends, and business models) was quite easy because Adage Usability had a clear interest in social media and Ajax technology. On the other hand, choosing the tested applications was much more difficult, but pilot testing fortunately helped in the decision making.

## **6.3. Evaluating the Study and Possible Future Work**

The results and the conclusions of the study answered quite well the research questions of the study. However, the used research methods, user groups, and the tested applications could have been chosen differently, too. The following tries to explain this, and it also gives ideas on how the subject could be studied in the future.

### **6.3.1. Research Methods**

The used research methods produced a big amount of both qualitative and quantitative data. All methods were useful and necessary for the final results of the study.

However, in studying user experience a follow-up study would have been useful and interesting. The users could have kept a diary about their feelings and opinions towards Web 2.0 applications and their usage. A new interview after a month or so would have offered more information about users' attitudes and long-term opinions. Have any of the users changed their usage habits after the test? Have any of them started using new applications? Do users just need a little push or someone to present the available service to them in order to get them interested?

After the study, the most common social networking applications were checked in case the users had joined them after the test. At least two users had joined Facebook, and there was suspicion about a few other users who or whose namesakes had joined Facebook.

### **6.3.2. User Groups**

Only two user groups were used in this study due to which only active young users and passive older users got compared. It would have been interesting to run the interviews with four user groups: active young users, passive young users, active older users, and passive older users. This way the differences between active and passive younger users as well as differences between active and passive older users would have been possible to analyze. It would also have been interesting to know if younger and older users have different kinds of reasons for being active or passive users. On the other hand, interviewing four user groups would have taken plenty of time and other resources which would not have been possible in this study.

### **6.3.3. Tested Applications**

Testing the chosen applications produced quite interesting data, but the applications could have been chosen differently. Google Maps and Facebook were good choices because they produced interesting results about Ajax usability and user experience. Wikipedia was also an interesting application due to its popularity among nearly all the users. Blogger and Google Reader were extra applications which just offered more information about Web 2.0 user experience and interview material.

It would have been interesting to replace one of these applications with a Finnish social media application, such as Eat.fi or Mondo.fi. Both of these applications offer recognition for participating users e.g. in the form of honorary titles and user rankings. According to the results of this study, user recognition might improve the user experience and encourage the

users to participate more. It would have been very interesting to prove this with a user study. It must be noted that one English speaking participant took part in the study and would not have been able to test these Finnish applications.

Another interesting application would have been micro-blogging service Twitter, which has become more popular this year. It would have been interesting to study whether people are actually using it or is it just the media that keeps reporting about the updates of Twitter users.

## References

- [Ada09a] Adage Oy. Käytettävyyden asiantuntija-arviointi. 2009. [Web site]. [Cited November 17, 2009]. Available at:  
[http://www.adage.fi/palvelut/kaytettavyystutkimus/kaytettavyiden\\_asiantuntija-arviointi](http://www.adage.fi/palvelut/kaytettavyystutkimus/kaytettavyiden_asiantuntija-arviointi).
- [Ada09b] Adage Oy. Käytettävyydestaus. 2009. [Web site]. [Cited November 17, 2009]. Available at:  
<http://www.adage.fi/palvelut/kaytettavyystutkimus/kaytettavyystestaus>.
- [Ale09] Alexa. 2009. [Web site]. [Cited September 8, 2009]. Available at:  
<http://www.alexa.com/topsites>.
- [And07] Anderson, Paul. What is Web 2.0? Ideas, technologies and implications for education. 2007. JISC Technology and Standards Watch, Feb. 2007. 64 p.
- [Bak07] Bakx, Ilse. User-Centered Design Approach for a Community Website with Social Software. 2007. HCII 2007. LNCS 4564. P. 3-11.
- [Bes06] Best, David. Web 2.0 - Next Big Thing or Next Big Internet Bubble?. 2006. Technische Universiteit Eindhoven. Lecture Web Information System.
- [Col09] Coleman, Keith. Gmail leaves beta, launches "Back to Beta" Labs feature. 2009. The official Gmail blog. [Web blog]. [Cited September 9, 2009]. Available at: <http://gmailblog.blogspot.com/2009/07/gmail-leaves-beta-launches-back-to-beta.html>.
- [Del09] About Delicious. [Web site]. [Cited September 9, 2009]. Available at:  
<http://delicious.com/about>.
- [Dol07] Dolson, Joe. Accessibility and Usability issues with Ajax. 2007. Accessible Web Design. [Web blog]. [Cited November 18, 2009]. Available at:  
<http://www.joedolson.com/articles/2007/10/accessibility-and-usability-issues-with-ajax/>.

- [Dwy07] Dwyer, Cathrine & Hiltz, Starr R. & Pesserini, Katia. Trust and privacy concern within social networking sites: A comparison between Facebook and MySpace. 2007. Proceedings of the 13<sup>th</sup> Americas Conference on Information Systems, Keystone, Colorado. 12 p.
- [Ell07] Ellison, Nicole B. & Stainfield, Charles & Lampe, Cliff. The benefits of Facebook “friends”: Social capital and college students’ use of online social networking sites. Journal of Computer-Mediated Communication. 12(4), article 1.
- [Fli09] What is Flickr?. 2009. [Web site]. [Cited September 9, 2009]. Available at: <http://www.flickr.com/tour/>.
- [Fog09] Fogg, BJ. Parents Need to Understand Facebook. 2009. Facebook for Parents - Persuasive Technology Lab @ Stanford University – 2009. [Online]. [Cited September 9, 2009]. Available at: <http://facebookforparents.org/>.
- [Fra08] Franco, Anthony. Flex vs. Ajax: Friends or Foes?. 2008. Effective UI. [Online]. [Cited September 9, 2009]. Available at: <http://www.uiresourcecenter.com/ui-technologies/adobe-flex/whitepapers/FlexVsAJAXFriendsOrFoes.pdf>.
- [Gar05] Garrett, Jesse James. Ajax: A New Approach to Web Applications. 2005. Adaptive Path essays. [Online]. [Cited September 8, 2009]. Available at: <http://www.adaptivepath.com/ideas/essays/archives/000385.php>.
- [Gib06] Gibson, Becky. AJAX Accessibility Overview. 2006. IBM articles. [Online]. [Cited September 8, 2009]. Available at: <http://www-03.ibm.com/able/resources/ajaxaccessibility.html>.
- [Goo09a] Google Latitude. 2009. [Online]. [Cited September 9, 2009]. Available at: [http://www.google.com/intl/en\\_us/latitude/intro.html](http://www.google.com/intl/en_us/latitude/intro.html).
- [Goo09b] Features: What is iGoogle?. 2009. Google search help. [Online]. [Cited September 9, 2009]. Available at: <http://www.google.com/support/websearch/bin/answer.py?hl=en&answer=20324>.

- [Goo09c] Google Terms of Service. 2009. [Online]. [Cited November 18, 2009]. Available at: <http://www.google.com/accounts/TOS>.
- [Har08] Hart, Jennefer & Ridley, Charlene & Taher, Faisal & Sas, Corina & Dax, Alan. Exploring the Facebook Experience: A New Approach to Usability. 2008. NordiCHI 2008: Using Bridges, 18-22 October, Lund, Sweden. P. 471-474. ACM. ISBN 978-1-59593-704-9.
- [Has06] Hassenzahl, Marc & Tractinsky, Noam. User experience – A research agenda. 2006. Behaviour & Information Technology. Vol. 25, No. 2, March-April 2006. P. 91-97.
- [Hea08] Hearst, Marti A. & Rosner, Daniela. Tag clouds: Data analysis tool or social signaller?. 2008. Proceedings of the 41<sup>st</sup> Hawaii International Conference on System Sciences 2008. 10 p.
- [Hin07] Hintikka, Kari A. Web 2.0 – Johdatus internetin uusiin liiketoimintamahdollisuuksiin. 2007. Helsinki, Finland: TIEKE Tietoyhteiskunnan kehittämiskeskus ry:n julkaisusarja. 47 p. Julkaisusarjan osa 28. ISBN 978-952-9714-50-6.
- [Hin08] Hintikka, Kari A. Liike-elämä ulkoistaa internetille eli meille käyttäjille. 2008. HS Teema 03/2008: Ihminen ja internet. P. 46-47. ISSN 1797-3740.
- [Klu07] Kluge, Jonas & Kargl, Frank & Weber, Michael. The Effects of the Ajax Technology on Web Application Usability. 2007. Webist 2007 – International Conference on Web Information Systems and Technologies. P. 289-294.
- [Kur08] Kurkijärvi, Lassi. Kaikki on kohta ilmaista. 2008. HS Teema 03/2008: Ihminen ja internet. P. 49-52. ISSN 1797-3740.
- [Leu08] Leukumavaara, Jenni. Puhelin on yhä naisten tärkein yhteysväline. 2008. Helsingin Sanomat. Vol. October 23, 2008. [Online] [Cited September 8, 2009]. Available at: <http://www.hs.fi/kotimaa/artikkeli/Puhelin+on+yh%C3%A4+naisten+t%C3%A4rkein+yhteysv%C3%A4line/1135240475608>.



- [Mah06] Mahemoff, Michael. Ajax Design Patterns – Creating Web 2.0 Sites with Programming and Usability Patterns. 2006. O’Reilly Media, Inc. 1<sup>st</sup> ed. P. 655. ISBN 0596101805.
- [Mar06] Markoff, John. Entrepreneurs See a Web Guided by Common Sense. 2006. The New York Time – Business. [Web article]. [Cited September 16, 2009]. Available at:  
[http://www.nytimes.com/2006/11/12/business/12web.html?\\_r=1](http://www.nytimes.com/2006/11/12/business/12web.html?_r=1).
- [Mau06] Maurer, Donna. Usability for Rich Internet Applications. 2006. Digital Web Magazine. [Web magazine]. [Cited September 8, 2009]. Available at:  
[http://www.digital-web.com/articles/usability\\_for\\_rich\\_internet\\_applications/](http://www.digital-web.com/articles/usability_for_rich_internet_applications/).
- [Mur07] Murugesan, San. Understanding Web 2.0. 2007. IT Pro. Vol. July/August 2007. P. 34-41.
- [Mäk08] Mäkinen, Esa. Tuhat ja yksi toimittajaa. 2008. HS Teema 3/2008: Ihminen ja internet. P. 30-35. ISSN 1797-3740.
- [Nie00] Nielsen, Jakob. Why You Only Need to Test with 5 Users. 2000. Jakob Nielsen’s Alertbox. [Web column]. [Cited September 11, 2009]. Available at:  
<http://www.useit.com/alertbox/20000319.html>.
- [Nie05] Nielsen, Jakob. Weblog Usability: The Top Ten Design Mistakes. 2005. Jakob Nielsen’s Alertbox. [Web column]. [Cited September 1, 2009]. Available at:  
<http://www.useit.com/alertbox/weblogs.html>. ISSN 1548-5552.
- [Nie06] Nielsen, Jakob. Hyped Web Stories Are Irrelevant. 2006. Jakob Nielsen’s Alertbox. [Web column]. [Cited September 1, 2009]. Available at:  
<http://www.useit.com/alertbox/hype.html>. ISSN 1548-5552.
- [Nie07a] Nielsen, Jakob. Web 2.0 Can Be Dangerous. 2007. Jakob Nielsen’s Alertbox. [Web column]. [Cited September 8, 2009]. Available at:  
<http://www.useit.com/alertbox/web-2.html>. ISSN 1548-5552.
- [Nie07b] Nielsen, Jakob. Web 2.0 'neglecting good design'. 2007. BBC News, 14 May 2007. [Online]. [Cited September 8, 2009]. Available at:  
<http://news.bbc.co.uk/2/hi/technology/6653119.stm>.

- [Nie93] Nielsen, Jakob. Usability Engineering. 1993. San Diego, United States of America: Academic Press. 362 p. ISBN 0-12-518406-9.
- [Nok09] Nokia Beta Labs. 2009. [Online]. [Cited September 9, 2009]. Available at: <http://betalabs.nokia.com/betas/view/ovi-lifecasting>.
- [O'Re05] O'Reilly, Tim. What is Web 2.0 – Design patterns and business models for the next generation of software. 2005. O'Reilly Media Inc. [Online]. [Cited September 8, 2009]. Available at: <http://oreilly.com/web2/archive/what-is-web-20.html>.
- [O'Re09] O'Reilly Media and TechWeb. Web 2.0 Summit 2009. 2009. [Web site]. [Cited November 17, 2009]. Available at: <http://www.web2summit.com/web2009>.
- [Pil08] Pilgrim, Chris J. Improving the Usability of Web 2.0 Applications. 2008. HT '08. Vol. June 19-21, 2008. P. 239-240. ACM 978-1-59593-985-2/08/06.
- [Por06] Porter, Joshua. The del.icio.us Lesson. 2006. Bokardo – Social Web Design. [Web blog]. [Cited September 1, 2009]. Available at: <http://bokardo.com/archives/the-delicious-lesson/>.
- [Sch07] Schmidt, Eric. Web 2.0 vs. Web 3.0. 2007. Google CEO's interview. [Online video]. [Cited September 10, 2009]. Available at: [http://www.readwriteweb.com/archives/eric\\_schmidt\\_defines\\_web\\_30.php](http://www.readwriteweb.com/archives/eric_schmidt_defines_web_30.php)
- [Sin02] Sinkkonen, Irmeli. Käytettävyysnasto. 2002. [Web blog]. [Cited November 17, 2009]. Available at: <http://www.adage.fi/blogi/2002/kaytettavyysnasto/>.
- [Sin08] Sinkkonen, Irmeli. Usability and user experience. 2008. Email group: all@adage.fi. April 30, 2008. [Online]. [Cited September 9, 2009].
- [Sky09] Skype. Managing calls and calling. 2009. [Web site]. [Cited November 18, 2009]. Available at: <http://www.skype.com/intl/en/allfeatures/calls/>.
- [Sto09] Storås, Niclas. Tällaisia ovat web 2.0:n käyttäjät. Tietoviikko. [Online]. [Cited September 8, 2009]. Available at: [http://www.tietoviikko.fi/kaikki\\_uutiset/article249185.ece](http://www.tietoviikko.fi/kaikki_uutiset/article249185.ece).

- [Tal09] Talja, Teemu. Web 2.0 Best Practices. 2009. Adage Usability's internal study report. P. 58.
- [Tro06] Trochim, William M. K. The T-Test. 2006. Research Methods: Knowledge Base. [Web site]. [Cited November 17, 2009]. Available at: [http://www.socialresearchmethods.net/kb/stat\\_t.php](http://www.socialresearchmethods.net/kb/stat_t.php).
- [Usa02] Usability First. Methods: Cognitive Walkthrough. 2002. [Web site]. [Cited November 17, 2009]. Available at: <http://www.usabilityfirst.com/methods/cogwalk.txt>.
- [w3c05] Role Taxonomy for Accessible Adaptable Applications Working Draft. 2005. w3c. [Online]. [Cited September 9, 2009]. Available at: <http://www.w3.org/WAI/PF/GUI/roleTaxonomy-20060508.html>.
- [Wik09] Wikipedia. 2009. Wikipedia – The Free Encyclopedia. September 9, 2009. [Online]. [Cited September 9, 2009]. Available at: <http://en.wikipedia.org/wiki/Wikipedia>.
- [Wol09] About Wolfram Alpha. 2009. [Online]. [Cited September 9, 2009]. Available at: <http://www.wolframalpha.com/about.html>.
- [You07] Young, G. Oliver. Topic Overview: Web 2.0. 2007. Forrester Research Inc.
- [Zuc09] Zuckerberg, Mark. 300 Million and on. 2009. Facebook Blog. [Web blog]. [Cited September 16, 2009]. Available at: <http://blog.facebook.com/blog.php?post=136782277130>.

## Appendixes

### Appendix A: Test tasks

- Google Maps and Journey Planner:
  - Find out how to get home from the test location by car or by public transportation.
    - Zooming and moving the map.
    - Changing the route with Google Maps.
- Wikipedia:
  - Find the people who are celebrating their birthday today and read more information about one of them.
  - Edit Wikipedia's Sand box page.
    - Add a header and two short lines of text to end of the article.
    - Review the page without publishing it.
- Blogger:
  - Write a short blog entry to *Kaikki kokeilee* blog and attach an image to it.
  - Publish the blog entry and find out what other participants have written.
- Google Reader:
  - Check the latest news of Helsingin Sanomat.
  - Subscribe to the blog *Kaikki kokeilee*, which you just wrote into, and scan through the blog entries.
  - Cancel the subscription.
- Facebook:
  - (To Facebook users only) Show me what you usually do when you enter Facebook.
  - Remove an unwanted person from the news feed.
  - Check the friends who are currently available for chatting.
  - Is it somehow possible to go offline (other people not seeing you)?
  - Find your calendar and the upcoming events. / Check your applications list.
  - Is it possible to show more than 6 friends in the friends-element on the profile page?
  - Is it possible to change the order of application boxes on the profile page?
  - (To younger user group only) Tag a friend on a photo.
  - (To younger user group only) Comment on a photo.
  - (To younger user group only) Remove your comment.

## Appendix B: Interview questions

- Google Maps and Journey Planner:
  - What kinds of maps do you usually use? Paper / Internet?
  - Have you ever used Google Maps or the map of Journey Planner before? How often?
  - (After the test task) Which one was easier or more pleasant to use?
- Social media: A list of social media applications (discussion forums, blogs, social networking applications, wikis, social bookmarks, multimedia, feeds and user reviews) was gone through with the user.
  - Which applications do you tend to use? What for? How often?
  - Which applications have you heard of?
  - What do you think about other applications based on what the interviewer has told you about them?
  - Are there any applications that you would never use? Why?
  - Are there any applications that you would like to use in addition to the ones that you are already using? Why?
  - Have you ever added multimedia content (photos, videos) or tags to the web?
- Wikis:
  - Have you ever used Wikipedia? How often? Why?
  - Do you consider Wikipedia as a reliable source of information?
  - Do you consider the articles as of good quality (well written, extensive)?
  - Have you ever used any other wikis?
  - Have you ever edited a wiki? What was that like?
  - (After the test task) What was it like to edit a Wikipedia article?
- Blogs:
  - Do you read any blogs? What are they about?
  - Do you consider the information presented on blogs reliable?
  - Have you ever published an own blog? What was it like?
  - (After the test tasks) What was it like to write a blog entry?
- Feeds:
  - Are you familiar with feeds? Have you ever subscribed any? About what?
  - (After the test tasks) Can you see yourself subscribing feeds one day?

- Social networking applications:
  - What kind of pros do social networking applications have? How about cons?
  - Have your communication manners changed along with the new applications?
  - (If not a user) Why are you not using any of these applications?
  - Are there any applications which you would like to use? Why?
  - (After the test tasks, if not a user) What was it like to use Facebook? Did your interest rouse?

## Appendix C: User evaluation form

### **Maps** (Filled after both mapping application tasks)

The usage of **Journey Planner** was...

Difficult	1	2	3	4	5	6	Easy
Frustrating	1	2	3	4	5	6	Pleasant

							Strongly disagree						Strongly agree
The map was easy to zoom							1	2	3	4	5	6	
The map was easy to move							1	2	3	4	5	6	

The usage of **Google Maps** was...

Difficult	1	2	3	4	5	6	Easy
Frustrating	1	2	3	4	5	6	Pleasant

							Strongly disagree						Strongly agree
The map was easy to zoom							1	2	3	4	5	6	
The map was easy to move							1	2	3	4	5	6	

### **Wikis**

Editing a wiki is... / I would imagine that editing a wiki is...

(Filled before the wiki task)

Difficult	1	2	3	4	5	6	Easy
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Editing a wiki was... (Filled after the wiki task)

Difficult	1	2	3	4	5	6	Easy
Frustrating	1	2	3	4	5	6	Pleasant

							Strongly disagree						Strongly agree
It would be easy to learn to use the service:							1	2	3	4	5	6	

### **Blogs**

Writing a blog is... / I would imagine that writing a blog is...

*(Filled before the blog task)*

Difficult      1      2      3      4      5      6      Easy

Writing a blog was... *(Filled after the blog task)*

Difficult                      1      2      3      4      5      6      Easy  
Frustrating                   1      2      3      4      5      6      Pleasant

It would be easy to learn to use the service:      Strongly disagree      1      2      3      4      5      6      Strongly agree

### **Facebook** *(Filled after Facebook tasks)*

The usage of Facebook was...

Difficult                      1      2      3      4      5      6      Easy  
Frustrating                   1      2      3      4      5      6      Pleasant

It would be easy to learn to use the service:      Strongly disagree      1      2      3      4      5      6      Strongly agree  
It was easy to find the needed information:      1      2      3      4      5      6  
It is easy to find information from menus:      1      2      3      4      5      6  
Facebook was tempting:      1      2      3      4      5      6  
The content of Facebook meets my needs well:      1      2      3      4      5      6

### **Google Latitude** *(Filled after Google Latitude demo)*

The service was tempting:      Strongly disagree      1      2      3      4      5      6      Strongly agree  
The content of the service meets my needs well:      1      2      3      4      5      6

### **Google Gears** *(Filled after Google Gears demo)*

The service was tempting:      Strongly disagree      1      2      3      4      5      6      Strongly agree  
The content of the service meets my needs well:      1      2      3      4      5      6



## Appendix D: User background information

**Table 1:** Background information of the younger and more active user group.

Num	Age	Sex	Education	Profession	Internet skills	Social media usage
1	25	Male	B.Sc.	Student	Intermediate	Weekly
2	24	Female	B.BA	Software specialist / Student	Skilled	Daily
3	24	Female	Laboratory analyst	Student	Intermediate	Weekly
4	25	Male	M.Sc (Eng.)	Entrepreneur	Expert	Daily
5	24	Female	B.Pol.Sc.	Student	Basic skills	Daily
6	24	Female	B.Sc. (Eng.)	Junior consultant / Student	Intermediate	Weekly
7	28	Male	MBA	Business Analyst	Expert	Daily
8	24	Female	B.Sc. (Eng.)	Student	Skilled	Daily
9	25	Female	Optometrist	Optometrist	Basic skills	Daily
10	25	Male	B.Sc. (Eng.)	Student	Skilled	Daily

**Table 2:** Background information of the older and less active user group.

Num	Age	Sex	Education	Profession	Internet skills	Social media usage
11	59	Female	Elementary school	Contact coordinator	Basic skills	Occasionally
12	60	Female	LL.M.	Head lawyer	Basic skills	Never
13	43	Male	M.S.Sc	Post-graduate student	Basic skills	Occasionally
14	58	Female	Business school	Retiree	Basic skills	Never
15	44	Female	Technical school	HPAC Designer	Intermediate	Occasionally
16	49	Female	Secondary school graduate	Financial Assistant	Basic skills	Occasionally
17	60	Male	MBA	Retiree	Basic skills	Occasionally
18	47	Female	MBA	Sales Manager	Skilled	Occasionally
19	57	Female	Vocational Qualification in Business and Administration	Accounting Manager	Intermediate	Occasionally
20	57	Male	M.S.Sc.	Retiree	Basic skills	Occasionally