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Designing User Interfaces for Mobile Web

Master of Science Thesis in the Programme Interaction Design

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Foreword

We would like to thank Mogul, Evitbe and all the awesome people working there for helping us and making us feel like being part of the team.

Special thanks to David Litmark for sharing his epic wisdom as our supervisor at Mogul, and to Camilla Starke for sharing her valuable time and advice.

We would also like to thank our examiner Fang Chen for pointing us in the right direction.

Abstract

The popularity of modern mobile phones has led to more people using their mobile phones to access the Internet. The majority of web sites today are not designed to adapt to the smaller screens and other limitations of mobile devices. This places new demands on user interface design and it is clear that website owners must start to adapt their websites for mobile use.

Designing for mobile web can be challenging and there are a lot of aspects to consider. In this thesis we provide theory as well as practical advice on how to design usable user interfaces for mobile web sites, especially in the area of campaign and event marketing and booking services.

This thesis uses a six-step design process for creating a mobile web design concept for a web-based event and campaign booking service. The design process was shown to be successful for creating the design concept.

The design concept is presented as a high fidelity, interactive prototype created using the mobile user interface framework jQuery Mobile.

Keywords: Mobile Web, Mobile Frameworks, GUI Design, Interaction Design, jQuery Mobile.

Glossary

API - Application Programming Interface

GUI - Graphical User Interface

IxD - Interaction Design

JQM - jQuery Mobile

OS - Operating System

UI - User Interface

W3C - The World Wide Web Consortium, International community that develop Web standards

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1 Introduction

Today more and more people use their mobile phones for much more than making phone calls and sending text messages. Mobile phones are constantly getting more powerful, and the gap between traditional computers and mobiles phones is shrinking. Modern mobile phones (i.e. smartphones) with more CPU, bigger screens, better connectivity and more capable web browsers have led to an explosion in increase of web browsing on these devices.

However, the majority of web sites available on the web today are designed specifically for desktop browsing with little or no considerations for mobile browsing. This has resulted in many sites providing poor usability while accessed on mobile devices. For these sites to become more usable they need to provide alternative designs and layout for mobile phones. The need for customized web pages with only the most vital information for mobiles is far from something new. Jones et al. (Jones, Marsden, Mohd-Nasir, Boone, & Buchanan, 1999) suggested back in 1999 that mobile web was something you needed to take into account and create special sites for. Despite this there are still many web sites that are not customized for mobile web.

But designing web sites for mobile devices is a difficult and complex task. There are multiple factors that make designing web sites for desktop computers different to designing for mobile devices. Such as changing contexts, different user behavior, device limitations and the amount of different mobile browsers and operating systems make it almost impossible to design sites that will look and behave as the design is intended everywhere. There are, however, a lot of tools available today that have made the process of designing and developing mobile web sites much easier. Technologies like HTML5, CSS3 and a vast amount of frameworks, dedicated to ease mobile web development, creates opportunities to develop usable mobile web sites for modern mobile phones more easily.

Also, companies that are present on mobile phones have a competitive edge over companies that don't. Companies that want to take their business to the mobile platform need knowledge on how to do it. To make the most of an entrance to the mobile platform a company needs to have a comprehensive view of the mobile market. The mobile market as of today is a jungle of many different vendors, mobile operating systems (OS) and mobile browsers.

In this thesis we will go through a case where the company; Evitbe wants to make a mobile presence by taking their campaign and marketing tool to the mobile platform.

1.1 Purpose

The purpose of this thesis is to provide theory as well as practical advice on user interface design for mobile web sites, especially in the area of campaign marketing. We are going to use new technologies, such as HTML5, CSS3 and the jQuery Mobile (JQM) framework to find how they can be beneficial to mobile web design.

Lastly we aim to leave readers of the report with a design process that is reusable for similar projects when designing mobile web sites or where existing web sites, designed for desktop, should be adapted to the mobile platform.

1.2 Limitations

At the end of this thesis we present our design concept to Mogul in form of our final prototype constructed in JQM, hence we will not implement any working mobile version of the actual Evitbe Interago service.

Our prototype will work in mobile phones and web-enabled handheld devices that support media queries. This is a direct effect of the scope of the jQuery Mobile framework that is used for the final prototype. Phones and handheld devices that do not support media queries will only get a plain HTML and might not work as intended.

We limit our focus to the user interaction design and usability of the system rather than the underlying technical aspects of the development. We will still touch on technical aspects but they are of lower priority.

There are scenarios where the event is paid through the system. Payment scenarios were not considered a high priority feature for the mobile version of Evitbe Interago, and payment scenarios were excluded in our prototypes.

Evitbe Interago is a campaign handling service that has two main user groups, an administrative side where customers can create, and setup their campaigns. You also have the recipients to campaigns side, the end users. Due to the limited time for this thesis it was decided together with our thesis provider Mogul that we will focus only on the recipient, end-user side of Evitbe Interago, not the administrative part.

We would also like to state that, when talking about mobile web, we don't suggest that it’s a separate web. Because there is only one web, so when we are using the term “mobile web”, we are describing the user experience while accessing web content on a mobile device.

1.3 Background

In this section we present background to the project and to mobile technology. We will present the provider and assignment for this thesis followed by an introduction to relevant aspects of web design for the mobile field.

1.3.1 Mogul

Mogul is an IT consultant company with offices in Stockholm, Gothenburg, Malmö and in Belgrade, Serbia. Mogul is one of the leading actors in the content management segment in Sweden and the main development areas are system integration, CMS, intranets and E-commerce. Mogul in Gothenburg has received requests for a mobile version of their system Evitbe Interago.

1.3.2 Evitbe and Evitbe Interago

Evitbe is a branch of Mogul that specializes on campaign and event marketing. Evitbe Interago is one of Evitbes products and offers services for customer communication and event administration to many big Swedish companies. The Interago CMS tool helps clients set up, design and administrate campaigns. The client can then follow the status of the project online in real-time, and make appropriate adjustments as the project progresses. The campaign can be distributed and communicated through a variety of digital channels and the client has full control over the marketing and presentation of the campaign. Mogul and specifically Evitbe are interested in what considerations to take and how they should go about to take their campaign handling system Evitbe Interago to the mobile platform.

Evitbe Interago has two main user groups (see figure 1), one of the user groups are working with the system with administrative rights, sending out the invitations. The other group is the recipients of invitations either from the aforementioned group or from Mogul directly. It's the recipients of event invitations and campaign offers that primarily would gain from being able to use the mobile platform to a greater extent, which is why the focus of this thesis will be aimed at this user group.

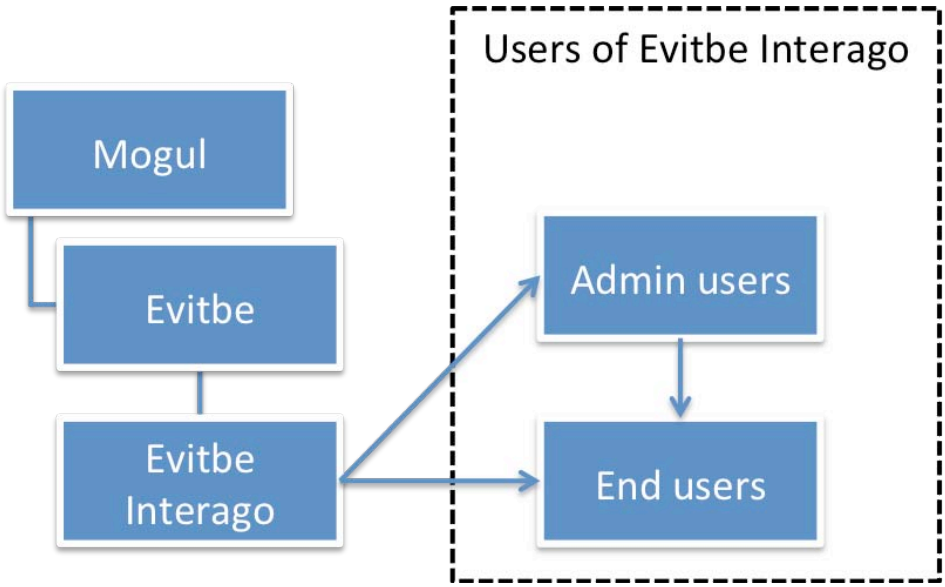


Figure 1. Overview of Mogul, Evitbe and Evitbe Interago in relation to each other and their customers, with their two different types of users; users with administrative rights and end users in form of recipients.

In order to be able to accept campaign offers or event invitations end users may need to provide information about themselves such as name, address, phone number and in some cases payment information as well. This type of information is provided in forms, whereupon a thought through easy way of filling in this information is of vital importance.

Almost anyone is a potential receiver of Evitbe Interago event invitations or campaign offers. This leads to the conclusion that this group potentially uses a wide span of different mobile phones and web-enabled handheld devices.

1.3.3 The Mobile Field

As discussed earlier users of Evitbe Interago might use a wide span of different mobile phones and web-enabled devices. Hence knowing more about the mobile field is a necessity. Compared to desktop web development, mobile web is much messier and less standardized. There are many devices and browsers to support and they all have different level of support for web standards. So when developing for the mobile platform there are several technical aspects that need to be considered.

1.3.3.1 The Mobile Market

The hype of smartphones and other handheld web-enabled devices have allowed more and more mobile web browsing today. Canalys released a report January 31st 2011 revealing that over 100 million smartphones where sold worldwide during Q4 2010 adding up to a total of almost 300 million units for the year 2010 (Canalys, 2011). A report by Gartner from February 9th 2010 support these numbers and also show that sales of smartphones have increased on a year-to-year basis by 72% from 2009 (Gartner, 2011). Canalys expects that the increase in sales of smartphones will continue (Canalys, 2011). There are lots of different smartphone vendors: Nokia, Apple, RIM, Samsung and HTC to name the five biggest. These five represent approximately 80% of smartphone units sold 2010 (IDC, 2011). In the same way as there are many different smartphone vendors on the market, there are a vast variety of different OS for smartphones, of which the five biggest represent 96,2% of the smartphone OS market 2010. The five big are Symbian (37,6%), Android (22,7%), RIM (16%), iOS (15,7%) and Microsoft (4,2%) (Gartner, 2011).

The mobile platform offers new possibilities for companies to differentiate from competitors by utilizing the steadily growing mobile market. According to Gartner's prognosis there will be more smartphones and web-enabled devices (1,82 billion devices) than PCs (1,72 billion) by 2013 (MinOnline, 2010). Despite this, many web sites today are not designed for mobile devices.

"Today, Many Web pages are laid out for presentation on desktop size displays, and exploit capabilities of desktop browsing software."

W3C Mobile web best practices 1.0 (W3C, 2008)

1.3.3.2 Mobile Device Categories

When designing for the mobile platform there are many different mobile phones to support and consider. Jakob Nielsen discuss that there is three different categories of mobile phones in an article from the beginning of 2009 (Nielsen, 2009). The categories identified in the article are:

1. Regular cellphones with a tiny screen. Often called feature phones, these devices account for the vast majority of the market (at least 85% in some statistics). They offer horrible usability, enabling only minimal interaction with websites.
2. Smartphones, in a range of form factors, typically with a mid-sized screen and a full A-Z keypad. These devices sometimes feature 3G Internet connectivity and perhaps even WiFi. Smartphones offer bad usability, forcing users to struggle to complete website tasks.
3. Full-screen phones (mainly the iPhone) with a nearly device-sized touchscreen and a true GUI driven by direct manipulation and touch gestures. These phones offer 3G Internet connectivity and even faster speeds when connecting through WiFi. They also offer impoverished usability; only simple tasks are reasonably easy — and only then if users are on well-designed sites that are optimized for mobile.

Nielsen further discuss that you need to have two totally different mobile web sites, one for covering the first category of regular phones, and a second one for covering the smartphones and full-screen phones. Since the Evitbe Interago service depend on a well functioning interaction between user and the mobile site it was decided early on not to create a mobile experience for the first category of regular cellphones. Focus is instead on creating a prototype that covers the second; smartphone and third; full-screen phone category.

1.3.3.3 Mobile Browsers

There are also many different mobile browsers. There is not any comprehensive statistics for what mobile browsers are used over the entire web. StatCounter is an online statistics tool. They take their statistics for mobile browsers from 4 billion page views divided on 3 million web pages. According to their statistics (see figure 2) for 2010 Opera is the most common followed in order by browsing from iPhone, Nokia, Blackberry, Android and iPod Touch (StatCounter, 2011).

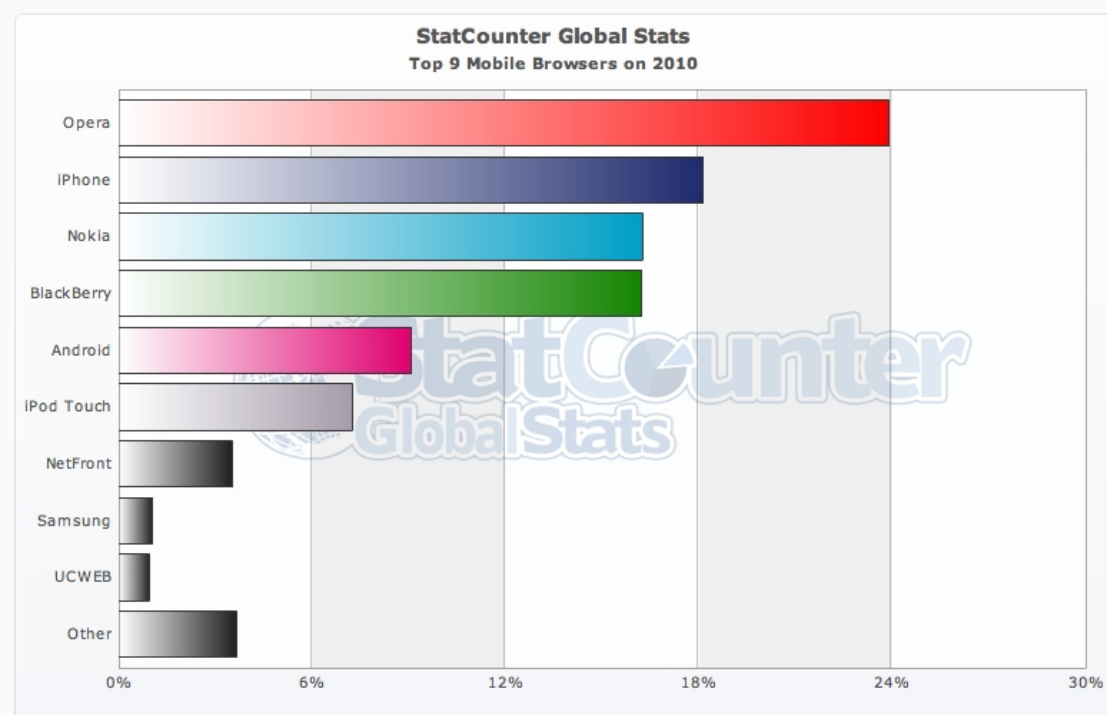


Figure 2. The top 9 mobile browsers of 2010 according to StatCounter.

In Sweden, which is the primary market of Evitbe Interago today, iPhone and Android together cover 90% of the mobile browsing market in April 2011 according to StatCounter (StatCounter, 2011). Even though these two constitute such a large share of the Swedish market today, you cannot ignore the remaining 10% of users. You cannot be sure market share will be consistent over even the nearest future either, considering Android have gone from 5% of the market to 28% in Sweden between April 2010 and 2011 (StatCounter, 2011).

Opera have two different smartphone browsers, Opera Mobile and Opera Mini. Opera Mini however is not an actual mobile browser since the actual rendering is done on the Opera server rather than on the client side (quirksmode, 2011). iPhone and iPod Touch use Safari Mobile. Blackberry have BlackBerry WebKit while Nokia and Android run different mobile browsers such as: Android WebKit, Nokia WebKit, Firefox, NetFront MicroB to name the most common. On top of this Dolfin for Samsung, Palm's Palm WebKit and Microsoft IE Mobile should also be mentioned as browsers that might need to be considered.

With this variety of different vendors, OS and browsers making a mobile web page available for as many end users of Evitbe Interago as possible, which of course is ideal, is a challenge.

1.3.3.4 Native Mobile Applications or Mobile Web Sites

Today we see a trend of many websites creating native mobile applications instead of adopting their web sites to mobile browsers. Many of these applications would, however, work just as well as mobile web sites. Today we start seeing web sites that provide great user experience equivalent to native mobile applications. Below we now present the major differences between these two directions.

1.3.3.4.1 Native Mobile Applications

With native mobile applications developers can take full control over the hardware. Its possible to use the camera, GPS, contact book etc. and if the application needs many of these things then maybe a native application is the way to go. Native applications also tend to be fast, robust and can provide features offline. The main problem with these applications is that they only work for the platform they were designed for. This creates extra work and cost with porting the application to another platform and updating more than one application.

1.3.3.4.2 Mobile Web Sites

The main argument for developing mobile web sites is that they can work on all mobile platforms and don't require any installation process. They are easily accessible through the web. Organizations don't need to worry about creating more than one version and they only need to update the site in order to update the entire application. Since end users of Evitbe Interago may use a number of different phones developing multiple apps would be needed to cover their user base. This is not an option due to the limited time available in combination with our lack of previous knowledge in application development for mobiles. Hence presenting a design concept for a mobile web site was decided to be the best solution both for us and for Mogul.

1.3.3.5 Mobile Markup Languages

Modern mobile devices have browsers that support several markup languages and the most prominent are WML, XHMTL-MP and HTML/XHTML. About 95% of the mobile devices on the market in USA support and prefer XHTML-MP, XHTML, and/or HTML and only 5 % support just WML (Frederick & Lal, 2010).

1.3.3.5.1 HTML

Hyper Text Markup Language (HTML) is the standard markup language of the web and most of modern mobile phone browsers support the full tag set of HTML. The American Tim Berners-Lee made the first specification of HTML in 1990 and the current version of the HTML specification is HTML 4.01, which was declared in 2000. Another version of HTML that is used widely on the web is XHTML, which uses stricter semantic markup then basic HTML. There is, however, a new version of HTML to be released. The new specification is called HTML5 and has gotten a lot of attention because of all its new features. With HTML5 W3C wants to create a markup language that combines HTML and XHTML and an HTML5 document can be written in both the HTML and XHTML syntax. HTML5 provides a lot of features that will help mobile web developers significantly. Some of the key features are:

- Canvas - A big problem with mobile devices is the often suffer from slow connections. Therefore it's important not to use too much pictures and heavy graphics on your site. The new Canvas tag, however, let you render graphics and other visual images only using scripts, no plug-ins required. This makes the file size of the graphics much smaller and it will load quicker.
- Video and Audio - The new Video and Audio tags enables developers to add video and sound to a page. Smartphone's are often quite powerful media players and these new tags provide a powerful way to provide media through the web without using plug-ins.

- Forms 2.0 - HTML5 provides ways to validate forms fields handled by the browser. HTML5 also provides more field description so that mobile phones with touch keyboards can provide more accurate input options. An example of this can be that if you mark up a form field for the type e-mail the mobile device will bring up the correct keyboard for that type of input.
- Offline Support - HTML5 supports Offline Support where mobile developers can store information on devices so the application can be used even if the connection is lost.
- GeoLocation API - The GeoLocation API isn't actually a part of HTML5. It's a separate specification from W3C embraced by almost all modern Smartphone browsers supporting HTML5. The GeoLocation API uses JavaScript to pinpoint the users position and it gives developers good tool to provide context aware web applications.

The majority of smart phone browsers on the market, even though HTML5 isn't officially released yet, support most of these features to some extent.

1.3.3.6 CSS

CSS controls the layout and formatting of a HTML document. It helps separate the content from the presentation. By keeping all styling in the CSS file rather than including it in the HTML file gives web developers much more flexibility and control over the web page presentation. The current version of CSS is level 2 (CSS2) and all modern smartphones support CSS2 fully or to a high extent. Many mobile phones in Nielsen's first device category; regular cellphones**,** however, have low support for CSS2. Thus it's important not to overuse CSS when targeting those kinds of devices.

A new version of CSS is under development called CSS level 3 (CSS3). CSS3 have been under development for a couple of years and is gaining more support from browsers. CSS3 have a lot of new features that will make life easier, both for desktop and mobile web developers. It includes more advanced layout tools, gradients and multi image backgrounds, animations, web fonts, rounded corners and shadows. Another feature is more advanced media queries. Media queries are already used in CSS level 2 and enable developers to use different CSS styles for different types of devices. Media "screen" is used for desktop and laptop computers and media "handheld" is used for smaller devices. This may sound like the perfect solution but the problem is that modern mobile browsers use the media queries differently; some only use the handheld CSS while other just ignore the handheld CSS.

CSS3 provides a solution for this through more advanced media queries. Now developers can specify different sets of styling depending on variables of screen width, screen height and whether the device is held in landscape or portrait mode. This gives web designers great tools to really control the presentation of the content on multiple sets of devices.

1.3.3.7 JavaScript and AJAX

JavaScript (JS) is used to add interactivity and animation in order to create dynamic and rich user interfaces for web applications. It is a scripting language that is run on the client-side and uses the DOM-model to manipulate the elements of the document. The support for JS varies between different browsers and is implemented differently,

which can cause inconsistencies in functionality. However, most modern browser, both desktop and mobile, have great JS support and there are many JS frameworks that help minimize the differences between them.

Asynchronous JavaScript and XML (AJAX) enables web applications and web sites to retrieve data from the web server asynchronously without having to reload the page. AJAX let's developers create more responsive user interfaces for web applications with lower bandwidth usage, and better user experience. Web sites get smoother transitions, and tend to work more like native desktop applications. AJAX is now making its way onto the modern mobile browsers and it gives mobile web developers great possibilities to design mobile web applications and web sites that work and feel like native mobile applications.

1.3.3.8 Provide Device Specific Content

There are several ways to provide device specific layout and content and device detection can be used both on the server or client side. All have pros and cons and there is no right answer on how this should be done to work for all sites. It's mostly the complexity of the site that determine in what way the site should adapt to the device features and limitations. We will now go through three device detection techniques.

1.3.3.8.1 CSS

New CSS3 media queries give web developers a great tool to control what CSS should apply on different screen sizes. You can, for example, set a set of CSS rules to detect certain screen sizes or if the phone is held in the landscape position and then apply specific CSS layout for that device (W3C, 2010). These media queries can help web developers design more scalable and cross-platform sites but because the underlying HTML will not change you cannot have the content become overly complex and you cannot fully utilize the opportunities and features of each platform.

1.3.3.8.2 JavaScript

Client-side JavaScript can be used to identify browser and device features and then load and adapt layout and content for that device. One major problem with this technique is that the JavaScript support varies a lot between mobile phone browsers and it can be challenging to support all targeted devices.

1.3.3.8.3 Server-side

By using server-side browser and/or device detection you can create sites dedicated for mobile devices. The content on the site can still be pulled from the same database as the desktop version but you can now organize the content (HTML, CSS and JavaScript) separately. The way that most sites do this is to provide the mobile site under a sub domain to the desktop site (e.g. "m.sitename.com" or "mobile.sitename.com") and the user accessing the site on a mobile platform just enter the site URL and is then redirected to the mobile version of the site (Gable, 2009). This way only the content that is relevant for the mobile users is displayed and this gives developers a good foundation to freely optimize the site for the mobile context. One problematic factor with this strategy is that it creates duplications of the content. It may also conflict with the vision of ,"One Web" where all URL: s should lead to the same content. More on "One Web" on page 14.

1.3.3.9 Mobile Frameworks

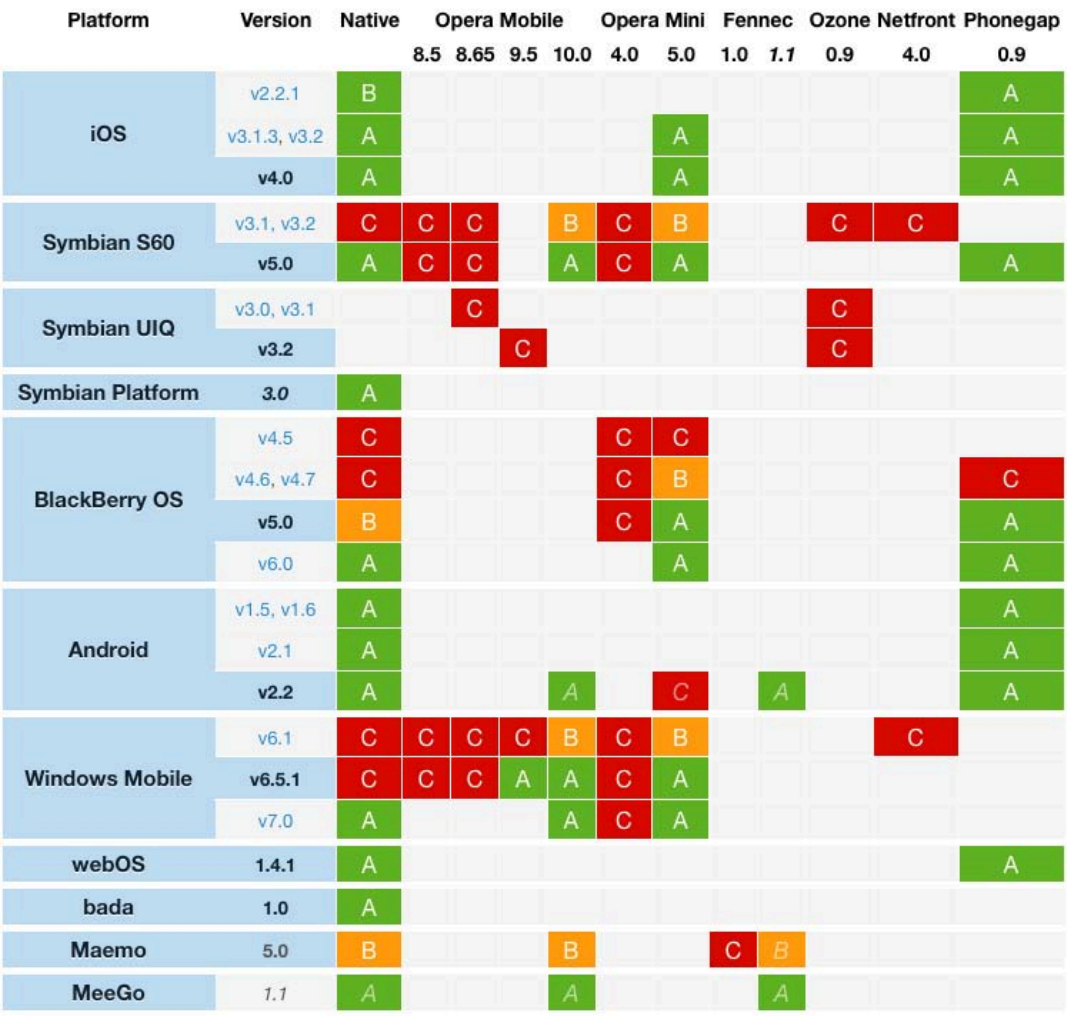
A mobile web framework is a library of code providing functions and mobile optimized UI elements and is aimed to speed up web development. Most frameworks for mobile development contains optimized style sheets, JavaScript libraries and rules/API's on how to write HTML and code. There are a number of different mobile frameworks and the most known frameworks that enable mobile web applications are Sencha Touch, DHTMLX, WebApp.NET and jQuery Mobile. To get a more comprehensive overview of the mobile frameworks available today we read up on the most popular frameworks (see Appendix A for more information on these frameworks). When reading up on the aforementioned frameworks it was decided we would use jQuery Mobile for our prototyping. This decision was made mostly because jQuery Mobile had a clear focus on cross-browser compatibility and provided us with a well-written API and a good support in form of a big community. A short presentation of the jQuery mobile framework follows.

1.3.3.9.1 jQuery Mobile

jQuery Mobile (JQM) is a free open-source JavaScript framework for designing touch-optimized and themable user interfaces for a variety of mobile platforms. It builds on top of the popular JavaScript framework jQuery and heavily uses technologies like HTML5, CSS3 and AJAX. The framework has a rich set of UI elements, supports multiple touch events and can easily be picked up by developers and designers with prior knowledge about HTML, CSS and JavaScript. However, it is important to note that JQM is mainly a framework aimed to ease user interface design for mobile web sites by providing UI elements, widget libraries, device orientation detection, screen size optimization and touch/gesture event listeners. It is not a framework providing code and functions for new HTML5 features like geo location, canvas manipulation and local storage.

The framework is young and, at the time of writing, still in alpha version. The version used in this project is the alpha 4. Even though JQM is a relatively young the alpha version is pretty solid and have gotten a lot of attention from the web developer community. One thing that separates JQM from other mobile frameworks is the aim to support a high number of mobile platforms including iPhone, Android, Symbian, Windows Mobile and BlackBerry. In figure 3 we see the full list of mobile browsers and platforms that is supported. They have graded the browsers from A to C based on the quality of the mobile browsers and its total market share.

JQM is built around progressive enhancement and semantic HTML markup, meaning that all devises that support HTML will be able to access the web content. Then based on how advanced the browser is, more advanced functions will work, while simpler devices will still be able to see the information in plain HTML but with less styling and functionality (jQuery Mobile, 2011).



Platform	Version	Native	Opera Mobile				Opera Mini		Fennec		Ozone	Netfront	Phonegap
			8.5	8.65	9.5	10.0	4.0	5.0	1.0	*1.1*	0.9	4.0	0.9
iOS	v2.2.1	B											A
	v3.1.3, v3.2	A						A					A
	v4.0	A						A					A
Symbian S60	v3.1, v3.2	C	C	C		B	C	B			C	C	
	v5.0	A	C	C		A	C	A					A
Symbian UIQ	v3.0, v3.1			C							C		
	v3.2				C						C		
Symbian Platform	***3.0***	A											
BlackBerry OS	v4.5	C					C	C					
	v4.6, v4.7	C					C	B					C
	v5.0	B					C	A					A
	v6.0	A						A					A
Android	v1.5, v1.6	A											A
	v2.1	A											A
	v2.2	A				*A*		*C*		*A*			A
Windows Mobile	v6.1	C	C	C	C	B	C	B				C	
	v6.5.1	C	C	C	A	A	C	A					
	v7.0	A				A	C	A					
webOS	**1.4.1**	A											A
bada	**1.0**	A											
Maemo	5.0	B				B			C	*B*			
MeeGo	*1.1*	*A*				*A*				*A*			

A High Quality. A browser that's capable of, at minimum, utilizing media queries (a requirement for jQuery Mobile). These browsers will be actively tested against but may not receive the full capabilities of jQuery Mobile.

B Medium Quality. A capable browser that doesn't have enough market share to warrant day-to-day testing. Bug fixes will still be applied to help these browsers.

C Low Quality. A browser that is not capable of utilizing media queries. They won't be provided any jQuery Mobile scripting or CSS (falling back to plain HTML and simple CSS).

Upcoming browser. This browser is not yet released but is in alpha/beta testing.

Figure 3. Table of the mobile browser grades taken from the jQuery Mobile website may 11th.

2 Theory

Only knowing mobile web standards and the technical aspects is not enough to develop and design usable mobile web services. Even if technical understanding is crucial we will also need to study the design theory behind creating usable interfaces for mobile web sites. How to design web sites for desktop web is widely known to the majority of web designers and there are many UI design best practices available. But many of these recommendations don't apply to mobile web due to the limitations and use context of the mobile phone. The desktop metaphors, layout, the heavy use of graphics and some interactive elements used in a desktop web often don't make sense on a mobile phone. If we want to design usable mobile web sites we need to consider using best practices with mobile phone users in mind and we also need to consider how a mobile users differs from desktop users. Further down in this section we will present fundamental UI guidelines and we will also present UI best practices for mobile web.

Another thing that makes mobile web different from desktop web is that mobile phones are used everywhere and we bring them with us wherever we go. This gives opportunities to design for a different browsing behavior where the web becomes an integrated part of the daily routines and information is available at all times. Mobile web users are more goal-orientated in their browsing behavior, compared to desktop users, and they quickly want to find certain types of content or information. So in order to design for mobile web we need consider what information, functions and content is mostly valuable to the mobile user and make it easily accessible on the mobile site. The interaction design process can help us with this and works well to identify fundamental and functional requirements for the mobile user. In order to identify user requirements and to test and verify the designs it is important to carry out interviews and user tests. The interaction design process provides design theory on how these user tests should be carried out and gives guidelines and heuristics on UI design where good usability is the main goal.

We will now go on and elaborate more upon the field of interaction design and theory behind designing meaningful and usable mobile web sites.

2.1 Interaction Design

In a ideal world information technologies are efficient, easy to use and makes sense in the context it operates in. But due to the fact that information technology is often poorly designed many systems and applications lack usability because of bad interface design and overly complex functions. Interaction Design (IxD) attempts to tackle this by making digital artifacts easy and efficient to use by designing satisfying user interaction (Preece, Rogers, & Sharp, 2007). IxD can be seen as an umbrella term for multiple disciplines, such as human-centered design, user interface design, software design and web design. All of these fields contribute and benefit from IxD and the focus is very much concerned with practice, providing tools for designing user experience (Preece et al, 2007). The interaction design process promotes the use of a wide set of methods and techniques aimed at helping designers create usable and satisfying digital artifacts. Because of all the design challenges involved in designing user experience for mobile devices, the interaction design process is highly beneficial in the web development for these devices.

2.2 User Interface Design

User interface design is about how to design the interface that is the bridge between a system and a user. In general the goal with user interface design is to allow the user to reach his/her goal with the minimum amount of resistance or frustration. If you use a well-designed interface the user don't think about what s/he is doing, but is rather able to achieve what s/he wanted without thinking explicitly about how to do it. Good user interface design is a craft that is hard to master. There are however guidelines on how to achieve them. When it comes to usability Jakob Nielsen is a very respected man. He has produced 10 heuristics for user interface design; he calls them heuristics since they are not to be seen as guidelines, but rather like rules of thumb (Nielsen, 2005). This list of heuristics is a very explicit checklist for how to design a working user interface. We will hence try to follow these as we design the mobile site. Nielsen's 10 heuristics are presented below:

1. **Visibility of system status**
   The system should always keep users informed about what is going on, through appropriate feedback within reasonable time.
2. **Match between system and the real world**
   The system should speak the users' language, with words, phrases and concepts familiar to the user, rather than system-oriented terms. Follow real-world conventions, making information appear in a natural and logical order.
3. **User control and freedom**
   Users often choose system functions by mistake and will need a clearly marked "emergency exit" to leave the unwanted state without having to go through an extended dialogue. Support undo and redo.
4. **Consistency and standards**
   Users should not have to wonder whether different words, situations, or actions mean the same thing. Follow platform conventions.
5. **Error prevention**
   Even better than good error messages is a careful design which prevents a problem from occurring in the first place. Either eliminate error-prone conditions or check for them and present users with a confirmation option before they commit to the action.
6. **Recognition rather than recall**
   Minimize the user's memory load by making objects, actions, and options visible. The user should not have to remember information from one part of the dialogue to another. Instructions for use of the system should be visible or easily retrievable whenever appropriate.
7. **Flexibility and efficiency of use**
   Accelerators - unseen by the novice user - may often speed up the interaction for the expert user such that the system can cater to both inexperienced and experienced users. Allow users to tailor frequent actions.
8. **Aesthetic and minimalist design**
   Dialogues should not contain information which is irrelevant or rarely needed. Every extra unit of information in a dialogue competes with the relevant units of information and diminishes their relative visibility.
9. **Help users recognize, diagnose, and recover from errors**
   Error messages should be expressed in plain language (no codes), precisely indicate the problem, and constructively suggest a solution.

10. **Help and documentation**
    Even though it is better if the system can be used without documentation, it may be necessary to provide help and documentation. Any such information should be easy to search, focused on the user's task, list concrete steps to be carried out, and not be too large.

2.3 Usability

Usability is a term used widely in IxD and it can be seen as a measurement on how easy user interfaces or products are to use and is defined in the standard ISO 9241-11 (ISO, 1994) as:

"The extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use."

A product with high usability ensures that it's easy to learn, efficient and effective to use and gives the user an enjoyable experience (Preece et al, 2007). It's important to focus on usability throughout the entire development process and to continuously do user tests to ensure that the product have high usability. It's a common miss understanding that only end-users benefit from usability, both developers and stakeholders also gain from prioritizing usability. There are a lot of studies describing the benefits (Bloomer & Croft, 1997) (Otkjaer Bak, Nguyen, Risgaard, & Stage, 2008) and examples of reported benefits are; increasing return of investment, reducing the development costs, more useful products, reduce training, reduced support cost and ability to meet delivery deadlines (Bloomer & Croft, 1997). Because the majority of web sites online today are designed primarily for desktop experience the usability for these sites, while viewed on mobile devices, are low. Most of these sites need to be redesigned with mobile in mind in order to ensure high usability on mobile devices.

2.4 Prototyping

Prototypes are used to communicate design ideas and can be described as:

> *"A representation of a design, made before the final solution exists"*
>
> Bill Moggridge (Moggridge, 2006, s. 685)

Prototyping is an effective way to test and evaluate new design ideas and to see how they work in practice. The use of models and prototypes also strengthens the communication between the design team as well as the suppliers and stakeholders as misunderstandings about how the design idea should look, work and be experienced can be ruled out (Preece et al, 2007). Prototypes are therefore suitable to use in the design process because it gives the possibility to test different solutions against each other at an early stage and facilitates the decision-making for what the next step of development should be.

There are no rules on how a prototype should be built or constructed as long as it fulfills its purpose to communicate design ideas. Hence prototypes can be anything from paper sketches to more complex versions of the system/application being developed. Prototypes are usually described as high or low fidelity prototypes. Low

fidelity prototypes are characterized by simple mockups that showcase parts of the site/application. These kinds of prototypes are cheap and can be constructed in relatively short time. High fidelity prototypes tend to have more functionality and are used to test more finalized parts of the product. It's important to note that developing high fidelity prototypes does not necessarily mean that the design is solid and these kinds of prototypes can be used at any stage of the design process. Prototypes can also utilize characteristics from both these types to enable users to get a feel of how a system/product might be used. An example of this is a web site where some pages work as intended but some pages are just static without any functionality.

2.5 Designing for Mobile

When designing web for the mobile platform you have a number of considerations that need to be taken into account that differ from web aimed at desktop users. Some important considerations are covered below.

2.5.1 One Web

"One Web" is a term described by WC3 and it expresses the ambition for web content to be accessible, within reason, on whatever web-enabled device the user might be accessing the web from. This doesn't necessarily mean that the user experience, presentation and the information should be exactly the same across devices but that the content should be handled according to the context of the user and device. Some services appeal more to desktop experiences while others appeal more to mobile experiences. The service provider should know the needs, strengths and limitations of each device and design user experiences accordingly (W3C, 2008). This, for example, means that services that have primarily desktop appeal maybe only should have a complementary mobile service, and vice verse.

One web is a nice way of thinking about and designing web services and though most web content today is designed only with the desktop experience in mind this is probably going to change due to the fact of increasing popularity of tablets and smart phones. Companies and web developers will have to start target these devices to a greater extent and this will change companies web strategies, where they have to support more devices than just desktop computers.

2.5.2 User Behavior

Mobile phones are, at its core, a communication device and people use their phones to stay connected throughout the day. They are highly personal devices and what type of phone and how and when it's used depends on the user's personality, needs and environment. Modern mobile phones are also incredibly versatile and can be used in countless ways, to many to list in this report. But what distinguishes mobile usage is that mobile phones are mostly used in short bursts of goal-oriented activities. Users will make calls, find information about their surroundings and pick up their phone for distraction and entertainment, whenever they have spare time (Cui & Roto, 2008) (Cerejo, 2011). So mobile websites would ideally be designed for specific tasks in mind, which the user can carry out in a short time frame. Mobile websites should be able to handle interruptions and designers should assume that the mobile phone is used in a variety of contexts.

Most users will also carry their phones with them at all times and this makes the mobile phone an incredibly interesting product to design services for. The advantage for the user is that information is always instantly available while the downside is that mobile phones may interrupt and break harmony in our environment (Crepeau, 2011). Because of the strong coupling between the user and the mobile phone, users may feel disconnected if they don't have their phone with them and friends and family may get concerned when no one answers their phone. It has become a social norm that we are always reachable wherever we are which can be stressful for a lot of people.

2.5.3 Context

When designing web services for desktop computers the context is relatively stable. The mobile user, on the other hand, uses their mobile through out the day where ever they go, on the bus, on the street or in the store. Mobile users are mobile and the environmental context is always changing. This can create many design challenges for mobile devices and different environmental conditions such as weather, noise and brightness can make some certain interaction methods impossible (Forum Nokia, 2011). Users will also have to divide their attention between the mobile's and the actual world and they will use the mobile phone differently within different social contexts. This makes it hard to anticipate how a certain user may use their phone in a given situation.

So when designing for mobile its impossible to know all the user and environment contexts that the device may be used in. Web services for mobile devices need to not crave full attention from the user at all times. But changing and dynamic context also provides a great possibility for designers to design for a variety of contexts. Mobile device technologies such as accelerometer, sensors or location-awareness of the devices increase the possibilities for innovative interaction design. Mobile websites can give the user "context-aware" information and this can hopefully save the user a lot of effort and frustration (Häkkilä & Mäntyjärvi, 2006). So while the designer cannot be prepared for every possible situation, one important aspect of mobile design is to keep it simple and try to focus on the most important functions for the mobile user.

2.5.4 Best Practices

Gong and Tarasewich (Gong & Tarasewich, 2004) reviewed and edited Schneiderman's proposed "Golden rules of interface design" (Schneiderman, 1987) to make guidelines for mobile interface design. The set of guidelines produced are general for mobile interface design, mostly aimed at operating systems and applications. Many of them are applicable to mobile web apps as well, while others are not as suited e.g. "Mobile applications should rely network connectivity as little as possible". We have hence made a quick review of their guidelines and have chosen the guidelines that fit the needs of web-enabled handheld devices and smartphones. Short presentations of the guidelines that are applicable to mobile web follow.

- **Enable frequent users to use shortcuts**
  Keep in mind to reduce the operations needed to do repetitive and frequently used tasks to a minimum. Mobile users often surf the web while on the move and if they have to go through a complicated series of operations to complete a simple task they are likely to lose interest.

- **Design dialogs to yield closure**
  When there is a sequence of actions that need to be performed it is good to cluster them into groups. Lead the user through the needed actions in steps and provide ways of knowing what the next and previous step is at all times. It is also important to give feedback for completing tasks to make it clear to the user.

- **Offer informative feedback**
  It's important to give informative feedback to the users operations and progress. Sometimes it can be problematic to provide good visual feedback on mobile platforms because of the small screen size. In some cases other types of feedback can be considered, like rumble or sound.

- **Support internal locus of control**
  It is important for the user to feel that s/he is in control of what the application does rather than the other way around. The users need to feel like s/he is initiating actions, not responding to predefined actions. So while it is a good idea to design the web applications to help the user by giving subtle clues on what to do and suggest behavior, the user always need to be in charge.

- **Consistency**
  Web sites should provide a consistent look and feel across multiple platforms. A user that is used to the desktop version of a site should feel right at home when visiting the site on mobile device.

- **Design for small devices**
  When designing user interfaces for modern mobile devices you are mainly designing for quite small touch screens. The limited size requires more careful consideration of what information is most important to show compared to design for desktop web. Touch screens also need bigger interaction points than regular desktops screens because you don't get the same precision with a finger as a mouse pointer. So it's important to make the interaction point such as links, text fields and buttons big enough for touch interactions.

- **Design for limited and split attention**
  Mobile users often has a lot going on and may need to focus on more then one thing at a time. So web sites for mobile devices need to not crave full attention from the user at all times. It's also impotent to look at other interaction possibilities such as sound and other "eye-free" methods.

- **Design for "top-down" interaction**
  Since you can only see a limited amount of information in a single view you need to be able to grasp the overview, the most important information of the content, at a first glance. This can be achieved by having headlines or short texts that can be expanded if the user wants to know more. One-column design with as little scrolling and zooming as possible required is recommended.

- **Design for enjoyment**
  Functionality and usability are key factors when designing for web experience. However having great functionality and usability alone will not make the web

experience complete. Aesthetics and useful interactions are also key factors in giving users a memorable web experience. Thoughtful use of color and small mobile optimized graphics can enhance the users impression of the mobile web experience.

3 Method

In the following chapter we will account for all Interaction Design methods used in this project. The motivation for using these methods is that they are all well-known methods, both to us and to the interaction design field, and have been shown to be beneficial to the interaction design process by countless studies and interaction design practitioners.

During this project we use a six-step design process, which is covered in greater detail in the following, design process chapter. A figure showing the process is shown here since it visualizes where in our process the methods presented in this chapter are used.

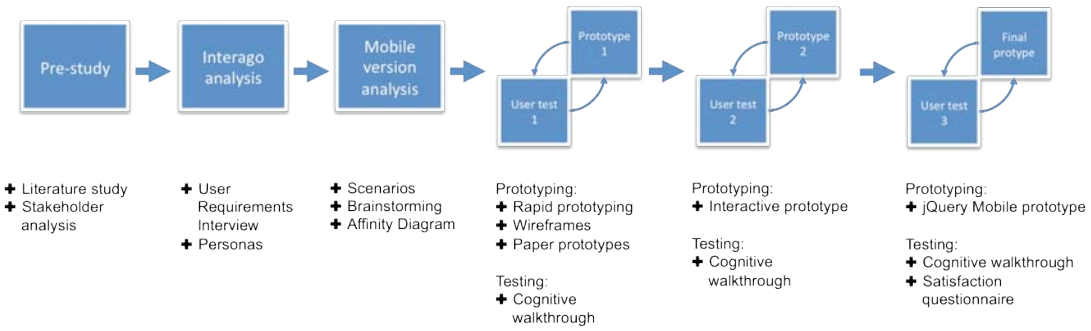


Figure 4. Our six-step design process. Below each step the activities and methods of that step are specified.

3.1 Literature Study

To gather information and to get an overview over the mobile web development a literature study was conducted in the early phase of the project but was also followed up throughout the entire project. It was used to find usable methods for the project and to create a knowledge base about mobile web development in order to be able to make informed decisions in the following steps of the project. The field of mobile development is a fairly new one and it's still very much evolving. This means that a lot of the information is changing very rapidly, and research made just a few years back have outdated information especially on technical aspects. We hence tried to follow other channels than research papers and books such as news sites, presentation videos and blogs to find the most up to date information. To ensure the validity from the online recourses we mainly used trusted sources that had a lot of legitimacy in the fields of Mobile Web Development and Interaction Design. A list of all the web recourses that was monitored throughout the project can be found in Appendix B. The literature study was conducted in the pre-study of our design process.

3.2 Stakeholder Analysis

Identifying key stakeholders is important in order to find in what way they might be influential to the decision making of the application development process. A stakeholder is a person, organization, or user group that will influence or are affected by the system. When key stakeholders are identified its important to analyze their role, task goals and responsibilities to the project. This is done in order to get an overview of communication needs and what is needed from each stakeholder group (Damodaran, Simpson, & Paul, 1980) (Maguire, 2001). During the pre-study step we conducted a stakeholder analysis to find all relevant stakeholders.

3.3 User Requirements Interview

User requirements interviews are used to identify requirements from users, stakeholders and domain experts. It's a great technique that helps gathering information about user needs and the problem domain. Because the focus of the interviews are to explore the problem domain, semi-structured or unstructured interview are mostly used where the interviewees are allowed to expand on their responses. It's also a great method to involve stakeholders and end users early in the project and to make them participate in the initial design decisions (Preece et al, 2007). We conducted user requirement interviews in the Interago analysis with product owners to learn more about how Evitbe Interago works.

3.4 Personas and Scenarios

Personas are used to create a rich description of a future user of the application under development. They describe a general user from a targeted user group. Describing this fictional user in great detail helps the designer relate to the user group. It's important to make the personas as real as possible by describing their attributes, attitudes, strengths, weaknesses, goals and context in great detail (Maguire, 2001).

A method that is connected to Personas is Scenarios. Scenarios are used to create realistic user stories where the persona interacts with the future application. The scenario describes the activities, context and mindset of the user while using an application. This kind of story telling techniques is natural for people and it's an effective way of describing, communicating and relating to user needs. Scenarios are often used to gather user requirements but they can also be used to describe and clarify design decisions later in the project (Maguire, 2001). Personas were created at the end of the Interago analysis (see page 23) and scenarios were then added to the personas in our mobile version analysis (see page 24) to find and highlight possible interactions between the personas and the mobile web site. The personas and scenarios created for this project can be found in Appendix C.

3.5 Brainstorming

Brainstorm is probably the most widely used and known method for generating ideas and solutions to a given problem. It's a simple method used in interaction design for generating design ideas and to find new ways of supporting users. Brainstorming also lets designers discuss design ideas in an open forum where all ideas should be taken into account and should not be debated or criticized. It is also encouraged to think outside the box while doing brainstorming, it's easier to tune down a crazy idea than the other way around (Maguire, 2001) (Oulasvirta, Kurvinen, & Kankainen, 2003). In a study by Oulasvirta et al. it's shown that brainstorming is an effective tool especially when designing for contextual areas not known to the designers. Designing for mobile involves a lot of contextual aspects, and brainstorming hence is great method for including the context when generating ideas. We used light forms of brainstorming throughout the project, but mainly in the mobile version analysis (see page 24). It was used to find existing functions and features, along with suggestions for new ones.

3.6 Affinity Diagram

An affinity diagram is a technique that is used to organize and structure design ideas and is often a good step after a brainstorming session. Designers group together

different designs ideas (functions, screens, concepts) written on post-it notes by placing related design ideas together. This gives structure and a good overview over all the ideas and can also help designers discover problems and design issues (Maguire, 2001). We used affinity diagram in the mobile version analysis (see page 24). It was used to sort the functions and features gathered from the previously mentioned brainstorming session.

3.7 Use Cases

Use cases originate from object-oriented software engineering in the early 90's but have since been adapted in a wider sense than when first introduced. Use cases focus on scenarios where a user interacts with a system, and what happens between them. The perspective of the scenarios is from the user's (called actor) point-of-view not the system's (Preece et al, 2007). Simple use cases were formulated at the start of building the jQuery mobile prototype (see page 31).

3.8 Rapid Protyping

There are different interpretations of rapid prototyping. At first it was a method for construction evolved in the 80's. It has since been translated to work in software development. The foundation of rapid prototyping is however that it is a method for doing prototyping while involving users. Testing is done in iterations where the prototypes increase in fidelity gradually (Keyson & Parsons, 1990). The feedback from users is however meant to be taken in quickly and implemented as quickly as possible, preferably within a couple of days. A user is a broad term in rapid prototyping as it can be users in the traditional sense but also designers, developers and stakeholders. Rapid prototyping is done in iterations where you prototype, take in feedback in reviews followed by refining the prototype based on the feedback and enter next iteration (Cerejo, Design Better And Faster With Rapid Prototyping, 2010). A combination of rapid prototyping and cognitive walkthrough (presented below) was used during the entire prototyping phase of our design process (see pages 27-31).

3.9 Wireframes

Wireframes are mostly used to create early GUI prototypes and mock-ups for testing and evaluating different ideas. The function of wireframes is to communicate the structure of the GUI and describe the navigation to the user. Wireframes can range from simple structural drawings to high-fidelity interactive simulations of the system, with animations, functional links and complex interactions (Puerta, Micheletti, & Mak, 2005). Wireframes were used throughout our prototyping steps.

3.10 Paper Prototyping

Similar to Wireframes designers create a paper-based simulation of an interface to test it with users. When the paper prototype has been prepared, a member of the design team sits down with users and plays the computer by moving interface elements around, according to the user's actions (Maguire, 2001). Paper prototyping was used in the first prototyping step of our design process (see page 27).

3.11 Cognitive Walkthrough

Cognitive walkthrough is a method for finding usability issues. A person(s) holding a cognitive walkthrough session go through a system, leading the user through tasks to perform. It is not a strict method, the user(s) are encouraged to speak freely and think aloud during the interaction, and the person(s) holding the walkthrough is allowed to ask questions to the user and discuss with the user during the interaction as well.

Cognitive walkthrough has its focus on ease of learning (Wharton, Rieman, Lewis, & Polson, 1993). Using evaluation walkthrough can give developers and designers a more comprehensive view over existing problems misconceptions and misunderstandings in the prototypes. Cognitive walkthroughs were used throughout in the user tests in all three prototyping steps (see pages 27-31).

4 Design Process

Our design process was inspired by the process described by Curry et al. in the article "Portage of a web application to mobile devices" (Curry, Kubicki, Schwartz, & Guerriero, 2010). Their article describes the process of porting a web application to the mobile platform and it shares lot of characteristics with our work. They suggest you follow an iterative four-step process followed by testing as seen in figure 5 below. First analyze all existing functions of the website, after this you prioritize them and decide which functions to keep for the mobile version. The final decision on which functions to keep should preferably be based on the prioritized list in cooperation with the clients, in our case with the product owners. They emphasize the importance of understanding the existing system, its users and that the design process should be iterative.

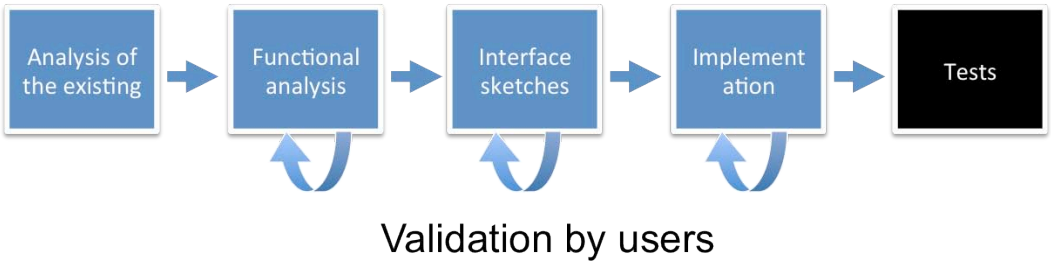


Figure 5. The four-step process followed by testing as suggested by Curry et al.

4.1 Six-Step Design Process

Our design process follows the suggested steps by Curry et al. but in greater detail for our specific work. The modified design process we have used is divided into six iterative steps and can be viewed in figure 4, page 18.

4.1.1 Step 1. Pre-Study

In the initial step of our six-step process we focused on finding relevant information about the mobile field to create a knowledge base about mobile web development in order to be able to make informed decisions in the following steps.

We also needed to know who would be affected by our work, and in what way. Hence we made a stakeholder analysis where we found four different stakeholders as presented in table form in figure 6 followed by a summarizing 4x4 matrix in figure 7 where the degree of influence and interest is portrayed.

Stakeholder	Role	Task goals	Information needs	Responsibilities
Evitbe	Product owner	Product feature (mobile site)	Continuous meetings, Progress check, Quality check	Influence, Support
Mogul	Supporter	Testing mobile web site development	Initial meetings, presentation of findings	Support
Evitbe Interago users	No specific role	Enable their customers to make bookings through their mobile phones	Example desktop sites	None
Evitbe Interago end users	No specific role	Possibility to use their mobile phone to book events	Feedback upon what features they are looking for in a mobile booking site	None

Figure 6. Identified stakeholders, with roles, task goals, information needs and responsibilities.

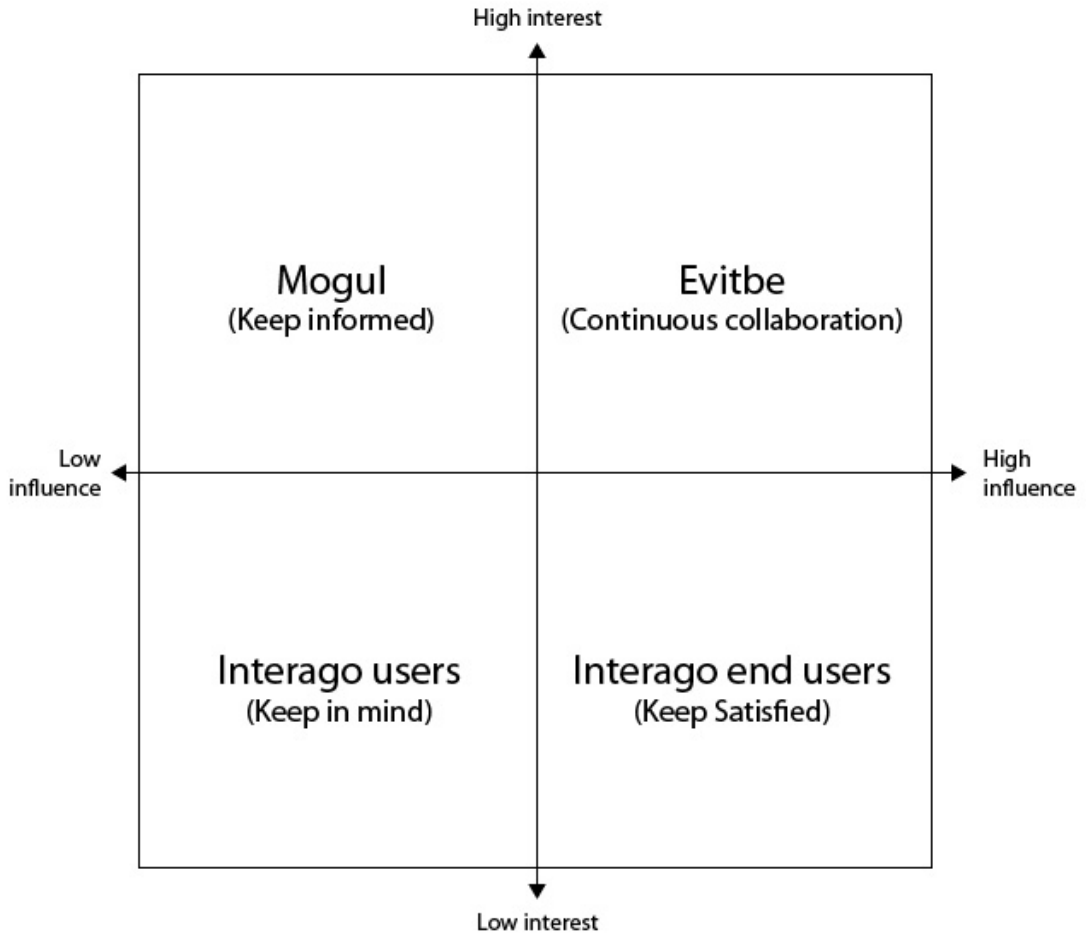


Figure 7. A matrix showing the degree of interest and influence from different stakeholders on our thesis work.

4.1.2 Step 2. Interago Analysis

We started by analyzing the existing implementation of the web application Interago. The goal was to understand the systems operations, services and functions. It's important that designers fully understand the application that they design for (Curry et al., 2010), especially if it involves a redesign of an existing implantation. We created a list of Interago functions to get a good overview. Many of the functions were taken from system documentation received from Evitbe.

In order to understand how users use the functions of the system we conducted user requirements interviews with two product owners and two potential end users. These four interviews were informal and only lasting between 10-15 minutes each. Based on what we learned from the function analysis in combination with user requirements interviews and the knowledge acquired from the Interago system documentation we created personas that represented different user groups of Interago (see Appendix C). Personas, as discussed in the method chapter, are used to describe targeted users groups by describing them as a specific user with daily behavior patterns and specific user details.

There are a number of factors that make Evitbe Interago a complex system, producing many design challenges that need attention. The most important of the design challenges are presented briefly below.

- A lot of content is created with a WYSIWYG editor - This means that there is less control over the content displayed on the site.
- Different branding for each customer - Each new Evitbe Interago customer gets a customized branding, with their company's colors and font and pictures.
- Invitations are sometime personal and sometimes not - In many cases the invitations sent through Evitbe Interago goes to already known customers, meaning they already have a lot of information on the recipient such as name, address, phone number etc. But in some cases this is not the case. Both these scenarios need to be considered.
- Bookable items can be anything - The invitations sent out through the system can be a variety of different offers. It can be a booking for a sports event or a lecture, but it can also be for a dinner, food or even a piece of clothing. The diversity of different invitations and offers is a challenge.
- The amount of bookable items can be high - Some events are very basic with just a few choices available. But there are also events where there can be over 50 different choices.
- Text and copy is created for each site - An event site is constructed by a number of different sites, normally a site for more information on where the event is held, how to contact the company and similar information. Some events have a large number of additional such sites. Each of these sites is created individually and hence the control over structuring headings and text length is difficult.
- Payments - The payment is handled by a payment service provider and not by Evitbe.

To tackle these design challenges we need to ideally create dynamic templates for mobile devices that are easy to customize and brand. For more details on the Evitbe Interago analysis see Appendix D.

4.1.3 Step 3. Mobile Version Analysis

In the third step we evaluated the desktop site in a mobile context. When designing for mobile it is important to re-evaluate what functions are most valuable to mobile users. The first task of this step was to look at the functionality of the desktop site and rank the different functions. The second task was to create scenarios to the personas created in the previous step. The stories can either be written in a great detail or in a step-by-step series. It's a good way to find and describe user requirements (Preece et al, 2007). When we created the scenarios for our four personas many requirements and "must have" features were identified. In a third task we tried to find even more or missed features and functions in a brainstorm session.

Following these three tasks we organized and structured all the functions, features and possible challenges using affinity diagram method where we wrote down all ideas, functions and potential challenges on post-it notes and then placed the ones relating to each other clustered together (see figure 8).

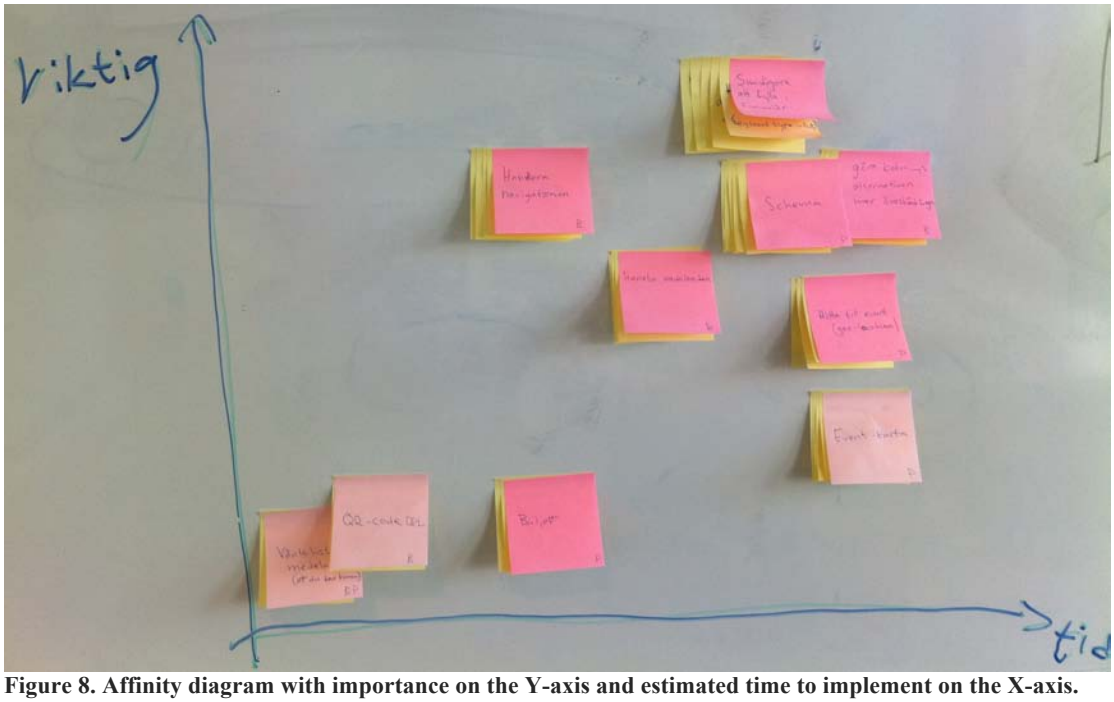


Figure 8. Affinity diagram with importance on the Y-axis and estimated time to implement on the X-axis.

This helped us get a good overview over all features, functions and potential challenges surrounding the system.

To visualize which of the functions should be brought over to the mobile version we created a diagram showing functions that could be included, and how they are related to each other as seen below in figure 9.

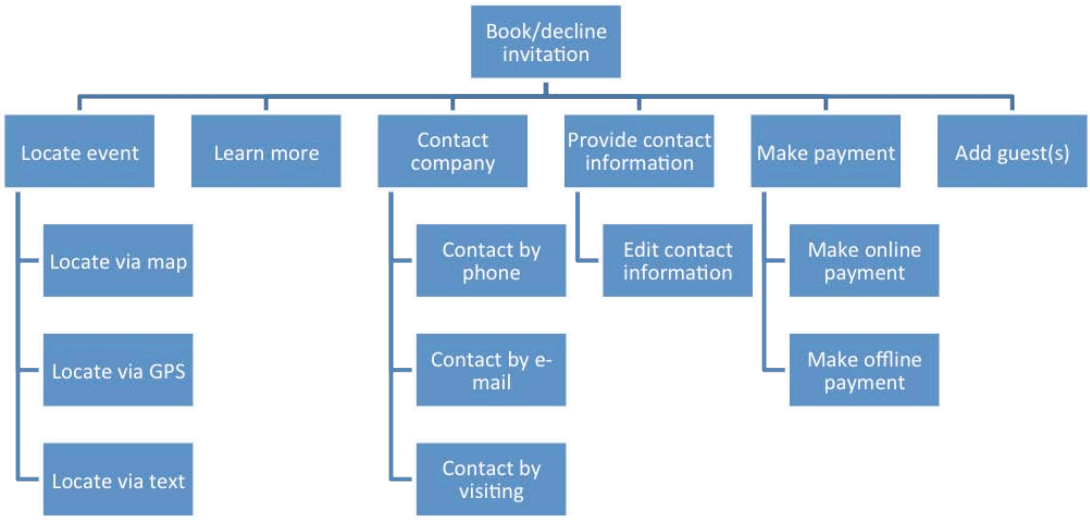


Figure 9. These are the functions relevant to the mobile version of Evitbe Interago seen from an end-users point-of-view. On top is the identified main function, followed by sub-functions.

The overall aim of the mobile version analysis was to choose the functions that should be exported to the mobile platform and also to understand what functions are most important to the mobile users.

In cooperation with a systems owner from Evitbe we decided that most of the identified functions and features should be deployed if possible, the only excluded function was the function of making payments.

4.1.4 Step 4. Prototype 1

We wanted to get a good interaction flow on the site and focused on making the process of booking as easy and clear as possible. From the findings in the previous steps it was obvious to us that this is not a service the user wants to learn, s/he just want to complete a task. Because of this the use of navigation and controls have to be very obvious and we focused on using widely used standards and conventions that the users would recognize.

With this in mind we started to sketch screens for the site on paper. We created two different scenarios; one more basic with fewer booking choices, and a more comprehensive, advanced one. These two versions were created so as many scenarios as possible would be covered. The sketches helped us communicate our designs with end-users and product owners, and in retrospect it was a very important step. Because the sketches were low-fidelity prototypes on paper (see figure 10) we got a first glimpse of how users might use the mobile site. It also gave us a common ground for discussing the system with the product owners. The goal of this step was to experiment and try out different user interface ideas. Besides doing this it also helped us discover usability issues.

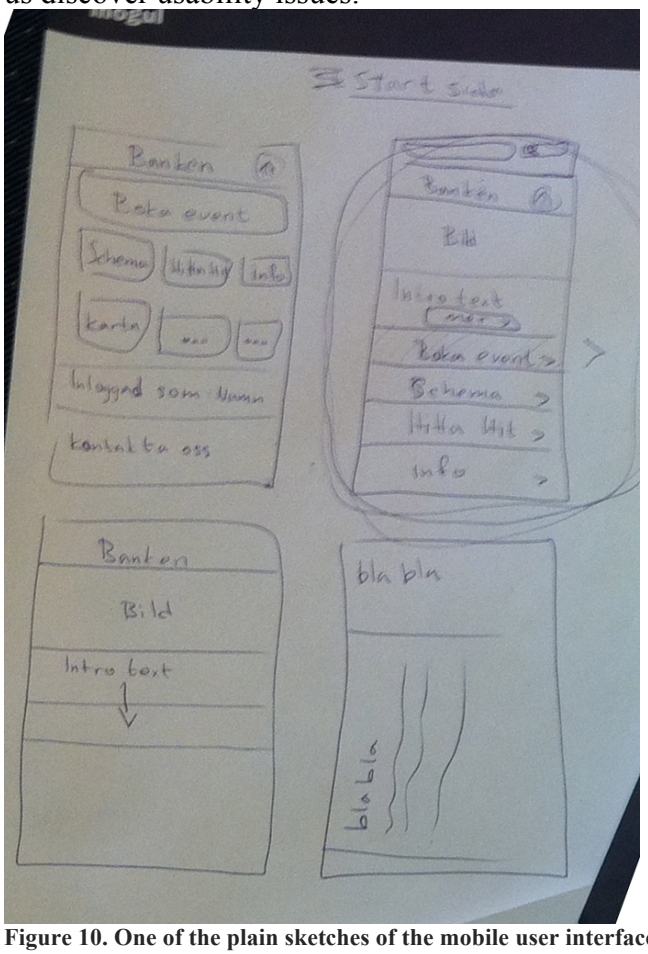


Figure 10. One of the plain sketches of the mobile user interface.

After the round of sketching we started creating more graphical paper prototype using Adobe Illustrator. This paper prototype was designed to fit the screen width of a modern mobile phone. When testing the design on users an early feedback was that they needed to know how much content would be visible on the screen on an actual mobile phone, just seeing a long piece of paper was confusing. This resulted in

creating a paper mobile with the screen size of the iPhone 3GS to give users a feel of the size and scrolling (see figure 11).

Figure 11. User scrolling a paper prototype during the third cognitive walkthrough.

We tested our prototypes on potential end-users of the system as well as product owners. The tests were carried out as cognitive walkthroughs. We conducted qualitative cognitive walkthroughs lasting 15-25 minutes each where we discussed issues and potential improvements with the users in an informal way. Most sessions were conducted with one user at a time, but we also conducted a session with two users as seen in figure 12, and one session with four users (product owners) on the final prototype.

Figure 12. Picture from one of the cognitive walkthroughs with two users during the first; paper prototype phase.

We had a total of 11 different users where four were product owners, two interaction designers, two entrepreneurs, one software developer, one working with sales and one student. The gender division was uneven with eight men and three women. The ages spanned between 20 and 45. A chart visualizing the participating users can be seen in figure 13. One of the product owners, one of the interaction designers and one of the entrepreneurs participated in all of the prototype phases while the other users participated in two or just one of the phases.

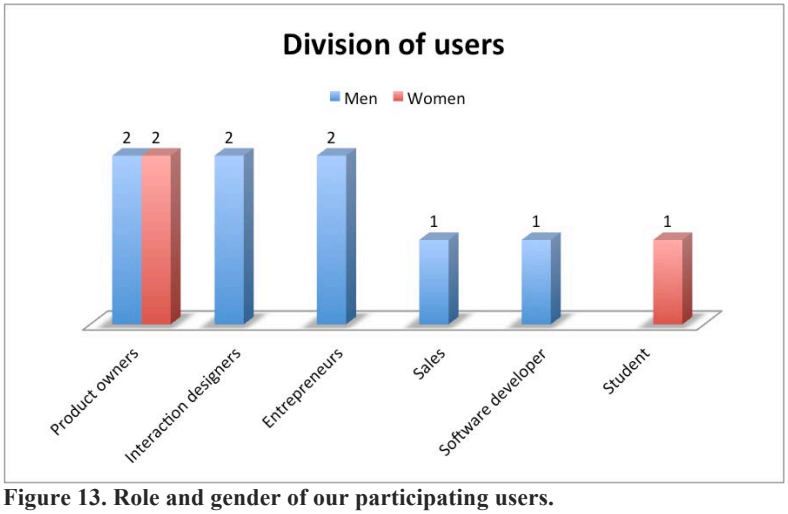


Figure 13. Role and gender of our participating users.

Of the seven users participating in the tests of the paper prototype step we had two product owners, two interaction designers, one software developer one working with sales and one entrepreneur. The different roles of the users in our user tests gave quite different feedback. Product owners identified mental errors of how we perceived the system, while the interaction designers had more thoughts concerning placement and

order of buttons while critique from the three remaining users focused more on the overall user experience.

Because we used paper prototypes in this step we were able to be very flexible and adapt to feedback from users into new improved paper prototypes quickly even between the user test sessions. The choice of having so few users came from Jakob Nielsen's recommendations that 5 users is sufficient for testing, since you have found most usability issues after 5 users, after that it's mostly repeating already discovered problems, with little or no new information. Using 5 users for testing in more iterations is hence recommended over having a greater number of users (Nielsen, 2000).

4.1.5 Step 5. Prototype 2

After the first paper prototype phase with appurtenant user tests we entered the second prototyping phase. An interactive prototypes was created using Microsoft Expression Sketchflow. Our choice of interactive prototyping tool was a result of a direct request from Mogul, who wanted us to test Microsoft Expression Sketchflow. Because this request was made no other interactive prototyping tools were considered. The interactive prototype used the same screens as our paper prototype but with ability for the user to click on elements to navigate through the site (see figure 14). Because of technical difficulties and time constraints the interactive prototype was shown on a TV-screen with a mouse connected instead of on a mobile phone.

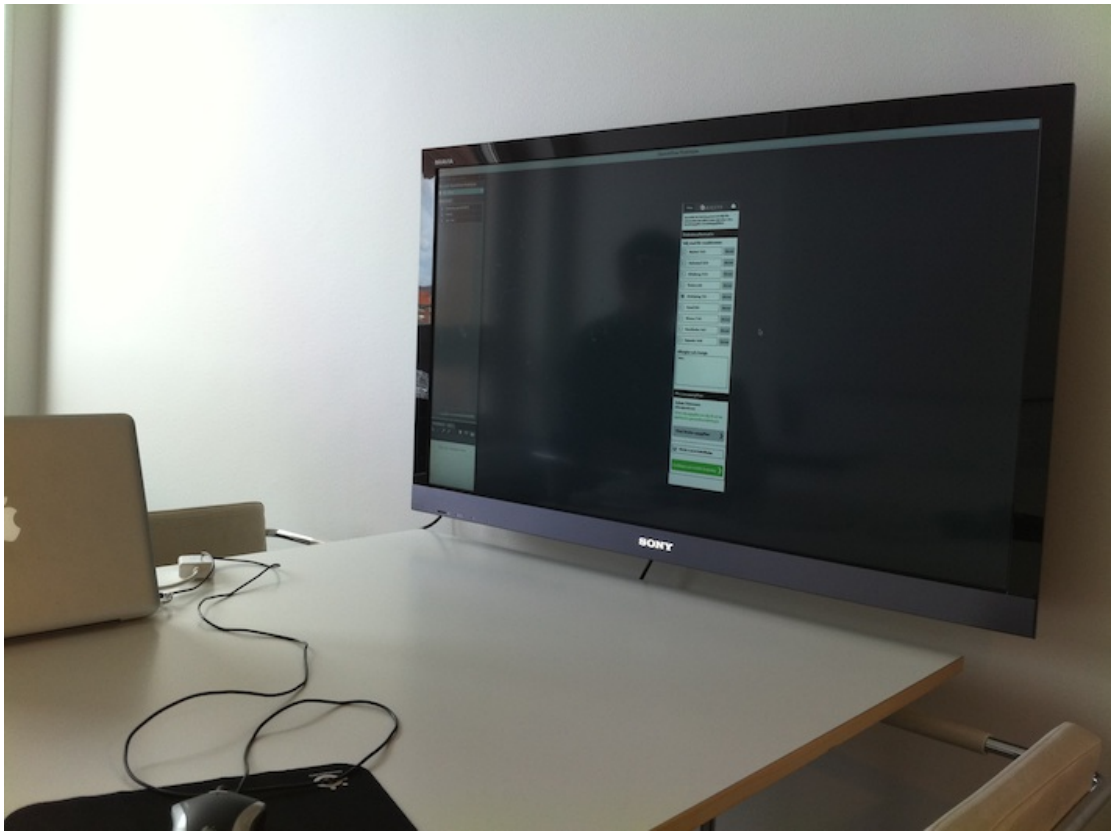


Figure 14. First version of our interactive prototype.

Five user tests were conducted on the interactive prototype, divided on two entrepreneurs, one user interaction designer, one student and one product owner. Making changes in the interactive prototype was much more time consuming than

with the paper prototypes so no changes were made between the sessions of this phase. All issues and suggested improvements were instead gathered and implemented when creating the final prototype.

4.1.6 Step 6. Final Prototype

Using the feedback gathered from the interactive prototype phase we made the first prototype using the jQuery mobile framework. In this step we described a set of use cases and then started to implement them one by one. The list of identified **use cases** can be viewed below.

- The user is able to decline an event
- The user is able to book items
- The user is able to add contact information
- The user is able to change contact information
- The user is able to visit sub-pages
- The user is able to read more about the event
- The user is able to read more about an individual item
- The user is able to use positioning to find the event
- The user is able to complete a booking
- The user is able to easily bookmark the site on his iPhone and get it on the home screen like a native application

Based on these use cases we implemented the design for the first version of the JQM prototype. A total of three user tests were then conducted. First two cognitive walkthroughs, one with an entrepreneur and one with an interaction designer, followed by a final user test session with four product owners. In the final session the product owners were asked to go through a number of tasks in the system (see Appendix E for the instructions given during this session). This session lasted 60 minutes. The aim of this activity was to make sure they went through as many scenarios as possible, so they both would get a overall feel of the site, but also to find as many possible flaws as possible when going through the site. The accumulated feedback from the two cognitive walkthroughs and the final product owner session generated a couple of minor changes that we implemented. After these activities and minor changes we arrived at the prototype as it looks today. The prototype will now be presented in greater detail in the following chapter.

5 Result

In this section we will give an overview over the final prototype and describe all of its functions, screens and the navigation flow. Because every registration site created with Evitbe Interago is custom made for a single campaign or event we will use examples of registration sites that could have been created with Evitbe Interago. The example sites are created for two fictive companies “Företaget” and “Bancken”. They differ in number of sub-pages, booking alternatives, copy and branding but they share the same navigation structure and functionality (see figure 15).

Figure 15. The home screen of Företagets prototype site to the left and of Bancken to the right

The site for the company Företaget have more sub-pages and booking alternatives than the registration site for Bancken and the reason why two examples are presented is to highlight how a simple and a more complex mobile site would behave when viewed upon in a mobile phone. We will mainly show screenshots from the mobile site created for Företaget and only show screenshots from Bancken to highlight certain differences. The most common way for users to access the registration sites is by getting an invitation e-mail from Evitbes customers and then following the link to the site. Most of these emails are personal to the customer and personal information will then be available at the registration site. An example e-mail can be seen in figure 16. If the event is available to everyone, e.g. through a banner on a site, the user will have to provide their personal information on the site.

Figure 16. An e-mail with an invitation to Swedish Open 2010. Tapping the link leads the user directly to the booking site.

5.1 Navigation Overview

The site is divided into four main parts; decline, information, booking and receipt. All of the parts are accessible from the home screen except for receipt that is only accessible by going through booking. A navigation diagram over the site can be viewed below in figure 17.

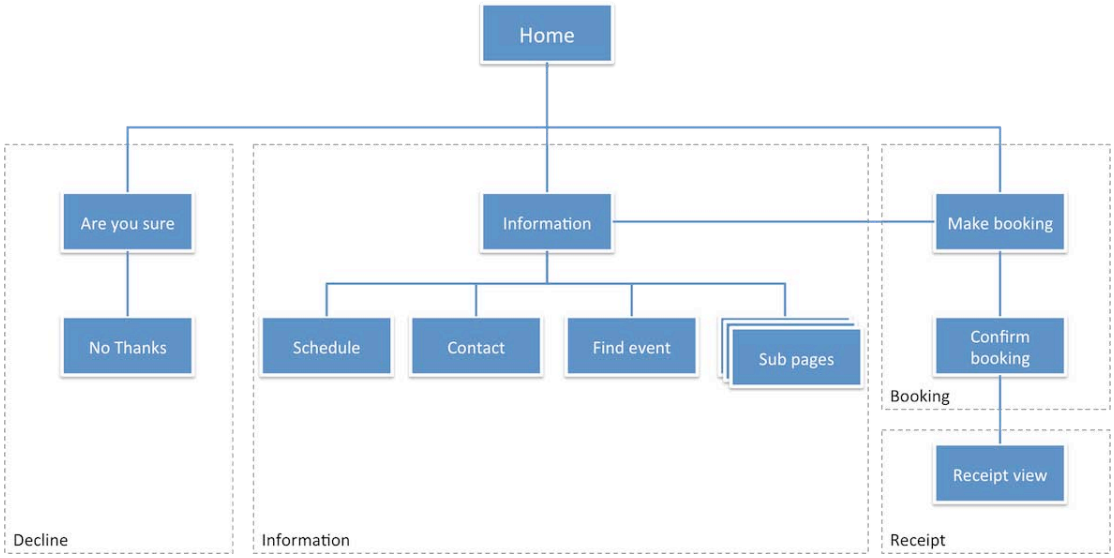


Figure 17. A navigation diagram over the Evitbe Interago mobile prototype.

When going between pages on the site the user sees an animation where the current page swipes out to the left as the new page enters smoothly from the right as exemplified below in figure 18.

The use of animations in this case instead of reloading the page in the same place gives a clear feedback to the user, so the user sees that the page changes as they touch buttons in the interface. If you the choose to go back to the previous page again this is strengthen by the animation as it goes the opposite way of when you entered that page. This swiping motion when going between pages is implemented throughout the entire prototype.

Figure 18. Three views showing how the animation between pages work. When you click the button at the left picture the animation start, in the middle view we see how the page is exiting to the left as the new page enters from the right. In the right picture we see how the new page content has replaced the previous page content as the animation finishes. If we would choose to go back the animation goes in the reverse order.

5.2 GUI Components

In the following section we will go through the main GUI components and layout of the prototype. JQM provides a lot of great tools and controls to build dynamic touch user interfaces that will adapt to a wide range of devices and screen sizes. The framework can automatically transform links, lists and form elements written in HTML to more user-friendly GUI controls. We have used the GUI elements provided by JQM to a high degree and it's easy to create touch optimized user interfaces using this framework. All elements are styled using CSS3, except for the icons that are using images, and this makes the rendering of the GUI components fast.

5.2.1 Layout

All page content throughout the site is placed in a single column and the heights of the pages are kept short to keep the use of scrolling at a minimum. JQM also provides ways to create grid-based layouts and we use this on some parts of the site.

5.2.2 Header (Top-bar)

Figure 19. Header of the page.

On top of each page is the top-bar, as seen above in figure 19, that displays the company logo, a "home" button and a "Tillbaka" button that works as a back button. The back button links back to the previously visited page and the home button links back to the home screen and enables users to get easy access to the home screen at any point.

5.2.3 Footer

Figure 20. Footer of the page.

The footer is at the bottom of every page and contains copyright text, telephone number and a link describing how the user contact information is handled, as seen in figure 20 above. The only page where the footer is not present is the map page. The reason for this is that it takes to much space from the already small area to show the map.

5.2.4 Buttons

Buttons are mostly used for navigation and are coded as hyperlinks and then transformed to big buttons using JQM. The buttons in JQM are big, graphically they might even seem over-dimensioned but the size of them makes them easy to tap. In JQM you have the possibility to change the color of buttons easily by changing an attribute in the code. We used a neutral grayish color for all buttons in the interface, with the exception of the booking button where we used a light nuance of green, and buttons for going to the previous page are black. This choice was made since booking the event is the anticipated desired behavior of most users, hence making it a different color makes it more visible, drawing the users attention when scanning the information on the site.

5.2.5 Lists

List views are heavily used in mobile applications to provide navigation and to present hierarchically organized information. JQM supports numerous types of lists view variations such as basic, nestled and numbered list. We use list views on multiple places on the site to structure content and to group buttons (see figure 21).

Figure 21. Picture showing different types of lists in JQM.

5.2.6 Form Elements

A lot of form elements are used on the site and JQM does a nice job of creating touch-optimized versions of the browsers native form elements, as seen here in figure 22.

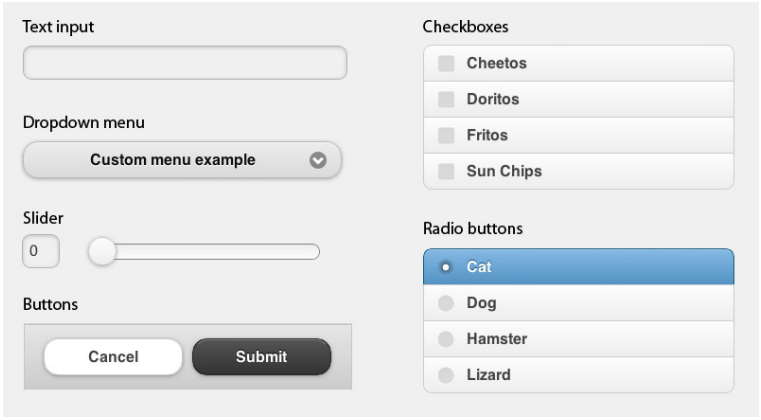


Figure 22. Form element examples.

Completing forms on mobile devices can be very time consuming and tedious for the user due to the limited and small keyboards. However, many modern smartphones with virtual keyboards have browsers that can recognize what type of content is required for a text field and then bring up an optimized keyboard for that type of input (see figure 23) and we use this to simplify typing in information.

Figure 23. Three different types of optimized keyboards for the specific content type. Keyboard for entering mobile phone number to the left, optimized for e-mail in the middle and to the right only letters are shown for writing a the name of a city.

5.2.7 Theming

The JQM provides a theming framework that easily lets designers use different color schemes and graphical elements for their mobile site. The themes are created using CSS3 and a set of icons provided by JQM. When writing this there are five "build in" themes in the framework (see figure 24) but designers can easily customize these to create their own branding and use their own icon sets. Designers are not, however, limited to only using the theming system of JQM, they can style their sites however they like using CSS. But the theming framework allows developers to get a site, with a nice look and feel, up and running with minimum effort. Because Evitbe Interago need to create branded sites relatively fast the theming system works well.

Figure 24. Examples of the 5 default themes in JQM. On top the buttons of all the five default themes are on the A theme background, next all five are on the B theme background and so on.

5.3 Screens

To make the structure of the site and the overall look and feel we will now go through the site by showing many screens. Starting with the home screen we will then cover the four suggested divisions of the site from the navigation diagram; decline, information, booking and receipt.

5.3.1 Home Screen

Figure 25. The home screen of Företaget. Here we see how Information, booking and decline pages can be reached from the home screen.

When arriving to the registration site the user will land at the home screen (see figure 25). The home screen provides a short menu with links to all three main user tasks decline, information and booking. These areas are representing three use cases that the user is most likely to do on the site; get information about the event, book the event or decline the invitation.

5.3.2 Decline

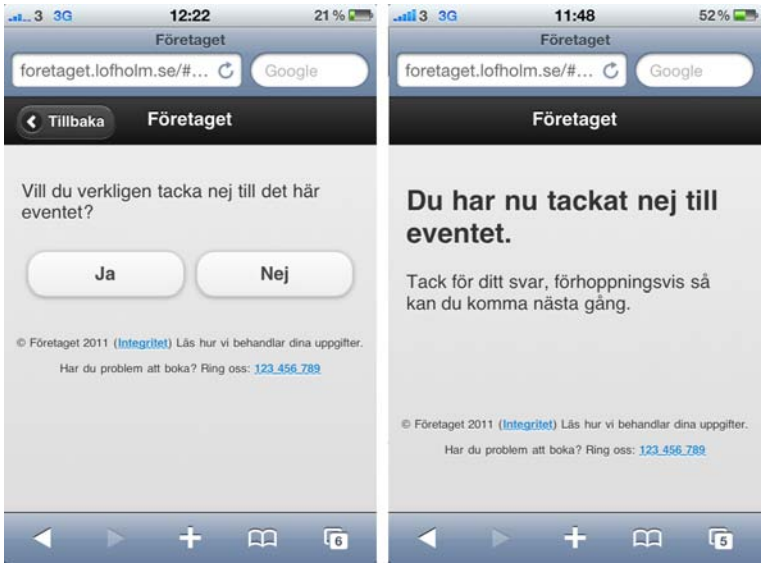


Figure 26. Tapping "Nej tack" leads the user to a page confirming if s/he really wants to decline. If the user press "Ja" a confirmation screen appears.

A user can easily decline the invitation to the event by pressing the "Nej tack - button" from the home screen. An error-preventing screen will then be presented to make sure that the user really wants to decline. By pressing "Nej" the user will cancel declining (see figure 26). But by pressing "Ja" the user will complete the decline process and will be presented with a confirmation message that the event has been declined.

5.3.3 Information

Figure 27. The information screens of Företaget to the left and Bancken to the right.

The information screen (see figure 27) contains a text describing the event in greater detail and a menu showing all the sub-pages created for the registration site. In the bottom of the page there is a button linking to the booking screen that enables users to navigate to this screen without having to go back to the home screen. The sub-pages are created and edited for each event and they are simple static pages with information about the event. Information that is typical on these pages and can be found on the majority of the sites is, schedule-, contact- and location-information. We created examples for these pages to demonstrate the possibilities with mobile phones and the JQM framework.

5.3.3.1 Schedule

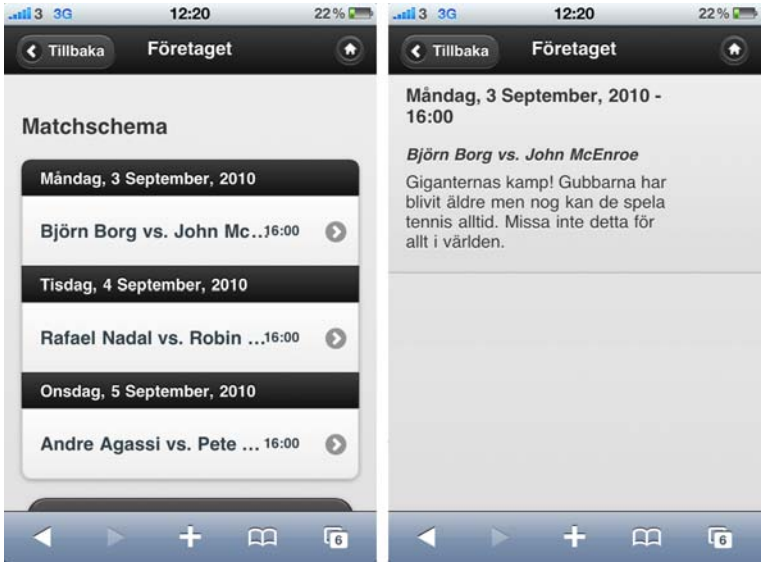


Figure 28. To the left a schedule with arrows suggesting that there is more information available. To the right we see the details on a specific item.

All the activities for the event are shown as list items and the user is able to get a good overview over the schedule (see figure 28). If the activity contains more information a small arrow will be displayed on the right side of the activity indicating that there is more information about this activity.

5.3.3.2 Contact

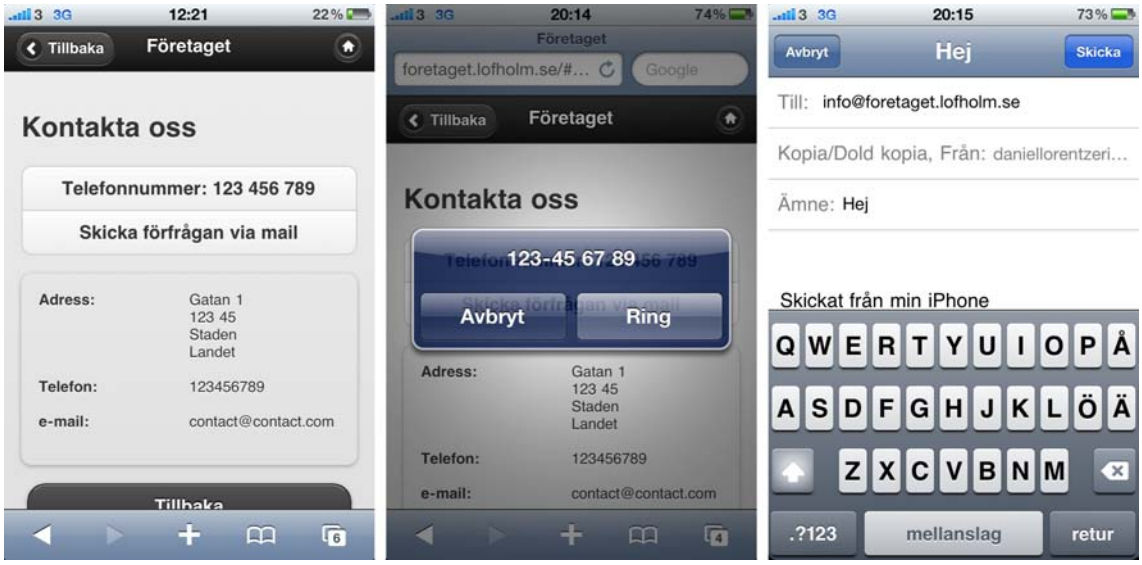


Figure 29. The contact page of Företaget shown to the left. In the middle we see a pop-up asking to call the number when tapping it. To the right the user preesed the button for contacting Företaget by e-mail and a new draft is opened.

The contact screen, as seen in figure 29 above, contains basic contact information and two buttons providing an easy way for the user to instantly call or send an e-mail just by tapping a button. Upon tapping the phone number the user gets a request from the phone to place a call to the specified number. The same procedure goes for tapping the mail address, when doing this a new mail to that e-mail address is opened. Examples of these features are shown in the middle and right view of figure 29.

5.3.3.3 Location

Figure 30. The screen as you arrive at the location page.

The location screen (see figure 30), besides from displaying basic event location information, uses Google maps and geolocation to help users to get to the event. If the user want to use Google maps for direction the user can specify to either use their current location or they can specify the location themselves. If a user chose current location a message pops up, asking for confirmation to use the users current location as seen in figure 31 below.

Figure 31. Pop-up asking if the user agrees to share their position.

After choosing if they are traveling by car or if they are walking they can get travel information either by getting the route displayed on a map or as described in text as seen below in figure 32.

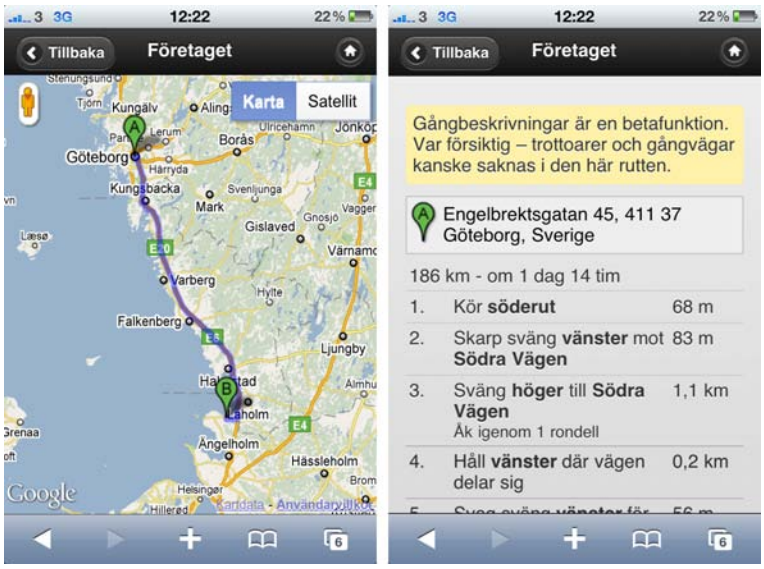


Figure 32. Views showing the Google map road description on a map to the left and in text in the right.

5.3.4 Booking

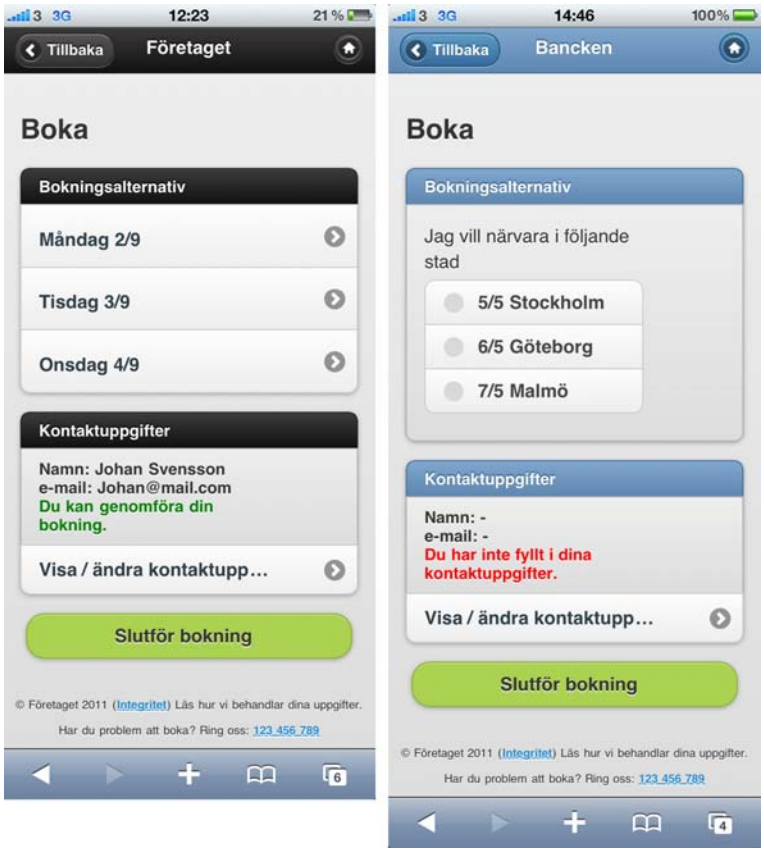


Figure 33. The booking page of Företaget and Bancken respectively. Notice that the contact information is pre-filled in Företagets booking to the left but not in Bancken to the right.

The booking screen displays all the bookable items on the site and the users contact information (see figure 33). Items can be selected using various form elements such as check boxes, radio buttons, dropdown menus or text boxes. The bookable items can be displayed and organized in two different ways depending on the amount of items:

1. **Low amount of items** - Items will be displayed directly on the booking page (see figure 34).
2. **High amount of items** - To handle high amounts of items they can be categorized under list-buttons (see left picture in figure 35). When a category (in our prototype a day) is pressed all the bookable items under that category is presented on a new page (see middle picture in figure 35). If the user selects items on this page and then goes back to the main booking screen the items that was selected will be visualized under the category heading in the list (see right picture in figure 35).

Figure 34. Low amount of items, here the user is able to choose what city to attend directly from the booking page.

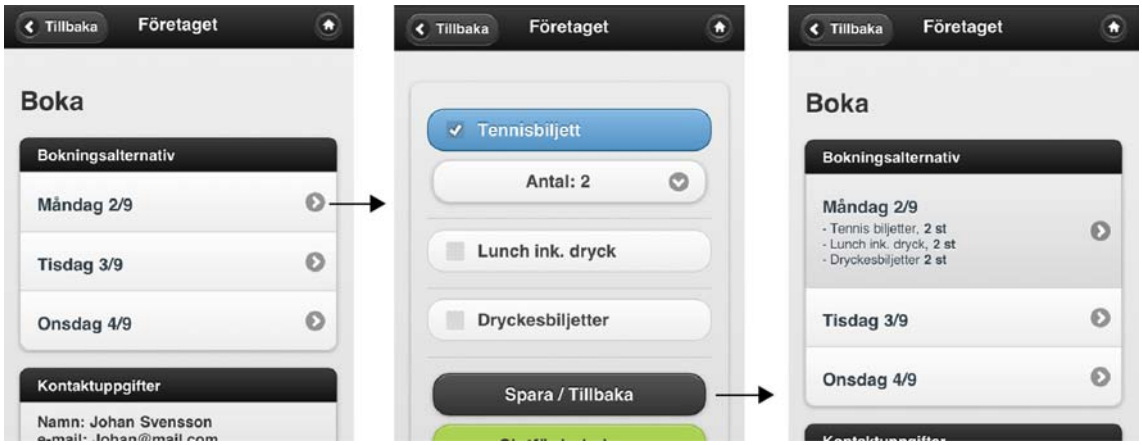


Figure 35. High amount of items, the user can tap each day to be able to see the items for that day. When going back the booking alternatives chosen appear under the title of the list button.

Some items may have an amount number connected that help users to book one or more of an item (see figure 36). To avoid clutter and unnecessarily long pages the button for selecting amount is only shown when item is selected.

Figure 36. A picture showing how the user has cheched a checkbox "Tennisbiljett" and a drop-down menu appear. Notice that there are no drop-downs under the other two list items because they haven't been selected.

The user contact information is usually available at the site due to the personal e-mail. If this is the case the user only needs to verify that the name and e-mail is correct and then proceed by pressing the “Godkänn”-button (see figure 37).

Figure 37. The user has the information pre-filled in this case and only need to view and confirm that the contact information is correct.

But if the contact name/email is wrong, or if the site is public and available to anyone the user will have to provide the right contact information. The form for entering contact information is opened on another page. The reason why the form is not included directly on the booking page is because the majority of users will not need to enter the information and that the form would make the page unnecessarily long. When the user is done entering/editing the information he/she can either go back to the main booking screen or proceed with the booking. However, if the text fields are left blank the user will get a notification instructing them to fill in the missing text fields (see figure 38).

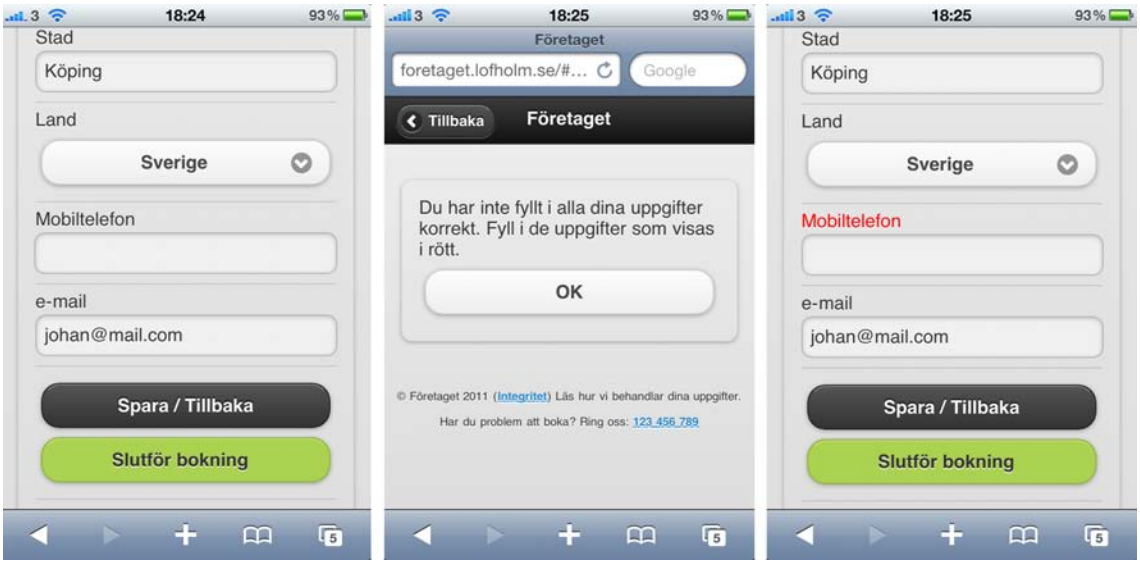


Figure 38. When saving without filling in all fields the user sees a page informing them that all fields were not filled out properly. In the right picture we see that the missed field is red.

When the user has decided what items to book and the right contact information is provided he/she can proceed with the booking by pressing “Slutför bokning”. The user will then have to confirm that the booking and contact information is right to finally complete the booking (see figure 39).

Figure 39. Here the user sees the booking specifications and provided contact information before proceeding.

5.3.5 Receipt

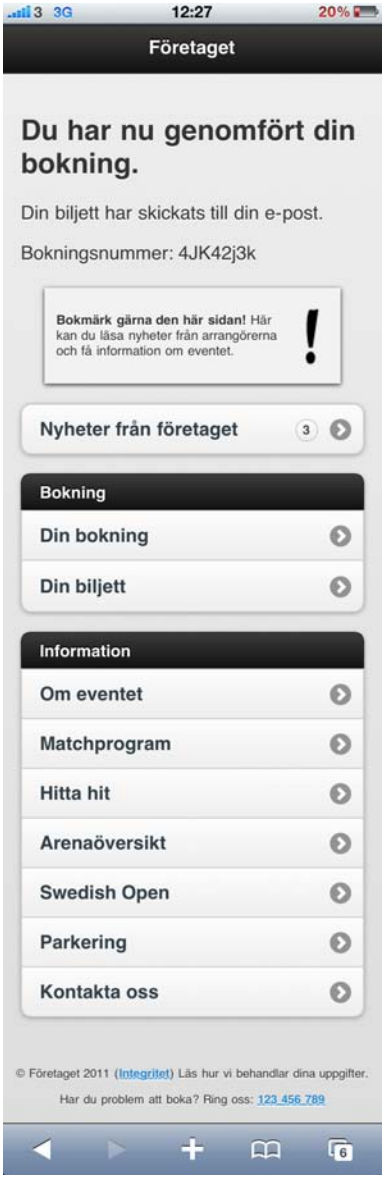


Figure 40. The receipt page.

The receipt page is reached if a user goes through with a booking (see figure 40). The receipt page can be viewed as a separate part of the site. The previous home screen is replaced by this page. The top of the receipt page provides the user with information that the booking is confirmed, and that a copy of their ticket has been sent to the e-mail they provided. They also get a booking number. Below the booking number the user is informed how to bookmark this page for future easy access to this page. The procedure of bookmarking the site as an icon on the home screen whick is a possibility on the iPhone will be covered further down in this chapter.

This page also gives the user a chance to get news about the event or the company that invited the user to the event under the headline “Nyheter från företaget”. In this case we see that the user have 3 unread news items indicated by the small bubble. The news page with three news is shown in figure 41.

Figure 41. Three news about the event in the news page.

Under the heading "Bokning" the user is able to look at the details of his or her booking. By pressing "Din bokning" the users booking is shown in detail, as well as a confirmation of the contact information provided (see figure 42). By pressing "Din biljett" the user see a ticket in form of QR-code ticket (see figure 42). The user is informed that this ticket can be shown directly from the phone at the event, but that the ticket sent to the e-mail is also valid.

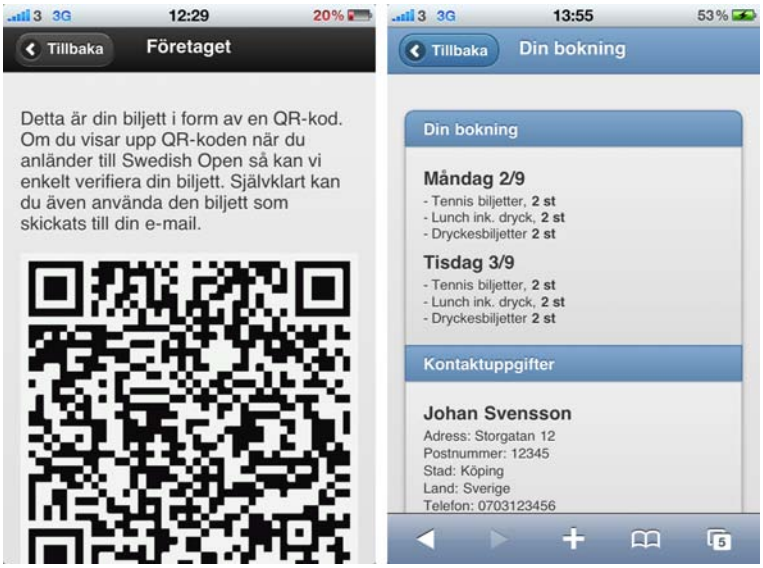


Figure 42. Users QR-ticket shown to the left and the specifications of the users booking to right.

Below the section on the users booking the sites sub pages are shown. They are shown under the heading "Information". In this case we have seven sub pages; the more information page under "Om eventet" plus all the other sub pages previously covered under the information screen part (see figure 40).

5.4 Home Screen Application

Because the receipt screen contains a lot of information that the user can benefit from, both before and while s/he is attending the event. The user is encouraged to bookmark the page for future use (see figure 43).

Figure 43. The user is encouraged to bookmark the page in the box marked by the red rectangle.

A scenario could be that a user, before going to the event, would like to get directions to the event and can then just go to this site to get the information. While on the event they can use the personal QR-ticket at the entrance and then check the schedule just by browsing in to the site with their mobile phone. The iPhone also have a way of placing websites as bookmarks on the phones home screen (see figure 44).

Figure 44. Showing how Företaget has been added to the home screen of the iPhone, then in the middle picture we see a splash-screen as the site loads and in the third picture we see how there is no address bar on top and no navigational buttons in the bottom area of the site.

If a user do this and then open the page, it will get an app-like feel. The address bar in the top as well as the bottom controls will be hidden and the site will look and act as an actual native iPhone app as seen in the rightmost picture of figure 44 above.

5.5 User Tests

Following the entire design process we needed to evaluate the JQM prototype. A combined assignment and satisfaction questionnaire was constructed where users were asked to test the prototype in a similar way as our product owners in the final user test, followed by answering six questions. 11 number of users participated in our final prototype satisfaction questionnaire. The users were asked to perform a number of assignments (see appendix F for the full satisfaction questionnaire) in Företagets JQM prototype on their mobile phone. Afterwards they were asked to answer six questions, five graded from 1-5 and the sixth question with comments on what was good respectively bad with the site. Six of the tests were conducted in person, where both of us observed the user as they went through the steps of the assignment followed by answering the questions, while five of the test were sent out to users who filled out the questionnaire on their own. The questionnaire took between 5 and 15 minutes to complete. Below are the questions of the questionnaire (see Appendix F for the full satisfaction questionnaire).

- How would you grade your visual impression of the site? (5 being the highest grade)
- How would you grade the navigation of the site?
- What grade would you give the terminology and information description of the site?
- How easy or hard were the assignments we gave you? (5 being easiest)
- Which is your overall grade of the site?
- What was good respectively bad with the site?

11 users filled out our satisfaction questionnaire. Out of these 9 were men and 2 were women. The ages spanned between 45 and 21 and the average age of our users was 28. All users that filled out the questionnaire used some kind of iPhone, where the majority used an iPhone4. A graph displaying the division between phone type and gender is shown in figure 45. The result of the questionnaire is summarized in figure 46 below. Note that the summarized results below only present the graded answers by the users; all comments made on any of the five first questions and on the open sixth question are presented and discussed in the succeeding discussion chapter.

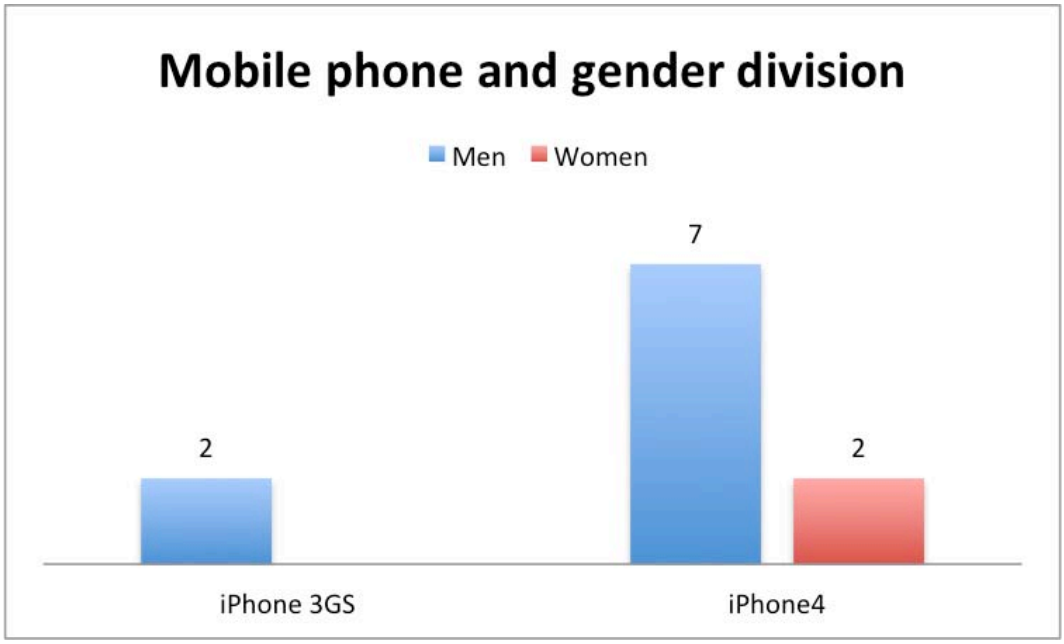


Figure 45. Summarizing table for type of mobile phone and gender division in the satisfaction questionnaire.

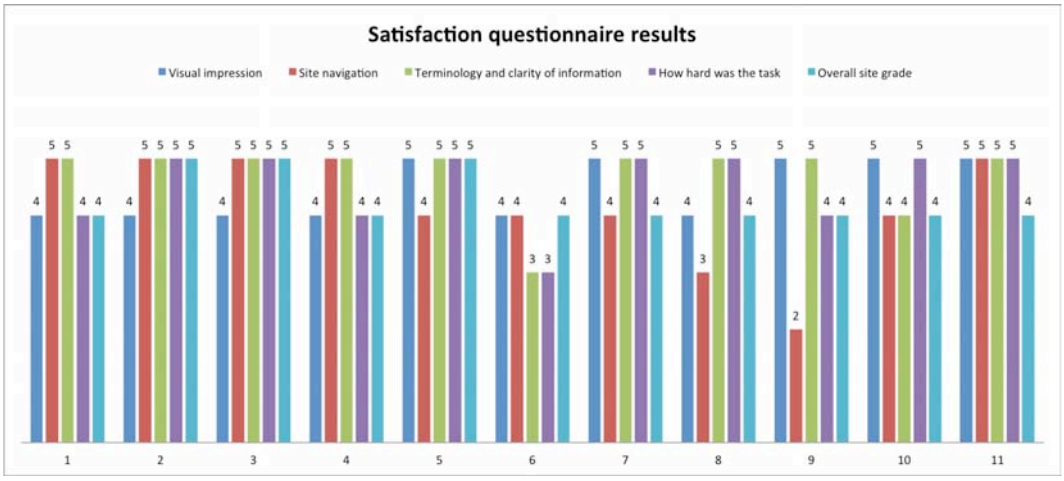


Figure 46. Summary of the grades for the five first questions of the satisfaction questionnaire.

The average score of the satisfaction questionnaire was as follows:

- **Visual impression** 4,45
- **Site navigation** 4,18
- **Terminology and clarity of information** 4,72
- **Task difficulty (5 being easiest)** 4,54
- **Overall site grade** 4,27

We intentionally chose users that had the possibility to perform the assignment on an iPhone for the satisfaction questionnaire. The reason for this is that during the development of the final prototype we noticed that the performance and particularly the appearance are marginally better on the iPhone than on other mobile phones. The goal of the questionnaire was not to find differences between particular browsers, but rather to review the site itself; it's visual impression, navigation, terminology and clarity of information. Having different mobile phones in the satisfaction questionnaire would potentially shift focus from the site itself to the differences between browsers.

5.6 Multiple Browsers Tests

When developing web for mobile phones and other web-enabled devices you can use emulators to test your design since buying all needed mobile phones and web-enabled devices is expensive. Testing on all potential end-user devices is very time consuming, but it is important to test on as many as possible to see whether the site works as intended on actual mobile devices (mobiThinking, 2010).

During the development of the prototype we tested the site on five different mobile phone models; iPhone 3GS, iPhone4, Samsung Galaxy S, HTC Desire HD and Sony Ericsson Xperia Arc. The majority of tests were conducted on the two iPhone models, only a limited amount of tests were conducted on the other models. In figure 47 and 48 below we see how the start page and booking page of the site look in the built-in browsers on the three aforementioned phones.

We know that JQM is tested on most browsers, especially the ones graded A by JQM as previously presented in figure 3 in the Introduction, so the differences between A graded browsers ought to be marginal, and the potential differences decrease continuously as new improved version of the framework are released.

Due to the time constraint of this thesis we were not able to do as much testing on different mobile phones and browsers as we would have wanted to and thus this is something that need to be addressed in future development of the prototype.

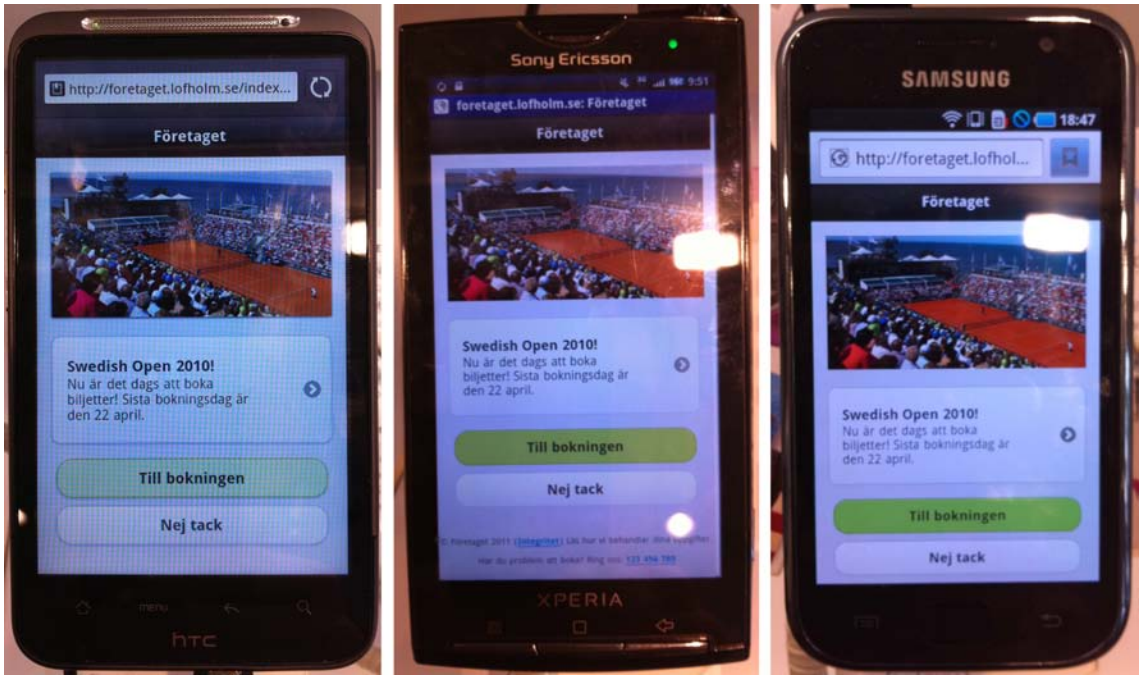


Figure 47. The start page on a HTC Desire HD to the left, on a Sony Ericsson Xperia arc in the middle and on a Samsung Galaxy S to the left.

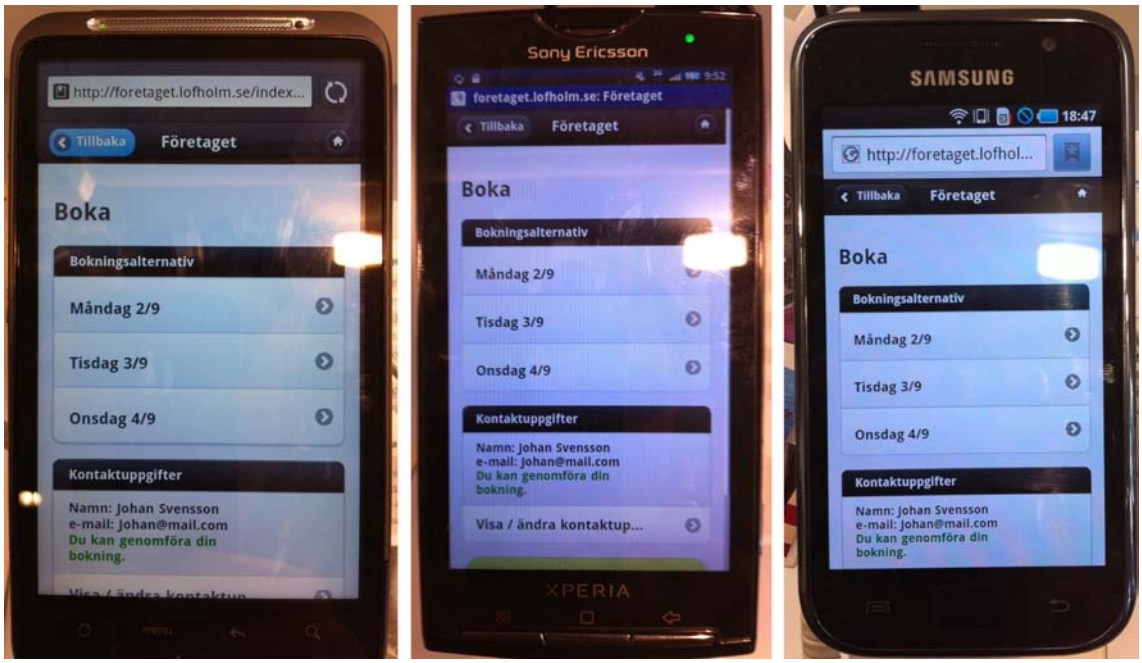


Figure 48. The booking page on a HTC Desire HD to the left, on a Sony Ericsson Xperia arc in the middle and on a Samsung Galaxy S to the left.

6 Discussion

In the following chapter we will discuss our design process and the result of this thesis. We will also provide thoughts about JQM and future work of the prototype.

6.1 Six-Step Design Process

The three initial steps of our six-step process provided us with a good background about the mobile field at large, and about the company and product at hand. The largest threshold to overcome was getting an overview of Evitbe Interago. We started out by doing user requirements interviews followed by reading the system documentation. It was however hard to grasp exactly how parts of the system worked and it was first when we got the chance to interact with the actual system that we could fully understand how the system worked. The lesson learned here is far from groundbreaking; actually using a system is preferable over only reading and talking about a system.

The work with paper prototypes and user test was an enormously effective way of starting out the prototyping phase of the design process. Because the paper prototyping was such a fast technique for producing prototypes it was easy to quickly adapt to all feedback from users and systems owners, and quickly produce new prototypes with suggested solutions. It was a really effective tool for establishing a common ground for discussing with the product owners on a level that was understandable for both parts. The paper prototypes were also good because they helped avoid the problem of getting to emotionally attached to the design. Using the paper prototypes we never spent too much time designing any idea thus throwing away ideas that did not work was not a problem. This meant that many misconceptions in the way we thought the mobile site would work was identified and rejected at a very early stage of the process.

The second prototyping phase with interactive prototypes was not as big a success as the paper prototypes. The prototypes took a lot of time to produce and make available for testing. Hence making changes in the prototypes was very time consuming. It could be that part of the problem was our inexperience with working with interactive prototyping tools. Microsoft Expression Sketchflow was a powerful tool for creating interactive prototypes, but it was perhaps to powerful and complicated for the simple interactions we wanted to create for our users, since making changes in the design was cumbersome and time consuming. We should have used an interactive prototype that was able to run on users mobile phones instead of on a computer screen as well, since this removed the feeling of how much information fits on a mobile phone screen and how the actual interaction works with the touchscreen of mobile phones.
In hindsight the design process in this short time span would have benefited from spending more time in the paper prototype phase, and then going straight to the JQM prototyping phase.

It should be pointed out that we still believe having an interactive prototyping phase before jumping to the third prototyping phase is a good idea. However using an interactive prototyping tool that you know how works and that works on the mobile devices you want to test it for is a necessity.

6.2 Prototype

We got a lot of feedback in form of comments from the satisfaction questionnaires. Overall the feedback was positive, as the grades also indicate, but we got some more constructive critique as well. We will now discuss a couple of these critiques and suggestions for change.

Most of the critique is about the structure of information, suggestions about having more information on the home screen was mentioned by two users. Having a longer information description on the home screen is a question that has come up many times especially during the paper prototype phase. It was decided that showing a short text on the home screen allows both the booking and decline buttons, which were identified as main user tasks in the function analysis, to be visible directly without scrolling. It could be that a reason for this critique is that the more information as it looks today, with an arrow to the right, is not clear enough (see figure 49). Two users commented on not knowing where to click to see more information at first. One of them clarified: “the arrow is not clear to me, it should say read more instead”.

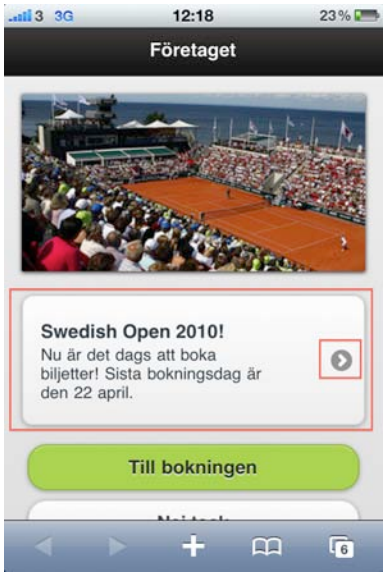


Figure 49. Finding more information from the home screen was not obvious to all users.

One user mentioned expecting to be able to click on the logo in the header to get to the home screen. Being able to click on a home page logo to get to the home screen is a standard in desktop web and should probably be implemented in our prototype as well.

The process of going through with a booking was clear to our users, however the receipt page that appears when a booking is completed was not. Three users commented on the fact that they were unsure what to do when arriving at the receipt page. Two of them suggested adding a button to close the site. This could be a solution, but it is rare to see web sites with close buttons. We believe the problem is that the users don't get enough feedback that the process is completed. By combining three suggestions that were given by users in comments in the satisfaction questionnaire this problem can hopefully be solved.

First adding the phrase "Thank you," to the beginning of the text notifying the user on the top of the receipt screen could be useful since it's the way booking confirmation screens are often written. We could also try changing the color to green, to stick out from the other text areas and be a clear feedback to the user that the process was successful.

Secondly the organization of the receipt page today has the news from organizers and the event as the first tappable event. The booking details and ticket pages are not available to the user without scrolling the receipt page. This is misleading to the user, as you believe the most important items are placed in the direct view. Changing the order of the news menu and the booking details and ticket would be an improvement in strengthening the intended role of the receipt page.

Thirdly change the text in the observation box that suggests you bookmark the site. Today it says that you can read news from the organizer, and get information about the event. This means the user is not informed that the receipt page contains information about their booking and ticket, which is the receipt page's main function. A greater focus on the receipt page's potential beneficial effect during the actual event also should be mentioned before any information about reading news from the organizer. A picture showing how it would look with these three changes implemented can be seen below in figure 50.

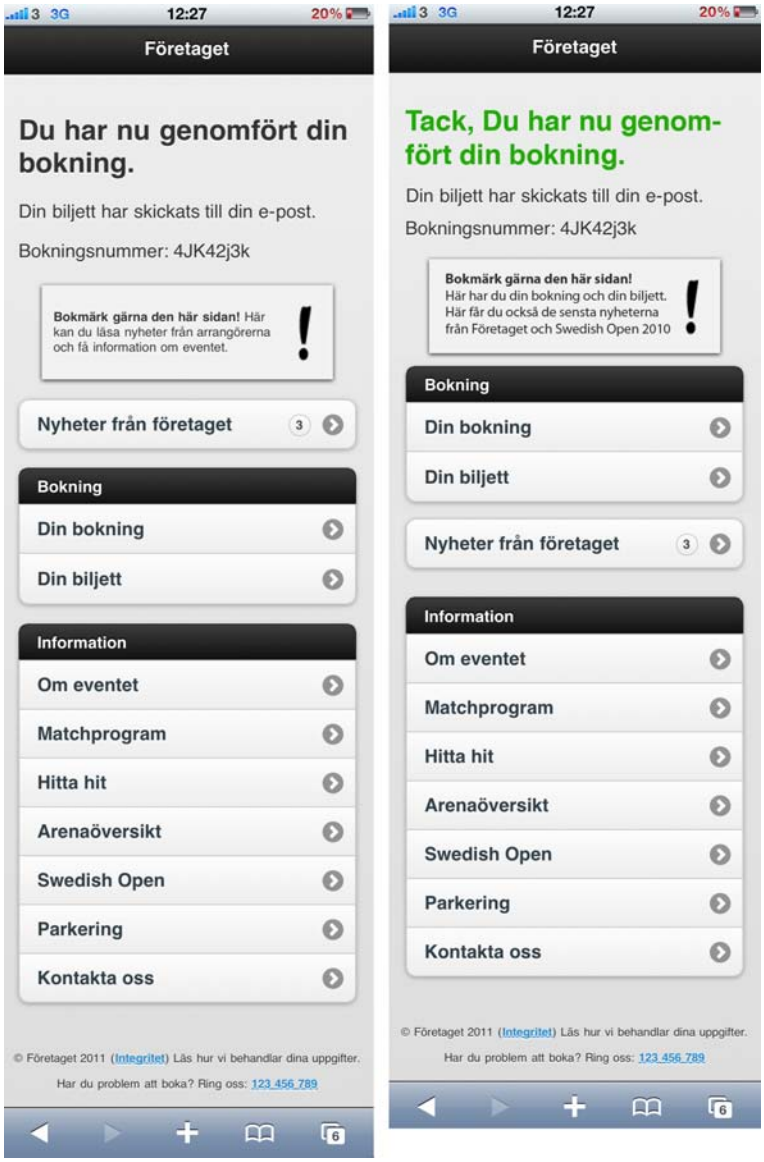


Figure 50. The receipt page, left picture showing how the entire page looks today and the right picture with the suggested improvements from the satisfaction questionnaire.

The feedback from the map page was overall positive; it was shown though that we had missed a simple function. In our prototype we are only using a dynamic Google Map solution, it was pointed out by a user that you expect being able to see a normal static map as well, where the event is marked.

In the satisfaction questionnaire users were asked to perform three identical bookings for two different days. This repetitive task was proven to be a task that needs to be automated in some way, since three users commented on it. There were no concrete solutions that cover how to solve this repetitive task. One solution that was discussed during the paper prototype phase would be to have a drop-down out in the booking menu, stating how many persons the booking is for. When you then check a box for an item in the booking the chosen number in the control would we auto filled. Whether it would work well or not is unsure, more testing on this feature would be needed before possibly being implemented. A suggestion for how this could look and work is seen in figure 51 below.

Figure 51. Three views, the left one with the old booking solution; with 1 pre-chosen automatically when a user presses "Tennisbiljett". In the middle we see an added drop-down in the suggested new main booking page to choose number of guests. The right picture shows how two is then pre chosen in the drop-down when pressing "Tennisbiljett" This could save time for this repetitive task identified in the satisfaction questionnaire.

6.3 Mobile Web Design

The main purpose for this thesis was to provide insights and advice on how to design usable user interfaces for mobile web sites. We would now like to summarize our most important findings. We will also discuss our experiences working with jQuery Mobile.

- **Keep it simple** - The best advice for mobile UI design is to keep things as simple as you possibly can. This can be challenging but by focusing on the most important features for your users and by not cluttering the design it will get more usable. Minimalistic sites with less graphics will also be smaller in file size and will load faster.

- **Design for touch** - When designing for modern mobile phones you mainly design for touch screens and interactions such as tapping and gestures (swipe, pinch, two-fingers, etc.). Touch screens need bigger input areas then sites designed for mouse-pointer interactions.

- **Design for user tasks** - Mobile websites would ideally be designed for specific tasks in mind, which the user can carry out in a short time frame.

When doing mobile the priority should not be on how to add more features but instead on how they can be simplified and designed for specific user tasks, i.e. "Where is the nearest bookstore?"

- **Design for user context** - Mobile users don't use the web as desktop users do. They use it while doing other things such as during a conversation, while watching TV or while shopping in a store. Try to understand when, where and how the site will be used and design web sites that give value to the user context and their environment.

- **Consistency between devices** - If users are used to visit the desktop version of a site they know how it works and what features and content is available on the site. Try to incorporate the same navigation structure and look and feel on the mobile version in order to not confuse the user. However, make sure its modified for mobile use. If this is too hard and challenging, maybe its time to look over the design of the desktop site. While doing mobile web design it is a good point to actually evaluate what features and content is most important on the site.

- **Use web standards** - Mobile web browsers have become much more capable of handling web content such as HTML, CSS and JavaScript but they are still far from perfect. By following current web standards you will allow the design to work on more mobile devices.

- **Test, test, test** - To make sure that the user interface is usable and looks as intended you need to test the design trough out the design process. This means both on users and in different mobile phones. The design process described in this paper is an example on how this work can be carried out.

6.3.1 jQuery Mobile

Working with JQM while designing mobile websites have been a pleasurable experience. It is important to note that JQM is not the best-suited framework for all mobile web sites. Small sites with no complex functionality mainly containing texts and images may benefit from just fluid layouts and/or CSS media queries. The need for JQM, or other mobile UI frameworks should be evaluated for each situation. The sites created with Evitbe Interago are not that complex and could be redesigned with just adaptive layouts, but the heavy use of form elements on the sites benefits from the touch-optimized form elements that JQM provides.

Our own experience with JQM has been that it is an incredibly easy framework to work with. It is consistent in its use of markup and function calls and we will recommend Mogul to use JQM when design and developing mobile web sites. Even though JQM is still in an early developing stage it has more features and is more stable then the majority of mobile web frameworks out there. The JQM team, and the community around them, will continue to develop JQM, making it even more powerful while adding features and improving performance. It is going to be interesting and exciting to see how the JQM project will develop and progress in the future.

6.4 Future Work

Our satisfaction questionnaire was conducted on users with iPhone 3GS and iPhone4. It would be interesting to make tests on other mobile phones and see if the grades are similar.

We tested the site on a variety on different mobile phones and browsers but due to the short time frame of the project and limited resources there are still mobile phones that needs to be tested to ensure that the site looks and behaves as intended a cross all the most popular mobile phones and web-enabled devices.

In order for this prototype to be integrated with Interago there are a lot of integration issues to be addressed. We focused on interaction design and user interface design of the mobile web site. Now work needs to be conducted to integrate the mobile web site with Evitbe Interago.

7 Conclusion

This thesis provides theory and practical advice on what to consider and think about when designing mobile web sites. The JQM framework used for the Evitbe Interago case has worked well and is thus recommended by us for similar projects.

In our background and theory, both exploring the mobile web field, we have provided usable and verified information about how to design usable mobile web sites for a variety of different mobile phones.

We used our six-step design process to go from idea to our final prototype and recommend the methods used, but we also encourage basing the choice of methods on the specific project at hand.

Our six-step design process was successful in the case of Evitbe Interago and it can be used for similar work of designing mobile web.

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Appendix A. Frameworks

There are a number of different frameworks for developing applications for the mobile platform. We will present some of the most popular frameworks below. We have prioritized frameworks that aim at web applications and supports more than one platform. There are many smaller frameworks that aim only at development for android or iPhone but these have been left out here.

1. jQuery mobile

jQuery Mobile(JQM) is a framework in alpha stadium aiming at cross-browser compability for the mobile platform. JQM supports HTML5, CSS3 and jQuery. JQM is built around progressive enhancement, meaning that it checks if the mobile device supports HTML, which is the minimum for it to work. Then based on how advanced the OS and browser is the material will look better and more advanced functions will work, while simpler devices will still be able to see the information in plain HTML but not as pretty or enhanced by functionality. JQM produces mobile web applications.

More information available at: http://jquerymobile.com/

2. Sencha Touch

Sencha Touch is a framework building on HTML5, CSS3 and JavaScript enabling users to develop web applications. Their aim is to be a cross platform-enabling framework. They currently support iPhone and Android, and according to their webpage Blackberry 6 will soon be added to the list

More information available at: http://www.sencha.com/products/touch/

3. DHTMLX Touch

DHTMLX Touch is an HTML5-based JavaScript library for building web applications for the web. DHTMLX Touch works on iPad, iPhone and Android along with other popular devices according to their webpage.

More information available at: http://www.dhtmlx.com/touch/

4. Webapp.net

WebApp.Net is a JavaScript framework taking advantage of AJAX technology for developing mobile web applications. WebApp.net requires WebKit browsers in order to work.

More information available at: http://webapp-net.com/

5. Wink toolkit

Wink stands for "Webapp Innovation Kit". Wink is a mobile framework based on HTML5, CSS3 and JavaScript for creating web applications for iPhone, iPad and Android.

More information available at: http://www.winktoolkit.org/

6. PhoneGap

PhoneGap is a mobile development framework for hybrids between native and web applications. PhoneGap supports iPhone, HP, Android, Windows Mobile, Symbian and Blackberry. PhoneGap is based on HTML5 and JavaScript. By being partly native this enables PhoneGap applications to take advantage of some of smartphones native features such as geo-location, camera and accelerometer. PhoneGap can be used to wrap projects from the previous frameworks to make them appear native.

More information available at: http://www.phonegap.com/about

7. Appcelerator Titanium

Titanium is a framework that enables development of native applications based on web technologies like HTML5, CSS3 and JavaScript. In the same way as PhoneGap, Titanium can be used to wrap projects from the other of the aforementioned frameworks to make them appear as native apps. Appcelerator Titanium is also a framework for developing desktop applications.

More information available at: http://www.appcelerator.com/

Appendix B. Web Resources

http://www.lukew.com
A blog by Luke Wroblewski, former lead user interface designer at eBay. Luke is dedicated to mobile web development and writes a lot about the field and is also a appreciated speaker at conferences around the world.

http://www.useit.com
Jakob Nielsen's website. Nielsen have been called the "the king of usability" and is highly respected in the fields of web design and usability. In his column "the alert box" he delivers a lot of studies and thoughts upon mobile web site usability.

http://jquerymobile.com
The jQuery Mobile blog is run by the jQuery Mobile team and delivers news about all new releases and changes related to the jQuery Mobile framework.

http://www.w3.org/standards/webofdevices
WC3 is the organization responsible for developing and setting new web standards.

http://www.smashingmagazine.com
Smashing Magazine delivers useful and innovative information to Web designers and developers. The authors and occasional guest authors of Smashing Magazine delivers a lot of great resources about mobile web development.

Appendix C. Personas and Scenarios

1. Personas

1.1. Larry Hobbins - Not high tech

Age: 57 years
Gender: Male
Occupation: CEO
Lives in: Stockholm, Norrmalmstorg

Description:
Larry is 57 years old and works as a CEO of a small but successful mechanical service company. He has worked at the company since he started it 21 years ago. Being a CEO for his own company is demanding, and makes Larry a very busy man. Larry is not always fond of new technology since it does not always agree with him. He has however learnt to master his home computer and is now quite excited to spend a couple of minutes before going to bed reading his local newspaper online quickly, since he rarely have the time to sit down at work to read any actual newspapers. He occasionally also browse the sports pages to see how his local hockey team is doing and go over the finical pages.

Larry reads his e-mail and mentally sorts them out, since he will not be able to answer all of them because he has not got the time. Usually he is only able to answer one or two of his closest family and friends' e-mails before going to bed. The invitation to celebrate his membership at the local bank sounded interesting, but Larry did not feel he had the time to reply the invitation.

Larry just got a smartphone from his kids but is struggling when using the phones browser. He thinks the text on the pages is so small and he is not comfortable pinching to zoom, or holding the mobile at a stretched arms length in order to be able to read the text on his 20 minute bus ride to work. Larry sees the potential of using his 20 minutes to browse the web and respond to e-mails such as the invitation from the local bank. But because of the small text, and failed attempts to click on intended links of most web pages, Larry will not do it because he always gets frustrated and for the fear of looking stupid in front of his fellow travelers.

1.2. Eva Asterlindh - High tech

Age: 56 years
Gender: Female
Occupation: Architect
Lives in: Gothenburg, Vasagatan

Description:
Eva lives in Gothenburg, Vasagatan and works as an architect at Stadsbyggnadskontoret. It is a civic organization responsible for planning the building development around Gothenburg city. She takes pride in her work and also is responsible for the organization blog. She also has damaged hearing and needs a hearing aid for which she sometimes fells quite embarrassed about.

Eva likes fashion and likes going out and shopping for clothes with her friends. She also likes to go to the theatre where you often can see her sitting in the foyer drinking wine and talking to her friends. Eva is quite popular among her friends and at work because she's young in spirit and likes to joke and gossip. Other thing Eva likes to do is to travel, paint and go for a walk with her dog.

Eva is divorced since seven years but she has three kids, two daughters and one son, with her previous husband. The kids are all grown up now and one daughter even has a child of her own. Eva likes to call her kids to see how they are doing, often with video using Skype. Two of her kids live don't live in Sweden so Eva thinks that the technology really helps her to keep in contact though she often go and visit her children where they live.

Eva drives an Audi A4 from 2008 and has a Dell laptop, which was given to her from Stadsbyggnadskontoret as a work computer. She also has a HTC ThunderBolt running the Android OS. She likes the phone quite a lot and uses it daily, both in her work and free time. Eva, quite often, has to help her friends when they have problems with their new Smartphones.

1.3. Jonas Bergsparv - Not high tech

Age: 26
Gender: Male
Occupation: Cashier
Lives in: Gothenburg, Johanneberg

Description:
Jonas is an outgoing young man working at Swedbank as a Cashier. In his free time he likes to play tennis, hang out with his girlfriend and go out to eat with his friends. Jonas has lived in Gothenburg all his life and is quite happy were he is, it's here he has all his family and friends. Jonas is not, however, so happy with his job at Swedbank. He started working there soon after he dropped out his studies at Handelshögskolan, which he attended for a year and a half. In the beginning the job was only going to be temporary but now he has worked there for more then two years.

Jonas recently moved in with his girlfriend following four years in a flat at Johanneberg. Jonas girlfriend, Erika, studied in Lund for three years but now she's back in Gothenburg trying to find a job but at the moment she only does some extra work at NK café. The couple doesn't have any kids and don't plan to have any in the near future. When Jonas and Erika goes out to drink they usually end up at fancy nightclubs and expensive restaurants around Avenyn, an exclusive street in Gothenburg. When the money from Jonas work salary starts to run out he often gets some extra from his parents.

Jonas doesn't really like computers, even though he plays a bit of Internet poker. He just recently got a Facebook account and don't get what all the fuzz is about. Jonas also has an iPhone, mostly because "everyone has one" but don't use it that much. His favorite app, however, is the Tennis Result Checker App.

1.4. Sabrina Johansson - High tech

Age: 29 years
Gender: Female
Occupation: Receptionist
Lives in: Malmö, Rosengård

Description:
Sabrina is a 29 year-old woman and a newly wed. He and her husband got their first child 6 months ago, and they are still adjusting to being parents. She just recently switched jobs and is now starting as a receptionist for a big phone company. She is nervous about making a good impression at her new job, so she never uses her computer for anything other than work-related duties.

Sabrina very much keeps in touch with her friends over the computer using social services such as Facebook and Skype. Nobody likes too much commercials, but Sabrina is extra annoyed with fly-outs. She is worried about the environment and about all the talk in the media over green house gases and is enormously annoyed when she gets commercial messages in the form of papers. She even ended the family's subscription to their newspaper and bough an online pass instead.

She enjoys spending time surfing the web so shoo now and again sneak away from changing diapers and instead take the chance to stay online while laying on her couch with her brand new iPad. Sabrina sees a lot of web pages on a daily basis and is always annoyed when sites have an amateuristic look or feel. She often bases her choice of which sites she likes on the first visual impression. Sites that don't scale well on her iPad or iPhone are discarded and are not visited on her laptop either. She likes web pages to be thought through and usable or she protests by not ever visiting them again.

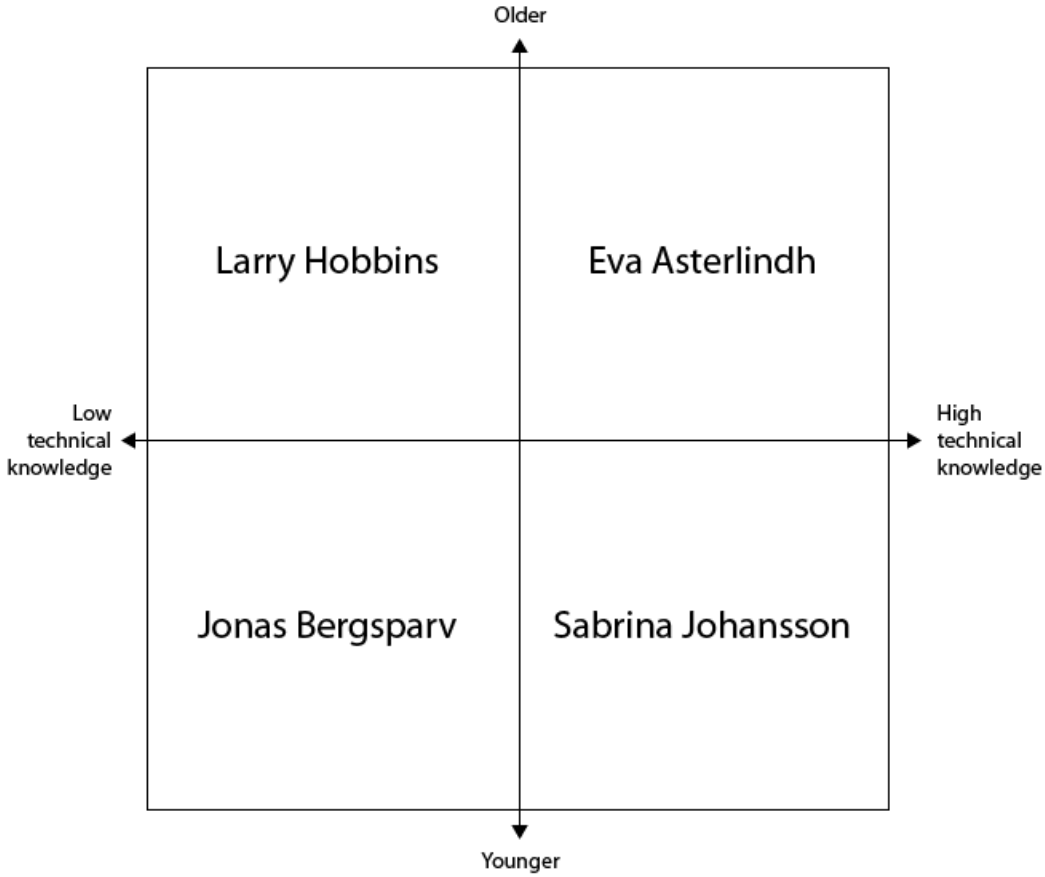

Figure 1. A matrix showing the division of age and technical knowledge of the presented personas.

2. Scenarios

We used the Way out West festival as a possible event handled by Evitbe Interago. Our scenarios were created with this event in mind.

2.1. Larry Hobbins

- He receives a mail about going to Way out West, but has not had the time to answer due to lack of spare time.
- A friend from worksuggests they should go together to Way out West a couple of days prior to the event.
- He tries to book the event on his computer, but get feedback that the event is full and that he is placed in the waiting list.
- He gets an email a day before Way out West, saying there is now a vacancy and that he therefore can have a ticket.
- He does not understand what the QR thing is and therefor print his ticket at home on their printers.
- He takes his ticket and goes to Way out West.
- His friend shows him how he can use the phone to find a page where he can see where and when artists play and where the toilets and restaurants are located.
- They decide to have a beer in the nearest service location, using his mobile phone to find it.
- He has not set up any favorite bands on his list so he gets information on times for all artists and bands.

- He wants to see musicians playing Jazz and Blues.
- He uses cell phone to find an artist who is soon due to start, and go and listen to a really jazzy concert.
- The next day, Larry once again goes to Way out West.
- He is unable to find the page he used yesterday without the help from his friend who is not present today.
- He hangs out with some other friends and they spontaneously go to shows they want to see.

2.2. Eva Asterlindh

- Eva has always been a bit eager to visit Way out West.
- She sits and eats dinner with her daughter on a restaurant when her mobile sounds.
- It is an invitation to Way out West from her work. She asks her daughter if they should go together.
- She has always wanted to see Anthony and the Johnsons.
- She books two one-day tickets as Anthony and the Johnsons is the only band she is interested in seeing, she books them directly in her mobile phones.
- She saves the page on your mobile.
- She uses the QR-code to register the ticket as she enters the area.
- Eva realizes that she forgot her earplugs.
- Eva uses the map page on her mobile to find info-stations where there should be earplugs.
- Eva goes and sees Anthony and the Johnsons with her daughter.

2.3. Jonas Bergsparv

- Jonas book a ticket to Way out West
- Jonas and his friends pre-party for a long time so they miss the deadline for going to the Slottsskogen area.
- He uses his mobile phone to see what club gigs are still on and then head downtown.
- He pays admission to get into the gig even though he really could have gotten it for free if he would have gone to Slottsskogen earlier.

2.4. Sabrina Johansson

- Receives a mail, telling her that she is invited to Way out West through her job.
- She gets a list of artists who will play.
- She accepts the invitation and go through what artists she would like to see.
- She sees a banner in the upper right corner where she can scan a QR code to access a mobile version of the site. She is tempted by the idea that she might find more information there.
- She uses a QR code scanner to bring up the mobile version of the site and save it on her iPhone home screen.
- As Sabina is not from Gothenburg, she wants help to find her way to Slottsskogen.

- When Sabina comes to the event she takes up the e-mail she received when she booked Way out West.
- When she is inside the area at Slottsskogen, she takes up the phone and sees a list of all the bands that she wants to see, where and when they play.
- She wants to see Robyn and press on the name Robyn in her list to get more information about the artist, where and when the artist plays.
- After seeing the Robyn concert Sabina gets hungry, she therefore uses her mobile phone to find what options she has. She finds some menus and price, and descriptions on where they are located.
- A friend advice her she really should go see the Arctic Monkeys and therefore look in the list of artists. She finds them in the list, and gets the information on when and where they play.
- After the great Arctic Monkeys gig Sabina really needs to go to the toilet, she uses the phone to quickly find the closest toilet.

Appendix D. Interago Analysis

Evitbe Interago is a campaign and event handling system aimed at companies. Here they are able to manage and setup up campaigns and events for customers and personnel among other things.

1. User group

Interago clients can create branded registration sites for their end customers that are linked to specific customer groups. These groups differ from client to client so the user group is very general.

2. Description of the existing system:

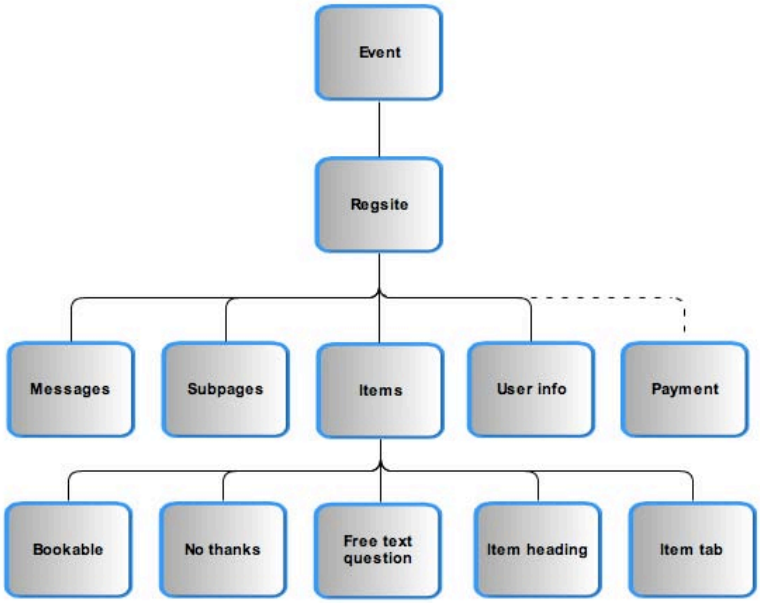

Figure 1. The structure of how an event is constructed.

2.1. Setting up an event

When setting up an event the client uses one of the Interago modules called Visitor. The process is done in steps and the starts with defining and describing an event. The client adds basic information (event name, date and time, location, etc.), intro text, items and sub pages that will be used on the registration sites. The items are used to generate user controls (checkboxes, radio buttons, drop-down boxes, tabs, etc.) in the form presented on the site.

When the event is set up one or multiple registration sites are created. The reason the client can chose to have multiple sites is to have the option of giving different types of offers to separate customer groups. The registration site represent the external web site where the end customers can accept the offer, by using the form presented on the site. To set up the registration site the client defines a set of properties. These properties are basic information about the site, text messages, sub pages and items that will be used. The items added at the event level will be included in on the registration site and the client can also add new items unique to the one site. Static sub pages can also be added to provide information around the event. The text messages are used give information to the customer when different actions (accept, cancellation,

chosen ticket, etc.) have been made. When the event and registration site(s) are set up it's the client can distribute links to the site using e-mail, SMS, MMS or print.

2.2. Marketing channels

Evitbe use multiple marketing channels:

- E-mail
- SMS
- MMS
- Web site
- Print

2.3. Registration site

The registration site is the part of the event that the end-users see when they get their invitation. The registration site is the page where the user sees what the event is about, how to book it and is able to accept or decline the invitation. The registration site consists of a number of parts that the creator of the event can set up; messages, subpages, items, the user information part and possible payment alternatives.

2.4. Messages

This is where you setup the messages that will be used for the registration site. You set up the main information part for the first view of the registration with text including pictures. This is also where you create messages for when certain actions are performed on the registration site, such as when a recipient declines an offer, accepts an offer or is put in waiting list etc.

2.4.1. List of messages:

- Intro text: This text is shown over the booking form on the registration site
- Confirmation: The confirmation text shown to the customer when completed a booking. This text is also sent to the customers e-mail account.
- No thanks: This text is shown to customers that decline the offer.
- Waiting list: Is used if the event is fully booked and the customer chooses to sign up on a waiting list.
- Cancellation: If a guest canel a booking this is the message that is shown.
- Closing text: If the guest close down the registration site this message is shown.
- Ticket page text: If tickets are enabled on an item, a message can be shown with instructions for how to get the ticket.
- Advanced Script: Event creators can use JavaScript to perform more advanced operations.

2.5. Subpages

Subpages for the registration site can be in form of directions how to get to the event, how to contact the company for more information or external links to other pages relevant for the event or campaign. The subpages are created using a rich text editor in which the user adds the content (text, images, links, video, audio, etc.) to the page. This editor adds a lot of auto-generated code that is challenging to handle.

2.6. Items

Items are the actual entities that the customer can book and choose from in the form on the presentation site. There are three types of checkable Items (Bookable, No thanks, Free text question) and two structural items (Item tabs, Item Heading) that can be used. The items can also be ordered and grouped in to lists.

2.6.1. Checkable items:

- Bookable: checkboxes, radio buttons or drop down lists that a user can click on to book and choose different options.
- No thanks: checkboxes or radio buttons that are clickable. Clicking a no thanks box disables previously filled in information in bookable items.
- Free text question: a free text box for filling out more specific information that is hard to anticipate beforehand, allergies e.g.

2.6.2. Structural items:

- Item heading: A heading for items can be used to categorize items into different themes.
- Item tab: If there are for example many different items for different events a list can become very long, you can then but different options for different tabs to keep the site more perspicuous.

2.7. User info

The user info part is where the information about the recipient is collected. If the user is in the database some information is filled out automatically such as name, address and e-mail etc. If a user has come to the registration site through for example a banner this info needs to be filled in. This is done in text fields; fields marked with asterisk must be filled out in order to go on. The user info is a default item and is always included.

3. Typical Interago registration site design:

Invites through Interago Visitor look like a standard e-mail. Invites are branded for each specific customer, with their logo and other preferences such as what type of navigation system to use and where to place it. An example of a registration site with a vertical and a horizontal branding can be seen in figure 2. Registration sites are either one or two-column views with a header with the company's logotype on top. The left column, if present is a narrow column, with a vertical navigation menu. If the menu is a horizontal one the page is usually in one column. The right or only column depending on navigation system contains the main information such as text and pictures.

The main content contains an image or images on top showing what the event is about. It is followed by the overall information about the event and how to go about booking it. Following this is the part that the user can fill in. For example, in tabs, checkboxes and radio buttons. There is also always a form where you as a guest fill out your contact information in text boxes. If you are already in the database some information is filled out automatically. In some cases there are also payment options listed.

By using the navigation menu, one can usually find more detailed information about the event, such as event program, where it is taking place and other ancillary information, and contact information for mailing the sender of the event or campaign.

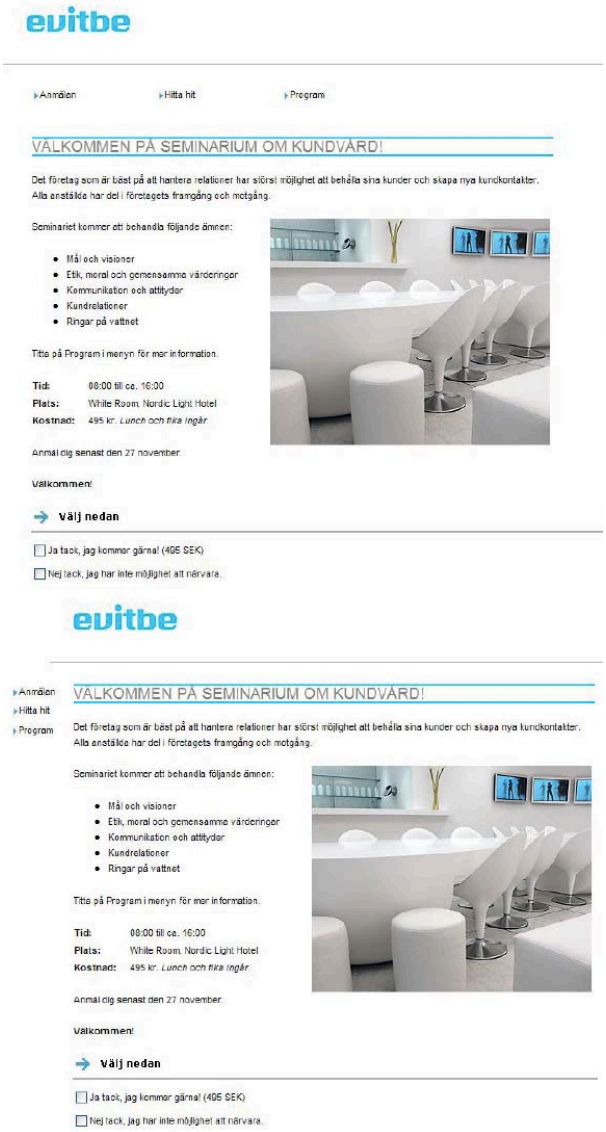

Figure 2. Above we see two examples, one showing a vertical menu and the other a horizontal menu.

Appendix E. Product Owners Final User Test Session Assignments

Here the assignments given to the four product owners during the final user test of the jQuery prototype are presented. First the original Swedish version followed by an English translated version.

Uppgifter – Bancken

1. Ta reda på mer om evenemanget
2. Läs schema om tiderna passar
3. Kolla upp vart evenemanget kommer att vara (antingen som karta eller beskrivning)
4. Hitta Banckens kontakuppgifter
5. Tacka nej till evenemanget, men ångra dig sedan.
6. Anmäl dig till en heldag i Göteborg och slutför bokningen

Uppgifter – Företaget

Du heter Johan Svensson och har mottagit ett e-mail där du blivit inbjuden till Swedish Open

1. Du klickar på länken i mailet som leder dig till bokningssidan
2. Ta reda på mera om evenemanget *
3. Läs schema om tiderna passar
4. Kolla upp var evenemanget kommer att vara (antingen som karta eller beskrivning)
5. Hitta företagets kontaktuppgifter
6. Du vill nu genomföra följande bokningar:
    a. Måndag 2/9
        i. Tennisbiljett, 2st
        ii. Lunch ink. Dryck, 2st
        iii. Dryckesbiljetter, 2st
    b. Tisdag 3/9
        i. Tennisbiljett, 2st
        ii. Lunch ink. Dryck, 2st
        iii. Dryckesbiljetter, 2st
    c. Slutför nu bokningen

*** Sidorna: Arenaöversikt, Swedish Open och Parkering fungerar ej**

Assignments – Bancken

1. Find out more about the event
2. Find a schedule to check if you are available on the days of the event
3. Try to find out where the event will be held, either on a map or in text
4. Find Banckens contact information
5. Decline going to the event, but then change your mind
6. Make a booking for an entire day in Gothenburg and complete the booking

Assignments – Företaget

Your name is Johan Svensson and you have received an e-mail where you have been invited to Swedish Open 2010.

1. Click on the link in the mail, leading you to the booking site
2. Find out more about the event *****
3. Find a schedule to see if you are available for the dates specified
4. Try to find out where the event will be held, either on a map or in text
5. Find the contact information of Företaget
6. You now want to make the following booking:
    a. Monday 2/9
        i. 2 Tennis tickets
        ii. 2 Lucnhes including drinks
        iii. 2 Tickets for drinks
    b. Tuesday 3/9
        i. 2 Tennis tickets
        ii. 2 Lucnhes including drinks
        iii. 2 Tickets for drinks
    c. Go through with the booking

*** The pages: arena overview, Swedish Open and parking are dead links.**

Appendix F. Satisfaction Questionnaire

Here the user satisfaction questionnaire that was used to grade our prototype is presented. First the original version used for the tests that is in Swedish followed by an English translated version.

Uppgifter

1. Surfa in på [site URL] på din mobil
2. Försök ta reda på mer om Swedish Open 2010
3. Titta vilka matcher som spelas.
4. Försök ta reda på var evenemanget kommer att vara, försök få fram en karta eller vägbeskrivning.
5. Hitta Företagets kontaktuppgifter.
6. Försök genomföra följande bokningar:
    a. Måndag 2/9
        i. Tennisbiljett, 2st
        ii. Lunch ink. Dryck, 2st
        iii. Dryckesbiljetter, 2st
    b. Tisdag 3/9
        i. Tennisbiljett, 2st
        ii. Lunch ink. Dryck, 2st
        iii. Dryckesbiljetter, 2st
    c. Slutför nu bokningen

Ålder: ( ) Man ( ) Kvinna Typ av mobiltelefon:

1. Hur skulle du betygsätta utseendet på sidan? (Där 5 är högsta betyg)
( ) 1 ( ) 2 ( ) 3 ( ) 4 ( ) 5
Kommentar:

2. Hur betygsätter du sidans navigering?
( ) 1 ( ) 2 ( ) 3 ( ) 4 ( ) 5
Kommentar:

3. Hur var sidans terminologi och informationsbeskrivningar?
( ) 1 ( ) 2 ( ) 3 ( ) 4 ( ) 5
Kommentar:

4. Hur enkelt/svårt var det att göra de uppgifter vi gav?
( ) 1 ( ) 2 ( ) 3 ( ) 4 ( ) 5
Kommentar:

5. Vilket övergripande betyg får sidan av dig?
( ) 1 ( ) 2 ( ) 3 ( ) 4 ( ) 5
Kommentar:

6. Vad var bra respektive dåligt med sidan?

Assignments

1. Go to [site URL] on your mobile phone
2. Try to find more information about Swedish Open 2010
3. Find out what matches are played during Swedish Open
4. Try to find out where the event will be held, either by finding a map or travel directions.
5. Find the contact information of Företaget
6. Try to make the following booking:
    a. Monday 2/9
        i. 2 Tennis tickets
        ii. 2 Lucnhes including drinks
        iii. 2 Tickets for drinks
    b. Tuesday 3/9
        i. 2 Tennis tickets
        ii. 2 Lucnhes including drinks
        iii. 2 Tickets for drinks
    c. Go through with the booking

Age: **( ) Man** **( ) Woman** **Type of mobile phone:**

1. How would you grade your visual impression of the site? (5 being the highest grade)
( ) 1 ( ) 2 ( ) 3 ( ) 4 ( ) 5
Comments:

2. How would you grade the navigation of the site?
( ) 1 ( ) 2 ( ) 3 ( ) 4 ( ) 5
Comments:

3. What grade would you give the terminology and information description of the site
( ) 1 ( ) 2 ( ) 3 ( ) 4 ( ) 5
Comments:

4. How easy or hard were the assignments we gave you?
( ) 1 ( ) 2 ( ) 3 ( ) 4 ( ) 5
Comments:

5. Which is your overall grade of the site?
( ) 1 ( ) 2 ( ) 3 ( ) 4 ( ) 5
Comments:

6. What was good respectively bad with the site?