USER INTERFACE DESIGN FOR iOS
CAMERA APPLICATION

Designing Gif Video Camera Application

Erika Kim

Bachelor’s thesis
April 2016
Degree Programme in Media
The objective of this thesis was to examine the fundamentals and basic principles of great user experience and user interface design. The focus was on laying out theoretical foundations and applying them into a practical end result – a camera application with a simple and user friendly graphical interface.

In order to set up the foundations of the thesis, a comprehensive research into the many different factors that, as a whole, make up a good user experience was conducted.

Throughout section 2, a brief history of mobile phones and the current place of smartphones and their applications are explored. In section 3, the popularity of mobile photography and the need of well-designed user experience and user interface in mobile camera applications are discussed.

And finally, section 4 and section 5 consist of key aspects that influence user experience including a brief introduction and explanation to the most noticeable of them – user interface design.

After the background knowledge on the subject is constructed, the practical part of the thesis presents a prototype and visual mockups of a new mobile camera application concept as a result.

Key words: mobile camera, camera application, mobile camera application, iOS, user experience, user interface, mobile photography.
CONTENTS

INTRODUCTION .................................................................................................................. 5

MOBILE PHONES AND APPLICATIONS ........................................................................... 6
  A Brief History of Mobile Phones ...................................................................................... 6
  Smartphones and Applications .......................................................................................... 9

MOBILE PHOTOGRAPHY AND CAMERA APPLICATIONS ............................................. 10

USER EXPERIENCE DESIGN ............................................................................................. 12
  The Importance of User Research .................................................................................... 12
  The Use of Wireframe .................................................................................................... 13
  The Need of Visual Design ............................................................................................ 13

USER INTERFACE DESIGN ............................................................................................... 14
  Qualities of Great User Interface Design ........................................................................ 14
    Clarity 14
    Conciseness ................................................................................................................ 14
    Simplicity ................................................................................................................... 15
    Consistency ................................................................................................................ 15
    Familiarity .................................................................................................................. 15
    Feedback ................................................................................................................... 16
    Forgiveness ................................................................................................................ 16
  Visual In User Interface Design ....................................................................................... 16
    Layout and Position ..................................................................................................... 16
    Shape and Size ........................................................................................................... 17
    Colour 17
  Techniques of User Interface Design ............................................................................. 18
    White Space ................................................................................................................ 18
    Animation .................................................................................................................. 18
    Depth and Focus ........................................................................................................ 18
    Verbs as Labels ........................................................................................................ 18
    Iconography .............................................................................................................. 19
    Typography ................................................................................................................ 19

DESIGNING GIF VIDEO CAMERA APPLICATION ...................................................... 20
  Concept and Target Audience ......................................................................................... 20
  Wireframe Prototype ...................................................................................................... 21
  Visual User Interface ..................................................................................................... 22
  Design Process .............................................................................................................. 22
  Mockups ....................................................................................................................... 23

CONCLUSION ................................................................................................................... 26
REFERENCES ......................................................................................................................... 27
APPENDICES ...................................................................................................................... 29

Appendix 1. Icons for the application .............................................................................. 29
Appendix 2. Screenshots for the application ..................................................................... 29
Appendix 3. iPhone mockups for the application ............................................................. 30
Appendix 4. Wireframe for the application ........................................................................ 33
INTRODUCTION

iPhoneography is a widely used compound word formed from the words “iPhone” and “photography”. It is the art of taking photos with an iPhone and can be seen representative of mobile photography.

This sensational popularity of mobile photography has led to the growth of mobile camera applications market. One of the key advantages of mobile photography is that it can be enjoyed anytime anywhere by just about anyone with their smartphones. Moreover, there are many different mobile camera apps which helps to create a decent photography using a phone camera. Needless to say, flawless user experience and intuitive user interface are necessities for mobile camera applications in order to help and benefit the users.

The main goal of this thesis is to find factors of ideal user interface design in mobile applications and apply them in a practical camera app design work.
MOBILE PHONES AND APPLICATIONS

Mobile phones have become one of the necessities in modern society. These days mobile phones – specially, smartphones – are more than just portable devices for phone calls and texting. They not only provide efficient way of communication, but also fulfill various everyday needs.

A Brief History of Mobile Phones

The history of mobile phone dates back to 1900’s. On April 3, 1973, Martin Cooper from Motorola made the first phone call on his invention, the world’s very first handheld mobile phone which weighed 1.1kg with the size of 228.6x127x44.4mm. 10 years later, in 1983, this invention was finally introduced to the market with the name of Motorola DynaTAC 8000X. The price of this mobile phone was almost $4,000 when it was first released in US.

PICTURE 1. Martin Cooper holding Motorola DynaTAC 8000X (Goodwin 2015)
In 1989, Nokia also launched their first handheld mobile phone called Mobira Cityman 900. The biggest achievement Nokia made with Mobira Cityman 900 was its portability. It measured in only 183x43x79mm and weighed just 760g. (Goodwin, 2015)

During the period 1990-1995, mobile phone technology began to significantly develop from design and portability aspects. In 1993, IBM introduced the first phone/PDA combo called Simon. IBM Simon is considered as the first smartphone that featured mobile software applications. (Ordinary Affairs, 2015)
In June of 2000, the first mobile phone with a built-in camera called SCH-V200 was introduced to the market by Samsung. SCH-V200 equipped a 1.5-inch TFT-LCD screen and a built-in digital camera that allowed users to take up to 20 images at the resolution of 640x480 pixels. (Dpreview, 2000)

The mobile market continually grew, and in 2007, iPhone was introduced to the world by Steve Jobs, former Apple CEO. With the continuous updates to the iOS operating system and the introduction of Apple store, iPhone attracted the worldwide attention and gained sensational popularity. (The Verge, 2013)
Smartphones and Applications

Worldwide the total amount of smartphone users exceeded 1.64 billion in 2014. Moreover, the number of smartphone users is expected to reach 2.38 billion in 2017. (eMarketer, 2014) (figure 1). In conjunction with the development of mobile technology and the popularisation of smartphones, mobile applications market has been growing steadily.

![Figure 1. Smartphone users and penetration worldwide, 2013-2018 (eMarketer 2014)](image)

Currently, there are more than 1.2 million applications or “apps” available in the App Store, and 1 million apps in the Google Play store. Mobile apps market is constantly growing and the market is flooded with apps providing a broad set of features and experiences. Both app stores are expected to reach 2.68 billion downloads by 2017. (University of Alabama)
MOBILE PHOTOGRAPHY AND CAMERA APPLICATIONS

As the old saying goes, a picture paints a thousand words. Photography has been existing in our lives for a very long time, however, it has never been this popular. You can often find people taking photographs either with their digital cameras or mobile cameras. It is quite hard to imagine that there was a time when photography was only for a small group of people, those professionals who had specialised knowledge and a skill-set of photography. In the modern society, photography is for everyone. Unlike the past, everyone can easily take photos either with their digital cameras or their mobile phone cameras and be some sort of a photographer.

Mobile photography is an art form of creating images with phone cameras. Along with the development of mobile technology, the quality of mobile phone cameras has improved tremendously within a few years, and naturally, mobile photography gained huge popularity. One of the core advantages of mobile photography is that it is simple and easy. Mobile phone camera is always carried with you and it doesn’t require any particular expertise in photography. And what’s more, there are numerous camera applications that can help you to enhance the quality of your pictures quickly and easily. Mobile camera applications took mobile photography to a whole new level. Mobile photography these days can be used as a way of communicating and expressing oneself. With a phone camera, you can take and create fairly amazing pictures with just a few taps. Mobile camera apps are becoming more feature-rich and people are becoming more creative with their apps. (Gray, 2012)

Instagram cannot be missed when talking about mobile camera applications. Instagram is a mobile photo and video sharing social networking platform with over 300 million active monthly users. Only after two months of its release in October 2010, Instagram reached 1 million users. As a number one photo and video social network platform, Instagram has more than 40 billion photos shared through the app. Instagram indeed made a great contribution to the growth of both mobile photography and the camera applications market. (Instagram)

Not unexpectedly, consumers are having more and more choices than ever before, and as a result, they are becoming more meticulous and resourceful in researching apps that they are interested in.
In order to survive in this enormously competitive camera apps market, it is extremely important to fully understand the consumers’ needs and provide the best possible experience for them. (Martens, 2010) To achieve a successful mobile application, it is important to use the right medium that meets the users’ needs. Researching and understanding the needs of the users as well as the needs of the market are the first steps to build a great user experience. In order to survive in such a competitive market, you must create a high quality camera application with beautifully designed user experience and user interface. (Fling, 2009)
USER EXPERIENCE DESIGN

User experience is how a user thinks, feels and behaviours when using a product or a service. It is a fairly wide concept and it covers all aspects of end-user’s interaction with any given system. From start to finish it must provide a seamless experience all the way through. (Nielsen & Norman)

User experience design is often confused with user interface design. User interface design has a big role in user experience design, however, it is just a subset of the whole user experience. User experience design covers the overall look and feel of a product or a service while user interface design only focuses on how the contents, features, functionalities are visually displayed and laid out. (Ming, 2014)

The Importance of User Research

Every successful application has not only concise, concrete concept but also clear purpose of use and its intended customer. The concept of the app and the target user group must be defined in the beginning of a project. iOS Human interface guidelines suggests to brainstorm every possible tasks related to the main concept and list every potential features of the app that might meet end-user’s needs and interests. The list of features and tasks can be as long as it gets. The list can be narrowed down later when the target user group is determined. (iOS Human Interface Guidelines)

Giles Colborne mentions the importance of knowing and understanding users in his book Simple and Usable. It is important to fully understand the users’ worlds, cultures, preferences and their behaviours to provide the best possible experience throughout the app. (Colborne, 2011)

It is recommended to set the target user group narrow and keep it as simple as possible. It is simply not possible to create an application that meets each and every person’s need and preference. Aiming a large target group likely leads the app to become overly busy and complex. It is recommended to maintain only the core features that are essential to the app and to its target users. (iOS Human Interface Guidelines)
Thinking in user’s context is the first step to create a great user experience. Creating persona is generally a good way to start thinking from user’s point of view. Questions to ask oneself could be; Why and how would they use the app? When are they using the app mainly? Where are they and what are they doing when they are using the app? The aim of this process is to motivate and benefit the end-users. (Fling, 2009)

The Use of Wireframe

Wireframe is an essential part in the process of designing user experience. It is normally used to propose structures and screen-flows for each page of the application. Wireframe makes it possible to explore different options for the app. It draws application’s overall outline and defines the hierarchy of the app’s contents and items. Main concept and contents, and users’ needs and motivations are all reflected in wireframe. Wireframe describes how users will encounter, engage, interact with the app and achieve their goals at the end. Most of the time, wireframes are black and white. However, there are no strict rules on how wireframes should look like. Wireframes can be stretched from simple sketches on a paper to high fidelity digital graphic mockups. (Mears, 2013)

The Need of Visual Design

Visual is one of three elements that are essential when designing user experience. Visual design is a look and feel of the app. This is where everything researched and created in the previous process are visually brought together. Having visually and functionally engaging user interface helps users to be more interested and motivated to interact with the app. In other words, great user interface helps users to have great user experience. (Anwar, 2015)
USER INTERFACE DESIGN

User interface design is one of the most important elements in user experience design. It is the first thing users see and interact with. User interface can be defined as a space where the interaction between a user and a system takes place. (Moreno, 2014) While experiencing user interface, users build their first impressions of the app and set expectations of what the app will be like. User interface creates an image of the app and gives users an idea of what can be expected from using the app. While user interface needs to be designed with a focus on the overall user experience, there are fundamental principles of user interface design.

Qualities of Great User Interface Design

Clarity

Clarity in user interface design helps to avoid ambiguity by making everything clear through language, icon, hierarchy, etc. It is unarguable that clear interface is a better interface. A clear interface doesn’t require a manual and is obvious enough to make sense even to a new user. It simply doesn’t make users think. (Byttebier, 2015)

Users should be able to recognise the meaning of each element. Each element should be clear and make sense. Clarity is important because it motivates and inspires users to interact with the app more effectively. It is important to make sure that users can easily recognise their tasks and interact with the core contents and functionalities of the app. (iOS Human Interface Guidelines)

Conciseness

While it is important to keep clarity in user interface design, it is also important to ensure that things are concise. Having too many things on the screen only makes it difficult for the users to find what they really need and want, and so the interface becomes
confusing and tedious to use. The real challenge is keeping it clear and concise at the same time. (Fadeyev, 2009)

**Simplicity**

Simplicity in user interface design means it is reliably fast and easy to use, and also, adaptable. It is convoluted to design a great user interface for mobile applications because of the characteristics of mobile. Mobile applications are mostly used on a relatively small mobile screen and in rapidly changing environment. Simplicity ensures that the users can easily and quickly understand and use the app. It is important not to confuse them at any cost. Users don’t want to spend their time thinking and wondering how to use the app. Simple user interface helps users to easily and quickly engage with the app’s core contents and features. In case of an application with a broad set of features, simplicity can be achieved by leaving out non-essential features and elements. However, one must keep in mind that blindly pursuing simplicity in user interface can lead to a drop in overall user experience aspect. (Krug, Don’t Make Me Think: Re-visited, 280)

**Consistency**

Consistency is one of the most fundamental design principles for great user interface, and, ultimately, for great user experience. Consistent user interface is predictable and comprehensible, and creates a feeling of familiarity. Keeping the user interface consistent throughout the application allows users to expect what they are getting by using the app. Consistent user interface and user experience can be achieved by maintaining consistent visual and text elements, contents, and interactions. Colours, typefaces, layouts and positions should be used consistently from beginning to end. User interface design patterns can be used to ensure consistency. (Smith, 2010)

**Familiarity**

Even if someone is interacting with the app’s user interface for the first time, certain elements can still be familiar. You can use real-life metaphors to communicate mean-
ings to users. For example, folder-style tabs are often used for navigation on websites and in applications. People recognise them as navigation items because the metaphor of the folder is familiar to them. (Jin, 2010)

Feedback

User interface should always give immediate feedback to the users. Clear and instant feedback can improve user’ overall experience and satisfaction. It is important to keep the users informed of their, or the app’s, actions and any changes so they don’t get confused. Whenever they do something, they should be able to see what happened, or even what is happening in case there is loading time. (Mogensen, 2012)

 Forgiveness

Everyone makes mistakes. How the application handles mistakes, unexpected errors and situations will be a test of its overall quality. Is it easy to undo actions? Is it easy to recover accidentally deleted files? A good user interface doesn’t punish users for their mistakes but should instead provide the means to remedy the errors. (Janko, 2009)

Visual In User Interface Design

Layout and Position

When designing layouts for a mobile application, one must consider the importance of each item and elevate those more important elements. Users should be able to find the relevant portions when viewed at a glance through the layout. It is recommended to position most important elements in the upper half of the screen. (iOS Human Interface Guidelines)
Shape and Size

Shape can be used to differentiate elements; for example, by varying the silhouettes of icons to make them easier and quicker to recognise. Size can be used to indicate importance, bigger elements being more significant. (Usability.gov) Making the most frequently used controls bigger will make it easier for the users to tap on them, and thus improve the efficiency of the interface. (Smith, 2012)

Colour

Colour is usually the first thing users notice. It is one of the most important elements in most design fields and it is no different in user interface design. Colours enhance communication and help to build strong visual image for the app. They not only create overall atmosphere of the app, but also deliver the app’s core message and set expectations in users.

Colour affects people in many different ways. It evokes different emotions in people, so to speak. Some colours might have different meanings in different countries and cultures. Understandably, each person perceives colours differently. Ergo, before choosing colours for the app, it is important to think about how the colours will be perceived in users from different countries with different cultural backgrounds. (Fling, 2009)

Just like any other products or brands, mobile applications have their identity colours. Identity colour, a key colour, influences the overall image of the app. Using the right key colour that fits the concept of the app is important when designing user interface. Colour is a very powerful tool. It could be a great help to create better user experience in a way that it evokes positive emotions in the users and gives more character to the app, or it could be more of a misleading mistake. (iOS Human Interface Guidelines)
Techniques of User Interface Design

White Space

White space is an empty space between various elements on the screen. White space is a great tool for building relationships between different elements and balancing the layout. White space can be created by grouping related items and controls, and building hierarchy of items on the page. White space is often used to draw attention to the core content and to clarify relationships between elements. (Cao & Zieba & Ellis, 2015)

Animation

Animation in user interface can draw attention and make the application more enjoyable and delightful. It can be used when colour and contrast alone aren’t enough to attract attention or visual continuity. The human eye is attuned to movements, especially when it’s happening on a static background. Animation is especially effective when used in a situation where something crucial happens and it is important the user notices it. (Anthony, 2015)

Depth and Focus

Another great way to focus user’s attention on one area is to use shadows and darkened backgrounds. For example, shadows can be used around pop-up menus and modal windows, and act as blankets that block out visual noise around the window. Shadows decrease the contrast of elements that lies under them, which in turn increase the contrast for the items they are used for. (iOS Human Interface Guidelines)

Verbs as Labels

When using an application, users will be thinking in verbs. “I want to save this file”, or “I want to update this entry”. When building dialog boxes, or any other type of user
prompt, it is wise to use verbs rather than exclamations such as “Yes” or “No”. When the users see options like “Okay” or “Cancel”, they will have to read the message above to understand what they are being asked to do. If the choices are presented as verbs, for example, “Save” or “Don’t save”, it becomes clear to the users what they are being asked without them having to read the accompanying message. (Fadeyev, 2008)

**Iconography**

Every application needs a well-designed app icon that carries the essence of the app. The app icon is the first impression of the app the users get. Icons can be used to simplify the interface and to make it look more visually appealing. Although icons are almost always less clear than words, when implemented correctly, they make the interface much easier to use. (iOS Human Interface Guidelines)

**Typography**

Typography for mobile requires a careful design decision. The main purpose of using text on a mobile app is to help and guide users to achieve their tasks and goals. Needless to say, the text should be legible. It has to be brief and clear. Mobile screens are relatively small and have limited space for typography. Size of the text, length of the text and space between, and around, the text should be designed with consideration for legibility. (TechArk Solutions)
DESIGNING GIF VIDEO CAMERA APPLICATION

To carry out the background knowledge into practice, I designed a new mobile camera application. The application is designed based on iPhone 6, iOS and, this paper covers the general user experience and user interface visual design part of the app.

Concept and Target Audience

The first idea I had in mind was to design a fun and easy-to-use mobile camera application. Once I got the rough idea for the application’s concept and target audience, I did a little research on the current camera apps market and tried out several different entertaining camera apps. And later the concept was narrowed down to a gif video camera app with moving stickers and filters.

Moving stickers allow people to be creative and create interesting images, and most importantly, they are fun. Stickers have been one of the most popular features in Asian apps, mostly in Asian messaging apps. The biggest mobile messaging app in Korea, KakaoTalk introduced their first sticker feature in December of 2011 with only 6 stickers (Jung, 2013). And in 2012, a Korean internet content service operator Naver also introduced stickers as one of the social features for their messaging app Line (Ghedin, 2013). Ever since, stickers have been widely used for mobile applications as a form of communication in East Asian countries.

The target audience of the app was both men and women of age 15-45 who reside in East Asian countries; South Korea, Japan and China, occasionally enjoy taking selfies and share them with others. As far as I am aware, these three countries, especially South Korea and Japan often share similar tastes and preferences for mobile applications (picture 6). And above all, I was certain that, as a Korean myself, I would be able to understand the users better and see things from the user’s point of view.
Wireframe Prototype

Once the concept and the target user group were determined, I needed to think about the interactions and the overall flow of the app. I started with some quick sketches on a paper. However, drawing was never my thing. After a few attempts to draw what I visualize in my mind, I decided to jump right into graphic mockups.

PICTURE 7. Wireframe prototype
Visual User Interface

What I always thought and felt while using the apps from Asia, mostly from Korea, is that they tend to use very strong colours and lots of graphical elements in their apps. And what I learned while researching the market was that contents like moving stickers could make the app more likely to be busy and messy.

The application I had in mind from the beginning was something simple both visually and functionally. So the challenge was to bring everything together and keep it as simple as possible, and at the same time, most importantly, not to forget that the target users.

Design Process

I first built layouts for each screen to get a better idea of the overall atmosphere of the application. In order to build simple, balanced as well as sophisticated layouts, I put emphasis on creating white space.

Based on the wireframe I created in the previous stage, I placed sample icons on the screen and moved them around, increased and decreased size of each icon numerous times until I found the best possible fit. Regarding icons, there were several different options available and it was worth considering to use some of the most common icons that could be more familiar and make more sense to the users. However, I decided to be a little bit experimental as I wanted the application to be original and be differentiated from other similar camera apps.

Given the fact that the target users are likely used to having or seeing strong colours in their apps, it was hard to decide whether to use colour for icons and texts or not. However, I decided to use one colour for every items on the screen.

I used white icons with a little bit of drop shadows to increase the depth and focus and to make it more distinguishable and noticeable. Furthermore, considering the importance of each element, I made a distinction between them by increasing either the size or the thickness.
Typography in the application is kept to a minimum. With the legibility in mind, the font Helvetica Neue was used. For the titles of the application’s each page, I used Helvetica Neue Condensed Bold with 30 point font-size, and for the secondary texts, Helvetica Neue Regular with 18 point font-size was used. The reasons for using the font Helvetica Neue is that it fits well with the concept of the application. Most importantly, it is legible, and at the same time, it brings out the other graphical elements and the core contents of the page without getting in the way of the user’s overall experience using the app.

Mockups

PICTURE 15. Viewfinder screen (left) and Done & Finished screen (right)

The app’s main screen Viewfinder, and the final screen Done & Finished are designed to be fast and simple, and most importantly to be visually and functionally consistent. Users can still access filters and stickers while recording and even afterwards to change or add something. Users can also add background music or sound effects as they want.
The filters can be previewed in real-time already in the list page so that there is no need for users to tap each filter to see its effect.

The stickers are categorized according to themes and each category contains a number of moving stickers. They can be previewed in real-time.
The app provides a list of free sample music. Users can preview any music on the list by tapping on the play button. Users can select music and add it to their recorded gif video by tapping on the other areas of each item.
CONCLUSION

Nobody wants to use a hard-to-use product when they have a numerous amount of other better options in the market. The competition in the mobile apps market is growing continually and the need of flawless user experience and intuitive user interface is increasing accordingly.

This thesis contains a theoretical framework on user experience and user interface design as well as a practical end result – a gif video camera application. In order to build foundations of the thesis, a comprehensive research on the subject was carried out. This thesis, however, leaves much to be desired, to say the least. What I think it boils down to is that the thesis project had limitations in user research. More time and effort needs to be invested into user research to fully understand them and ultimately to design ideal user experience and user interface for the end users. The focus on the needs of the users should be maintained throughout the design process. It was unfortunate that the application’s substantive development part could not be covered in this thesis. However, the development of the application will be carried out at the earliest opportunity.
REFERENCES

Anthony. 2010. Simplicity is Not Overrated, Just Misunderstood.
http://uxmovement.com/thinking/simplicity-not-overrated-just-misunderstood/

Anthony, R. 2015. Will animation be the big UI trend of 2015?

Anwar, U. 2015. 5 Ridiculously Common Misconceptions about UX.
http://www.sitepoint.com/5-ridiculously-common-misconceptions-about-ux/

Byttebier, T. 2015. A clear interface is a better interface.
http://thomasbyttebier.be/blog/a-clear-interface-is-a-better-interface

http://www.fastcodesign.com/3046656/why-white-space-is-crucial-to-ux-design

Choi, YJ. http://m.blog.daum.net/kcc1335/4808

http://www.dpreview.com/articles/1013905500/samsungdigiphone

eMarketer. 2014. 2 Billion Consumers Worldwide to Get Smart(phones) by 2016.
http://www.emarketer.com/Article/2-Billion-Consumers-Worldwide-Smartphones-by-2016/1011694

Fadeyev, D. 2009. 8 Characteristics Of Successful User Interfaces.
http://usabilitypost.com/2009/04/15/8-characteristics-of-successful-user-interfaces/-clear

Fadeyev, D. 2008. 10 Useful Techniques To Improve Your User Interface Designs.
http://www.smashingmagazine.com/2008/12/10-useful-techniques-to-improve-your-user-interface-designs/


http://www.theguardian.com/artanddesign/2012/nov/16/mobile-photography-richard-gray


Instagram. About Us. https://instagram.com/about/us/

iOS Human Interface Guidelines. Color and Typography.

iOS Human Interface Guidelines. Designing for iOS.

iOS Human Interface Guidelines. From Concept to Product.


http://www.uxbooth.com/articles/less-is-more-simplifying-your-user-experience/

http://theuxreview.co.uk/wireframes-beginners-guide/


Nielsen, J. & Norman, D. The Definition of User Experience.
http://www.nngroup.com/articles/definition-user-experience/

 Ordinary Affairs. 2015. When were cellphones invented.
http://ordinaryaffairs.com/when-were-cellphones-invented


http://www.uxbooth.com/articles/consistency-key-to-a-better-user-experience/

TechArk Soultions. Typography an Important aspect in mobile app design.
http://www.gotechark.com/typography-important-aspect-mobile-app-design/

University of Alabama at Birmingham. The Future of Mobile Application.
http://businessdegrees.uab.edu/resources/infographic/the-future-of-mobile-application/

The Verge. 2013. iOS: A visual history.
APPENDICES

Appendix 1. Icons for the application

Appendix 2. Screenshots for the application
Appendix 3. iPhone mockups for the application
Appendix 4. Wireframe for the application