Different screen sizes on iPhone and iPad effect the user experience

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Abstract

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iPad applications are often considered easier to use than iPhone applications, primarily due to that iPad screens is larger and can contain more information than the iPhone screen. The goal with this report is to describe how the different screen sizes between iPhone and iPad affect the user experience. The iPhone and the iPad have a lot in common, for example iOS, design process, Apple Human Interface Guidelines, development language, structure and elements used on the screen. The biggest difference is the screen size. The iPad has a larger screen than the iPhone which makes it is easier to create a user experience that requires fewer actions to acquire more information on an iPad than on an iPhone. When less actions is required the user can fully focus on completing the task. With larger screen on the iPad it is easier for the user to get an overview and see more content in one screen. This makes it possible to create applications that have great deal of content with a good overview and navigation.
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1 Introduction

There are many differences between the interface on iPhone and iPad: The iPad is not just a big iPhone and this report will discuss the differences. Background to this report is that Wahoo Development, which is a local startup IT company in Uppsala was assigned to develop an iPhone application for Kontaktdagarna. Kontaktdagarna is a job fair at Uppsala University primarily for students in Economics, Information Systems and Media and Communications. The fair is two days with several events weeks before and during the fair. There are 80 exhibitors during the fair some exhibitors and are present two days and some one day. The main purpose of the application was to make Kontaktdagarnas physical catalog digital. Other benefits was to be able to send push notifications to the visitors and easier interact with the companies digital channels for the visitors. Since 2011 Kontaktdagarna have been managing their administration with a Content Manage System (CMS). A CMS is an application that allows editing, publishing, organising and modifying content from a central interface. The main function and use of a CMS is to organise and store data [1]. To make it possible to communicate between the iPhone application and Kontaktdagarnas CMS an Application Programming Interface (API) was used. An API is a set of protocols, routines and tools for building computer applications [2]. With their CMS Kontaktdagarna are able to manage their homepage and the exhibitors are required to fill in the information about them. The iPhone application fetches content from the CMS via the API, this makes it possible for Kontaktdagarna to change the entire content in the application and thereby use the application for several fairs.

The main work in this project was to develop the iPhone application but to be able to compare the iPhone interface with the iPad interface the iPhone application had to be converted to an iPad application. The comparison focused on some views that contain a lot of information and therefore have the largest potential to have different layouts on the two devices. Since some views are simple and don’t contain a lot of information they are not interesting to compare. The simple views was implemented to the iPad application but the layout of these views are very similar to the corresponding views on the iPhone application.

The iPhone application was published on Apple App Store and used during the customers event. The iPad application was converted from the iPhone application and they use the same functions and theme, the difference is the layout of the content. The iPad application will not be published on App Store, it is used to compare the differences between the devices.
2 Method

The workflow of the development project of the iPhone application have many similarities with agile software development strategies such as Scrum [3]. In Scrum a backlog is a list of all the tasks that needed to be completed to make the *Kontaktdagarna* iOS application [3]. Wahoo Development and *Kontaktdagarna* worked in close collaboration with meetings every second week to discuss the course of the development and milestones. After every meeting a list with tasks to complete by the next meeting was agreed on, in Scrum this time period is called a sprint [3]. Wahoo Development aimed to make a working prototype available in an early stage to have something to presuppose and show to *Kontaktdagarna* during the development process. The point of close collaboration and short iterations was to ensure that *Kontaktdagarna* would be satisfied and that the application fulfilled their expectations, this also helped to eliminate wasted development time.

During the entire process Apples Human Interface Guidelines (HIG) [4] HIG are recommendations for developers to make applications have a common interface base.

2.1 Design

Apple uses the same HIG for all iOS devices, iPhone, iPod and iPad. Both iPhone and iPad applications fetches their content from *Kontaktdagarnas* CMS. This means that the iPhone app and the iPad app will have the same content, the customer bought the iPhone application from the company, therefore was the content in their CMS optimised for iPhone. The focus of this report are on the differences in the layout of the information and what the extra space on iPad could be used for.

2.1.1 iPhone

The first step in this design process was to understand the customers expectations, vision and goal with the application. Wahoo and *Kontaktdagarna* agreed on a few keywords that worked as design guidelines for the application. With these keywords in mind the members of developing company sat down disconnected from each other and made several pen and paper mockups of the application. To the meeting afterwards everyone brought their sketches and ideas to combine and improve the best ideas from the different sketches until a few prototypes remained. The criteria of judgement was Apples Human Interface Guidelines, the keywords and the user experience.

With ideal conditions there should have been some user tests with these
early prototypes to ensure a solid user experience, due to the time aspect this was not possible. The company presented a digital wireframe with what they thought to be the best prototype to the customer. Wireframes are faster than writing code in xcode, and makes it clear to the receiver what the focus is and gives a more professional impression then pen and paper sketches.

During this first phase of the design process focus on the user experience, how the user should navigate, which information should be displayed and where. The next phase of the design process was to create the user experience that the design keywords described. The stage of the development was to make the application the customers application by applying their graphical profile as the theme.

2.1.2 iPad

The iPad is not just a big iPhone. The iPad has a larger screen usually twice the size of most iPhones but that is not the only difference. It is a disparity in how and where the devices are used, the iPhone is always with the user and used in many different ways and places. The iPad is a bigger device and therefore not as mobile and used to more specific tasks then the iPhone. The user have unequal expectations on the devices, and this in turn affects the design of applications for iPad.

The design process of the interface started with pen and paper sketches and with the extra space there where new challenges even though the content was the same. Five interviews were conducted with users, two interviews with possible buyers of the application. They were conducted according to the technique where the participants are given a task to achieve and told to think out loud why they do something. The participants of the interview was shown a pen and paper mockup of the first view, when the participant "clicked" a button the view that followed where shown, every action and reason the participants made was noted and compiled. Due to the limitations with the data fetched from the API the final design could not contain any new data, the most appreciated design by the participants could therefore not be implemented.

2.2 Development

The applications are written in Objective-C and Apples Integrated Development Environment (IDE) Xcode 6 was used which was the most common language and IDE at this time. During september 2014 Apple released a new programming language called Swift [5] which intend to replace Objective-C but at this moment Objective-C is the best language for developing iOS applications. Some other platforms that can be used to create iOS applications are Xamarin where
applications are written in C Sharp (C#) [6] and Titanium where applications are written in JavaScript [7]. These two platforms are used to create applications that works on several different devices with different operating systems such as iOS and Android. The main reasons why Objective-C was chosen as development language was my wish to learn native iOS development and when the development of the iPhone application started Swift had not been announced by Apple. When the iPad application development started Swift was recently released, the effort to translate the iPhone application to Swift was not in the scope of this project. At the moment for development Objective-C was very well documented and many common development problems where discussed on different forums.

The development structure of the project are Model View Controller (MVC) [8] which works very well with Xcode and Objective C. It’s easier to follow the MVC convention when developing in Objective-C and Xcode then it is to follow another development structure.

2.2.1 iPhone

The development process of this iPhone application consist of four major phases. The first phase was to implement the navigation between the different views and the most crucial functionality for the application. The second phase included the creation of a network connection to fetch mock data via an API from a server and bind that data to the information that was shown on the screen. In this phase the implementation of the design was a comprehensive part. The third phase covered the development of a local database on the device to be able to see content in the application without an internet connection and to make the content appear immediate on the screen. The last phase was a thoroughly review of all the applications features to detect and remove bugs.

2.2.2 iPad

The iPad application inherits most of the functionality from the iPhone application. The difference was the layout of the views and the introduction of some new views. The main phase of converting an iPhone application to an iPad application was the implementation of the new views and changing the layout of the views inherited from the iPhone to enhance the user experience.

3 Theory

There are many different methods to develop and design software applications and Human Computer Interaction focus on the users experience in the applica-
tion. The market is flooded with several applications for every task that gives the user the possibility to choose the best application. If an application is easy to use, understand and gives the user good conditions to complete the task, it is more likely the application will be used and appreciated. Applications are judged on how it facilitates one or several tasks to the user, not the technology who makes it possible to complete the task [9].

The foundation to develop applications that are valuable is to use the technology to enhance the user experience. Benyon describes it as, "Our goal is to design interactive systems that are enjoyable to use, that do useful things and that enhance the lives of the people who use them. We want our interactive systems to be accessible, usable and engaging. In order to achieve this we believe that the design of such systems should be human-centred. That is, designers need to put people rather than technology at the centre of their design process."

3.1 Design

The design of the iPhone application had two goals. The first was to make the application intuitive, understandable and easy to use for the users. The second goal was to satisfy the customers requests for their graphical profile interwoveed and their need for participation in the design process. Norman describes the importance of design as, "Well-designed objects are easy to interpret and understand. They contain visible clues to their operation. Poorly designed objects can be difficult and frustrating to use. They provide no clues or sometimes false clues. They trap the user and thwart the normal process of interpretation and understanding" [10]. With Normans and Benyons words in mind, the user experience and the design are interlaced and very important to develop valuable applications.

3.1.1 Wireframe

Wireframes are blue prints of the applications visual layout, with the main focus is functionality and priority of content and behaviour. Graphics, color and typographic style usually left out. Wireframes can be produced in different ways. Depending of the purpose, it can be sketches on a whiteboard, pen and paper sketches or made with computer software. Designing wireframes as an iterative process is effective to make rapid prototypes [11].
Figure 1: A wireframe for iPhone

Figure 1 is an example of wireframes from the design process of the iPhone. Wireframes can be used to confirm that the final product meets the expectations of people responsible for scope, structure and strategy. People responsible for building the product can use the wireframes as a reference to questions about the functionality [11].

3.1.2 Usability

According to Faulkner the concept of usability originate form the ergonomics side of Human Computer Interaction (HCI). Usability is not special for HCI and the techniques that is possible to use in HCI have been used in ergonomics for some time. Usability engineering consider real users in action and evaluates the system according to a pre-defined set of criteria [12]. Benyon believes that there are twelve important design principles to make a good design of a system. The design principles interact in complicate ways and can sometimes contradict each other and other times reinforce each other [9].
3.1.3 Interface design

According to Faulkner [12] the principles of interface design are naturalness, consistency, relevance, supportiveness and flexibility. These principles aims to create an interface that is effective to facilitate the user to complete the tasks. They focus is on the applications functionality and the users steps to complete the task. When Faulkners principles are used they achieve their goal and creates an effective interface that facilitates the users ability to complete the task.

**Naturalness** declare that a good interface should show a suitable way to preform the task and the appearance should seem to be natural. The user’s task syntax and semantics should be reflected in the interface. The language should be natural for the task and the structure of the interface should follow the structure of the task since the user is familiar with the language and the structure of the task. The needs of the user should control the adaption of the system and not expect the user to adapt to the systems needs.

**Consistency** is significant to unite the different sections of the system to one uniformed interface of the system. The way the system interact with the user should be consistent throughout all the sections of the system. The system should not expect the user to learn one way of preforming a task in one section and then another way of preforming the same task in an other section of the system.

**Relevance** protects the user from redundant information. The interface should only present the minimum information that is required to complete the task. The information need to be presented in such way that it makes sense to the user. To maximize the user performance and prevent unnecessary errors made by the user the keystroke effort required to complete a task should be minimized. The system should use previous inputs and not require any redundant information and only request information from the user no more times than what is necessary to complete the task.

**Supportiveness** enlighten the importance of the system to provide sufficient support to help the user complete the task. The interface should help the user to answer a few important questions such as where am I? What is happening? What can I do? How do i get there?

Native users will naturally need more support than experts. Therefore it is important to know which level the intended users of the system resides on.
**Flexibility** intend to highlight the importance of the interface to ascertain the disparity in user preference, performance and requirements. There is a fine line between encourage users design personal interfaces to enhance their performance and dissuade the users from designing personal interfaces to make it possible for users to help each other and reduce the problems when a new user start using someone else personalized interface.

3.1.4 Perception

In the early twentieth century a group of psychologists called the Gestaltists identified a number of "laws" of perception that they considered to be natural for humans, these are called the gestalt laws of perception [9]. Despite their age these "laws" are still widely regarded as important. The gestalt laws can be used to organise objects to be perceived in a certain ways.

**Proximity** Is the observation of objects that appears close together tend to be perceived together is called the law of proximity. Figure 2 is a standard Mac OS X alert box, the buttons are organized by the law of proximity. This make the user see the distinct difference between the *Don’t Save* button and the group of *Cancel* and *Save* buttons. Figure 3 show the corresponding alert box in Windows 7 which don’t use the law of proximity but uses equally spacing between the buttons.

![Figure 2: Mac OS X - Buttons organized by proximity](image)
Continuity is when individual figures are linked together and creates smooth, continuous patterns. People tend not to see the individual disjointed figures, people see the smooth, continuous pattern. The law of continuity makes it possible to connect disconnected elements in the system. Figure 4 is an example of six individual figures that together creates a continuous pattern.

![Figure 4: Individual figures creates a continuous pattern](image)

Similarity is figures that have the same shape and size tends to seen as a group when they appear close together. File icons is an example of that, when the same icons are placed together it looks more organised then if the same icon are mixed with others.

Closure It has shown that it is easier for people to perceive objects that are closed rather then to perceive objects that are open. Unconsciously people often add the missing information to close an object so that the object easier can be perceived against the background. Figure 5 is one example of how three unclosed filled circles can arouse the shape of an white triangle.
3.2 Human Interface Guidelines

Human Interface Guidelines facilitates the developer to make the application intuitive and consistent. The goal with HIG is to create a consistent experience across the platform where navigation and gestures are intuitive [13]. In this project the Apples Human Interface Guidelines [4] have been used to make the iPhone and iPad application as intuitive and easy to use as possible by allowing the users to use previous knowledge and actions from other applications that follows the Apple HIG [4].

3.2.1 Design Principles

One important part of Apples HIG are the design principles which constitutes the foundation of the user experience. The principles are divided into six areas that attend to different parts of the user experience.

Aesthetic Integrity The appearance of the application have a big influence of the user experience, not the actual artwork but the rather the interaction between the appearance and the behavior to deliver the functionality that the user expects. It is important that the application send a unified and clear message about the purpose and behavior to make the users rely on it [4].

Consistency “Lets people transfer their knowledge and skills from one part of an app’s UI to another and from one app to another app.” [4]. A consistent application attends to the peoples standards and paradigms at the moment and adapts to those to push the user experience forward.
Direct Manipulation of onscreen objects instead of use separate controls is according to Apples HIG [4] easier for the user to understand the consequences of the action and the user is more engaged with the task. The multi-Touch interface makes it possible for the user to use gestures to manipulate onscreen objects.

Feedback is important for the user as an acknowledgement for the preformed action. Feedback can be buttons that highlights to indicate that it has been pressed, a subtle animation that shows a deleted row deleted from a list or a sound that acknowledge the users action. Sounds as feedback should be a complement to a visible acknowledgement since the user can’t always hear there device [4].

Metaphors Other familiar situations can help the user to complete a task in the application without any introduction. A metaphor can be an action like flicking to change the page in a magazine or artworks on objects like icons to inform the user what the application can offer. Metaphors are best when they enhance and help the user experience without enforce the limitations of the object or action it alludes from [4].

User Control The application should inform the user about consequences of a decision to minimise unexpected outcome and let the user make the decision. If the information is simple and action is straight forward it is easier for the user to understand and remember the consequences from the action. The user expects to be able to cancel an action or undo the action, if the action is potentially destructive the user expects a chance to confirm the action [4].

3.2.2 Designing for iOS

There are threes themes that are involved in iOS and the content and functionality should guide the design process.

Deference The user interface should help the user to achieve the goal by facilitate interaction and provide understanding for the content. By using the whole screen it is possible to emphasise the most relevant content and have space to show more detailed information. The interface should be like a good referee guide the game and never steal the show [4].

Clarity Will help to emphasise and ease the interaction with the content. Colors can distinguish important content and discrete show the user possible interactions, colors is also important to define the theme of the application.
Together with negative space important content and interactions are easier to understand and more emphasised. Borderless buttons are encouraged, to indicate interaction a borderless button uses color, context and a call-to-action title. By using the system’s fonts the developer ensure that the applications interface is intact even when the user choose a different text size [4]. Figure 6 shows how Apple uses color and negative space to facilitate the interface, the sender have blue color and the receiver have grey. Figure 6 clearly distinguish the sender and receiver buy starting the speech bubbles from different edges of the screen. The surrounding white space also called negative space is used to enhance the speech bubbles and gives clarity.

![Image showing negative space](image)

**Figure 6: Negative space**

**Depth** iOS applications often uses depth to communicate. The content is divided into layers which are ordered and positioned to help the user understand the relation between objects on the screen. When the user interacts with an object on the screen the other objects that are related are positioned out of focus for the user but the according to the original order [4].
3.2.3 Navigation

One essential part of a good user experience is the navigation. The user’s path though the content requires to be logical, predictable and easy to follow. The user should always be aware of their position, how to get back and how to get to the next destination in the application. A good navigation experience guides the user towards it’s goal without getting any attention. There are three main navigation styles, flat, hierarchical and content driven each suited for different app structures [4].

**Flat**  From the main view the user are able to navigate from one primary category to several other primary categories. Instagram is a good example of an application with flat navigation style and the primary categories are available via a tabbar at the bottom of the screen [4].

**Hierarchical** The user make one choice per view until the arrival at the destination. If one choice is wrong or to change destination the user must retrace some of the steps or start over from the beginning. An application with a hierarchical navigation style is Dropbox, which usually is filled with folders inside folders, once inside wrong folder the user must retrace the steps to get back where the wrong choice were made [4].

**Content driven** Some applications have content driven structures and a content driven navigation. An application for magazines or books where the user navigates by choosing a section from the table of content or by moving from one page to another [4].

These navigation styles can be combined to fit the structure of the application. The main navigation can be flat with a hierarchical structure inside one or several of the primary categories [4].

3.2.4 Feedback and Animation

**Feedback** When the user interact with the content of the application it is important that the user know what the application is doing, which actions possible to do and what result of and action will be. The feedback should be delivered to the user via the visual user interface without stealing the users focus from the content. Alert is a powerful feedback that need to be handled with care, if the user is flooded with unimportant alerts they will quickly be ignored. An alert should contain important information and ideally and action attached to the important information [4].
Animation  
Elegant discrete animations impregnate the iOS user interface and many of them are not even noticeable and just taken for granted. Animations can enhance the user experience by giving the user insight of the navigation structure, help the user understand the consequences of an action, enforce the sense of direct manipulation and inform the user with feedback. Used wrong animations can disorient, confuse and distract the user from the content. Custom animations should be used consistently throughout the application so that the user can build on the previous experience. Depending of the purpose with the application animations have different functions. An amusement application have more patience from the user when it comes to beautiful animations that does not have any other purpose than to entertain. An application that provides productivity animations have to be quick and provide information that facilitates the users goal with the application [4].

3.3 Development

3.3.1 Xcode 6

To develop software the developer needs tools that allows to work in a more efficient and better manner to create software. Xcode is provided by Apple Inc. and have been their way of enabling developers to develop applications for Apple devices. The first version of Xcode was released in 2003 and the latest version is Xcode 6 which includes Xcode IDE (Integrated Development Environment), Swift and Objective-C compilers, iOS simulators for different devices, Instruments analysis tool and the latest OS X and iOS SDKs (Software Development Kit) together with many other features. All features are well integrated to make the workflow as easy and smooth as possible. The Interface builder facilitates the designing of the interface, it gives the user a good overview and have many good features like drag and drop to insert elements to the interface. This makes it possible to create the interface and the source code parallel and ease the understanding of the structure of the application. With the simulator tool the developer can simulate the application on different devices to be able to make an application that works as intended on all the devices the release aims to [14].

3.3.2 Model View Controller

The Model View Controller (MVC) is a design pattern used as protocol for communication and organisation for objects in an application, every object are assigned to one of the three roles: model, view or controller. The different types of objects are separated from each other by boundaries with communication
rules that enhance the pattern. The benefits of using MVC are comprehensive, objects can be reused and their interface is better defined. It is also easier to extend and change applications that use MVC since the view and the model don’t have any direct communication one of them can be replaced or changed without affecting the other one [8].

Figure 7: MVC overview

**Model**  Objects that have the role of the model are embody data that are specific for the application and also define the logic and computations to manipulate and process that data. As an example a model object can be a company that is shown in the catalogue and the object have a structure with positions that should contain certain information, like company name, logo, information and so on. Every company object have the same structure but the data that it contains are different. When data in the object are changed from a remote place via a network the object notifies the controller that it has changed to the change displays. If the user makes an action to modify or create data that action is communicated via the controller to the model to make the changes [8].

**View**  Objects that the user are able to see on the screen have the role of the view. A view object know how to respond to a user action and how to draw itself on the screen. View objects are often used to display or manipulate data from the model objects. When the view objects are reused they help the user to understand what their actions are since they usually perform the same action. View objects learn about changes in the model from the controller and communicates user changes to the controller [8].

**Controller**  The objects that are controllers are the bridge between the view and the model objects. It is though the controller the view gets information if the data has changed and therefore need to update the view. The model gets information from the controller if the user makes an action to create or manipulate data and therefore know if the model have to update. The controller object communicates user actions from the view to the model and communicates changes in the model to the view [8].
4 Result

The content in the two applications are fetched from Kontaktdagarnas CMS and this makes all the data and images optimised for iPhone. This is not ideal since it is better to scale down images to make them fit then to scale them up which often make the images unsharp and grainy. But the CMS is built for the iPhone application. The iPhone application is in portrait and the iPad is in landscape.

4.1 iPhone

The iPhone application was released to Apples App Store in december 2014 and downloaded 700 times for Kontaktdagarna in Januari 2015. The application replaced a physical catalog and added new possibilities to interact with the visitors during the annual event of Kontaktdagarna in Uppsala.

Figure 8 shows an overview of the events that were planned and the user was able to see a preview of the description of the event. The black alarm clock indicates that the user has a reminder for that event. Figure 9 displays the complete description of the event, this is shown when the user click on the preview. Figure 8 and Figure 9 are two examples of how negative space is used to create a spacious interface. Negative space is used to create space between elements throughout the iPhone application.

Figure 8 shows a list of all the exhibitors of the fair in 2015. The user are
able to mark companies as favourites with the star and choose display favourites by clicking the top star, to search in the list and to filter the list on what the companies are looking for and offers. The circle in front of the company name display which students the company are interested in. When the user chooses one company figure 11 is shown and the user can scroll down to get to figure 12 where the user get information about what the company is looking for and what they can offer. The map in figure 13 show where in the fair area the company have their showcase.

The user get information about that company and interact with the company in several ways. To change company the user can use the arrows in the top right corner, swipe or use the back button to get back to figure 10.

![Figure 10: iPhone List Company](image1)
![Figure 11: iPhone Company Logo](image2)
4.2 iPad

The iPad application is used to compare the differences between the two devices iPhone and iPad. The iPad application fetches the same data as the iPhone and since there is no other CMS for the iPad application, the images are therefore optimised for iPhone. Figure 14 displays the event list, on every event the user are able to view the complete description at once. The user can set a reminder for an event by clicking the alarm clock, when the clock is black the alarm i set.
On the iPad it is possible to see the list of companies and all the information about the selected company at the same time as Figure 15 shows. In the left list the user is able to mark companies as favourites with the star and choose to display favourites by clicking the top star, to search in the list and to filter the list on what the companies are looking for and offers. The circle in front of the company name display which students the company are interested in. The right view the information of the company is complete, the user can interact with the company in several ways.
An alternative layout is shown in figures 16 and 17. The grey area could be used for promoting events that the current company is a part of. The company could also promote job openings or themselves and the area could also be used for an event during the fair.
Adecco is the world’s leading provider of HR solutions. With close to 31,000 employees and more than 5000 offices, in over 60 countries around the world, Adecco offers a wide variety of services, connecting more than 550,000 colleagues with over 100,000 clients every day. The services offered are temporary staffing, permanent placement, outsourcing, consulting and training. The Adecco Group is a Fortune Global 500 company.

Figure 16: iPad Company Logo

Figure 17: iPad Company Map
5 Analysis

The goal with the iPhone application was to create a stylish, clean and flat application that is intuitive and easy to use. The theories from Benyon [9], Faulkner [12] and Norman [10] are general for designing and interactions in computer science. These theories are the foundation of which Apples Human Interface Guidelines gives hands on examples for iOS development. The theories and Apples HIG are interlaced in many ways with the main goal to support the development of applications with a good user experience.

Apples Human Interface Guidelines had a large influence in the applications. To make the applications easy to use it is important that the user can use knowledge from other applications. Apples Human Interface Guidelines had a large influence on navigation and visual design, elements that are commonly used in many iOS applications are used in key parts of the applications to make the user able to reuse knowledge and recognise these elements.

5.1 Design

The theme of the applications was inspired by Kontaktdagarnas graphical profile, the background is a blurred image of Kontaktdagarnas logo in white on their main blue color. The white text could sometimes melt in with the background which was not preferable but Kontaktdagarnas second color was white therefore was the main color blue and the second color white. One very important aspect from Kontaktdagarna was the look and feeling of the application and they wanted an application that corresponded with the visitors perspective. To give the user feedback when a button is selected the button becomes black or something other happens on the screen.

Wireframes was used in the beginning of the design process to communicate the basic design layout of the iPhone application. It was a fast way of expressing ideas about the layout, functions and to create a discussion about these things and it also gave an professional impression. The benefits with wireframes in this project was that wireframes become a bridge in discussed functions, layout and design. It was a fast way to express ideas in a way that they understood and it was easy to discuss the wireframes.

With the iPad application wireframes was used to conduct the interviews with users and possible customers. The pen and paper wireframes made it easy for the persons to understand that the focus was with the functions, layout and usability not if it was possible to get another background. The result of these interviews became the foundation for the design of the iPad application.
Interface design  Faulkners [12] five principles of interface design corresponds well with Apples Human Interface Guidelines, their goal is the same to facilitate the use of the application. In the applications this was used in the general workflow and a very common tabbar was used to categorise information in tabs. Tabs are used in many other applications which makes it easy for the user to understand how tabs work. The structure of the information in the application is well suited to be categorised in five different tabs. If the information would have required six or more categories the tab structure would not be suitable since the maximum number of tabs displayed in a tabbar on smaller iPhones is five tabs. If more than five tabs are used the one to the rightmost will be a "more" tab and the user will have to click that tab to be able to see tab five and larger. This will not give the user the same overview of the information and add an action for the user to see all the information therefore another layout should be used in that case.

The possibility to filter the company list by interests and favourites is an example of flexibility, the user are able to customise the list of displayed companies according to several options. This is possible in the iPhone and iPad application.

Perception  the information about the companies shown in the application have a structure that makes it possible to use the laws of perception to distinguish the information into different groups. The most distinct example of how perception is used is in figure 15 the iPad version where the information about the company is displayed. With the laws of perception the information is grouped into several groups and they are not separated by any lines just space. This is a way of creating boxes without lines.

5.2 Human Interface Guidelines

Apples Human Interface Guidelines have been used as a key theory throughout the design process, they give substantially examples of how to use or implement theirs theories. To make the user experience of application feel native many of the default features such as tabbar and listviews were used with small modifications to these elements to make them fit the theme.

Design principles  Apples HIG[4] are similar to Faulkners interface design principles[12] but expressed in different ways. Both aims to improve the user experience and facilitate the user task. The application does not contain any unnecessary objects or information, every element has a purpose, the interface aims to facilitate the user to achieve the goal. To create consistency the user can
reuse actions from different parts of the application. In the iPhone application the user uses the same action to expand the news cell to see all of the content as in the event cell to expand and see the content. When the user explore a company in the detailed view it is possible to change company by flicking left and right. By doing a left swipe the user returns to the list of companies, the left swipe is common in other applications e.g Apples Mail where is has the same function to return the user to the list. The icons in both applications aims to be intuitive and very easy to understand and tell the user what is behind it by using common metaphors lik a star for favourites and the calendar for the event view. The application is informative and the main goal for the user is to browse for information, the different functions in the application aims to make the browsing easier to the user. One action can affect the user when the user does not use the application the possibility to set a reminder for an event. When the user clicks that button a confirm box appears for the user to confirm their action, this gives the user control over the application.

**Designing for iOS** the black color is used to inform the user that a button is selected, in the tabbar all the icons are white except from the selected one. This give the user a obvious image of which tab that is currently showing. In the event view the alarm clock turns black when the user have choose to set a reminder for an event. The same goes for the list where the companies are shown, the black star to the right indicates if the user have choose a company as a favourite. To filter by favourites the user selects the white star at the top next to the search and filter buttons. This gives clarity to the user throughout the application, a black button indicates that the user have selected a button and made a choise or an action.

Both applications aims to give the most relevant information in the prime areas, and the less important the information is the more the user have to search for it. This helps the user to easy achieve the most common tasks and goals and creates deference. Negative space is used throughout both applications but has larger importance on the iPhone than on the iPad. The intuitive solution might be to diminish element to make them fit in to the small screen. This creates an interface that is cramped up with elements, hard to use and easy to click on the wrong element since they are so small. To create an interface that is easy and comfortable to use the designer have to go the contradictive way and remove many elements and enhance the remaining elements with negative space.

**Navigation** in both applications combines the flat tabbar with the hierarchical list and detailed view, this combination works very well with the structure of
the application and gives the user a overview with the tabbar and the possibility to dig deeper with the detailed view. In the detailed view of one company the user can move through the list without getting back to the listview and choose a new company, the user can use the arrows in the topbar to change the viewed company, the user can also flick left or right to change company. The company changes accordingly to the list that is chosen, if it is filtered, favourites or searched. The iPad application have the same structure as the iPhone application since the iPad screen is bigger it is possible to show the list of the companies and the detailed view at the same time, this gives the user the impression of a completely flat structure.

**Feedback and Animation** there is not many animations in the applications and they are all very subtile. In the iPhone event tab, all the event text are cut off after four lines and when the user “clicks” on the event the textarea expands and show the complete text. A subtile animation displays the expansion and collapsing textarea. This was used to give the user an explanation of what is happening in contrast to the textarea just becomes bigger immediate. When the user changes tab on both applications there is an animation that makes the content appear from the side the user is moving to. If the user changes tab from event to catalog the content of the catalog comes from the right side of the screen, if the user goes from catalog to event the content comes from the left side of the screen. This used to facilitate the users location awareness in the applications.

## 5.3 Development

**Xcode 6** gives the developer all the necessary tools to develop iPhone and iPod applications. The more time spent in Xcode the more the functions and way of doing things are understood and appreciated. A new thing in Xcode 6 is that the story board is possible to make device independent, this facilitated the conversion of an iPhone application to and iPad application.

**Model View Controller** is a structure that facilitates changes in the model and the view without affecting each other. The structure of Xcode interlace well with the structure of MVC.

The MVC structure made the converting from an iPhone application to an iPad application very smooth. Since the content is fetched from an CMS that *Kontaktdagarna* controls it was not possible to make any changes to the model. It was only the controller and the view that had to change which saved development time.
This structure could create some problems, in this case some of the controllers become very large and therefore hard to navigate in and complex to search for bugs.

5.4 Customer Influence

If the applications not had been developed for a customer it would have been easier to follow some of the guidelines since their theme made som problems with the graphical design.

Regarding the content the customer hade some things that they wanted to be in the application, such as sponsors and list every one in the project group of Kontaktdagarna. An interesting idea would be to follow The laws of simplicity[15] to make an application that is as simple and elegant as possible. Due to the customers requirements this was not possible.

6 Concluding discussion

With a larger screen on the iPad it is easier for the user to get an overview and see more content in one screen. This makes it possible to create applications that have a great deal of content and easier to create an overview and good navigation.

In order to create a good user experience on a device with a small screen it, is of great importance to remove information (all elements that are not essential to the view) and enhance these elements visibility with space. This can be done both in terms of distance-proximity variations and even more importantly by using negative space.

As shown in the result it takes the iPhone application user four screens to select one company and see all of the content for that company. In the iPad application it is possible to for the user to see more information in one screen than on four on the iPhone. This requires less actions by the user to se the content of the application which could make it easier for users to understand and navigate throughout the content of the application.

An interesting way to continue this work would be to develop both applications with more functionality and use the extra space on the iPad version to give the companies more possibilities to catch the users interest in their company.
References


