



# Design of Mobile Applications

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## I. INTRODUCTION

Design has proven to be of great importance, and it is inadmissible to invest money and effort in something that has a bad taste. Even more important is the design of a mobile application that is used by modern users with modern devices looking for convenience, practicality and beauty.

The truly good design of a mobile application combines well-structured information, navigation, functionality, usability, or more precisely, great user experience.

Simple design is subordinate to a basic and clear idea, not a lot of ideas. This is the best way to grab the user's attention. It can also help the user decide if he is interested in the application. By presenting all possibilities and functionalities in a right and well-planned way, people will be given the opportunity to choose the right application for them.

Centralizing the idea and concept should be recognized throughout the whole project. All users are very individual. They have a different level of knowledge, competence and desire to discover new things. For these reasons, the basic idea of the design should be recognizable and uniform in the deepest parts of the application. The vision of application must be harmonious. This way, people will feel comfortable, they will feel that they master the application.

## II. BUILDING USER INTERFACE

All of us as end-users are working with different types of interfaces - sites, mobile devices, TVs, clocks etc. Where there is a user, there is also a user interface. Logically, where there is a confused user, there is a bad interface. The task of any graphic design is to create a good-looking but user-friendly environment that users can enjoy. For this purpose, the developer need to think from the point of view of users and the way they would like to use an interface. Professional development of user interfaces is not just putting a few buttons and links. Things are much more complex, they are a homogeneous mixture of art and science. With the latest trends in mobile applications design, the basic idea is simplicity. The tendency to remove details from the screen is a difficult task. "Simple does not mean less" is very true when speaking for design. Simplicity can also be used to achieve goals, giving only what is needed to people[3]. When building the user interface, there are also additional issues concerning working with the application that should be pay attention to.

## QUICK AND EASY REGISTRATION

We live in the hectic digital era, where consumers are "spoiled" with numerous mobile apps, websites and digital services. If they have to fill in a long form to use an application, they may lose interest and quit. Registration must be quick and easy so that it is not felt by the user. On the other hand, collecting specific user data from an early stage is absolutely necessary to optimize the user experience of a successful mobile application.

The registration process should be made as easy as possible. Here are two options for registration:

- Signing in without creating a new user but using an existing account. One of the easiest ways to implement this method is to offer users to link their existing account (Facebook, Google, Yahoo) with the application, and use the data needed for login. For most people, linking the application profile to one of the social networks is extremely convenient as they are among the most commonly used online platforms right now.
- Enabling users to become well acquainted with the mobile application before they have to sign in. It's a good idea for users to get to know at least a part of the application, to get to know the different features and evaluate them. This will give them confidence and will even motivate them to make a registration. This tactic is well-tested, especially in online stores, where users can browse, add goods in the cart, and register only when they want to make the purchase.

## NOTIFICATIONS AT THE RIGHT TIME

One of the main tools for reminding users for a mobile application is to send notifications [2] when they do not use it. So-called "push notifications" are extremely effective, but only when their sending is consistent with user habits. Statistics show that in 63% of cases notifications are not sent at the right time, and people simply ignore them. Several effective tactics that give good results are:

- Sending useful information at a particular moment. It is not difficult to determine the time from the day when users have the best chance to pay attention to a notification and to open the relevant mobile application. The habits of the people who would use the particular application should be learned. If the application is for ordering food, for example, it is logical to send notifications around noon or in the hours before dinner. A fun-related app will attract the most users with timed notifications outside of work hours, preferably right after work and later in the evening.
- Reflecting the context of the specific time of the day. To take an example with a news mobile application. There are many events happening during the day, but it is nice to determine which ones are important to users and send notifications for them. At work, most people would only pay attention to news that specifically touches them, such as traffic jams, emergency power cuts, and tax changes. In the later hours, notifications of sporty and curious news have the greatest effect.

## III. SELECTING COLORS

The color palette is often considered the most important aspect of a mobile application after the functionality, of course.

Interaction between people and computers depends to a large extent on the graphical elements of the user interface and their colors, respectively. They help users understand the content, use the various components, and perform actions. Each mobile application has a color scheme that indicates which colors to use and where. One of the main decisions in the development of a new mobile application is the choice of color scheme. There is no doubt that colors play a major role in guiding users within the screen area and the mobile application as a whole, but sometimes for the sake of clarity, they should be used in conjunction with other methods to make communication more effective. This includes indicators, creating a sense of density and realism of the elements, which is characteristic of the material design, well-known symbols and even text that gives a direct description for a specific action. When choosing an effective color scheme, a number of factors, including the distinctive color of the brand, and the psychological significance of the colors, must be taken into account. Colors must be selected to create a lasting association with the brand and its products and to impact strongly on the particular target audience.

Simpler color combinations are most effective for improving users experience as they do not burden the eyes and allow people to concentrate on the content. Variegated mobile apps may look fun, but they are definitely not easy to use. Studies have shown that most people's preferences tend to combine two or three colors.

Typically, a color element or section does not appear on the screen alone, it is always next to or on other colored details. In order to be distinguished, they should be colored with different but close colors, thus creating a contrast. The level of contrast is determined by how different one color is from another. When properly used, this effect reduces eye strain and directs users' attention by clearly distinguishing the components shown on the screen.

For easier reading, two colors with low background contrast and font should be used. Reading is difficult, especially when the user uses the smartphone or tablet's mobile application outdoors and the light is bright.

Using a high contrast ratio between colors gives users greater convenience. The contrast ratio shows how different one color is from another, for example 2: 1 or 20: 1. The larger the difference between the two numbers, the greater is the relative intensity of the light between the two colors.

The main contrast ratios most commonly used in designing mobile applications are:

- For a small font, a contrast ratio of 4.5: 1 is recommended for the background.
- For a large font (18 pt. standard or 14 pt. bold or larger), a 3: 1 ratio is usually applied for the background.

Abiding to these rules makes it easy for all users to read text, including those with visual problems, including color-blind. Typically, icons and other important elements are also in the same contrast ratios. This achieves not only higher aesthetics, but also users feel more comfortable when using the application for a long time.

But when it is necessary to attract the user attention, high contrast should be used. Designers of mobile apps use this

technique to draw attention to certain elements on the screen. Higher contrast is the best solution for highlighting important content or other key components. If the goal is, for example the user to touch a button, its color must be in sharp contrast to the background and the surrounding elements.

#### IV. BUTTONS DESIGN

Every design of a mobile application is unique in its nature, but this does not mean that it should not follow principles which ensure user interface usefulness and user experience satisfaction. Buttons are one of the main elements of the user interface. They are part of the interaction between the user and the mobile application, so their importance should not be underestimated. Experienced designers always form the buttons so that they match to the experience and intuition of the application users. All buttons have a clear mark, either in the form of words or a symbol. They must be easily found within the screen, their position is in accordance with the user's path [5]. For directing people to take action that matches their goals and those of the brand, buttons with more visual weight should be used.

Users understand that a visualization of a mobile application design is a button when it comes to "hints" of real buttons like shape, brightness and volume illusion. It is important to note that a large number of users already rely on their previous experience of working with interfaces and developers may borrow good practices from other applications.

#### SHAPE

The standard button shape in the UI is the rectangle with rounded edges. Recent trends in design show that more modern variants, a rectangle with tapered angles, are becoming more and more popular. With the introduction of the floating buttons in Android mobile apps, the round shape is also very popular and universally accepted. Experimenting with other forms is always an option for designers as long as they are easily recognizable by the brand's consumer audience. The main condition for creating the buttons is the sequence. It is a good idea the choice for shapes to be limited to two or at most three as their style should be the same. It is also a good idea their dimensions do not differ significantly. Thus, users are intuitively orientated which interface element is actually a button.

#### SHADOWS

When shadows are used in the right way, they make the mobile application buttons stand out from the background. These elements appear slightly raised, which in turn provokes users to push them. Even very slight shadows have a positive effect on the orientation of the users.

Users avoid interface elements that do not have precise mark. Each mobile application button must therefore have a clear mark or icon. In this way, users are quick and easily oriented. The designation of each interactive interface element, including a button, must always be related to what it will do for the user. When users understand exactly what will happen, they feel comfortable and get the confidence to push the button. Therefore, it is important to use verbs with exact meaning, not exclamations or other vague words and phrases. When the verb is part of a phrase, as in "Create Account", it should be used in its entirety for clarity, even if the button becomes bigger. In order to have the layout aesthetics and well arranged the size of the button can be aligned with that of other related items. If it is part of a fill form, it may be the same size as its fields.

When creating a native mobile application, the developer team follows the user interface guidelines established for Android and iOS. This achieves a consistency that creates user convenience and saves time. Users feel comfortable when they are accustomed to a certain look of the buttons and so they recognize them more easily. Of course, using the buttons as part of the navigation is thoroughly tested by the developer at the prototype level, which will achieve the best possible results.

Easy use of buttons is more difficult to achieve in mobile applications, given the different screen sizes of smartphones. That's why it is important carefully to choose whether the size of the button to be fixed or floating

#### **SIZE AND DISTANCE**

First of all a button must be dimensioned with the rest of the screen elements. At the same time, it should be large enough to be finger-friendly. When determining its optimum size, data on the width of the cushion and the fingertip can be used. The cushions are on average between 10 and 14 millimeters wide and the toe tips between 8 and 10 millimeters. We can conclude that a button with a minimum size of 10 by 10 millimeters will be convenient to be pushed by all members of the target audience of the mobile application.

This data should also be taken into account when determining the distance between two buttons that are adjacent. This usually happens when the user can take two separate ways of action. The distance must be large enough to prevent the wrong push.

#### **VISUAL FEEDBACK**

Designers are also focused on the interaction between the user and the button. As an interactive design element, the button can have at least two states - not pressed and pressed. Visual feedback provides information about its condition. This is a basic principle of material design [1] that seeks to continually improve consumer experience. There are several basic techniques that can be used. The buttons that are active and can be pressed are in bright color. Those that are not available are usually in the same color, but are pale or light gray. Among the main ways to mark action, is animation. It is common practice to press an active button to blink, indicating that the user's desired action is performed.

The design should put the emphasis on the most important elements and, when it comes to buttons, the emphasis should be on the key actions the owner of the mobile application wants users to take. Through effective use of color and contrast, people's attention is directed to these actions. The button should also be in a prominent place, especially when it comes to viewing the tablet application.

#### **CALL TO ACTION (CTA) BUTTONS**

So-called CTA buttons are designed with a purpose to push users to take the action they want, to attract attention and to induce action, they must be in bright colors, contrasting with the surrounding elements. There is no need the color to be shrill and absolutely different. If there is such a button type along with others on a screen as part of the application interface, the rest can be in fainter colors in the same tone and even in more dead ones such as gray.

#### **VISUALLY HIGHLIGHT PRIMARY AND SECONDARY BUTTONS**

When users have a choice between two actions and two buttons respectively, visual directing to the company's needs

can be used. This is not only a win-win marketing tactic but also creates user-friendliness by taking the eye off. The primary action button must have a higher visual weight. It should dominate the other visually. This is achieved mainly by using a brighter color and a higher contrast, and a larger size can be added if the design permits. Secondary action buttons should logically have less visual weight, thus optimizing the brand's ability to achieve its goals and directing users in the direction it desires.

#### **V. TYPOGRAPHY IN DESIGN**

Some experts believe that typography is 95% of the mobile application design. This statement may be somewhat extreme, but the importance of this component cannot be denied. Optimization of typography means optimizing the accessibility and usefulness of the application as well as the balance of the graphical composition and hence of the user interface and experience. This is because the text remains the main way to communicate with users at the moment. The size, weight, color and style of the font must meet the application's objectives and its characteristics. So the end result will be as good as possible.

The purpose of the text, as one of the main communication tools, is to establish a connection between the application and users so that they achieve their goals. Its effectiveness depends not only on content but also on typography - the style and the appearance of the font. There are no strict rules or steps in a particular order that have to be applied when choosing a font. It happens quite often the designers' opinion not to be one and the same when choosing a font. However, there are some basic guidelines for choosing the typeface and layout of the text, leading to the best result.

#### **FONT SIZE AND LINE LENGTH**

Font size and text layout have a huge impact on user experience, including reading the screen. Small and concise text is hard to read and can refuse the user to get to know the content. So he can miss essential information. The problem is further exacerbated by the small screen sizes of some devices. Therefore, two of the most important prerequisites for good typography are the correct size of the letters and other symbols and the length of the rows.

The size of the font should be large enough to be easy to read. As for the number of characters per line, it is best not to exceed 30-40 on the device screen. Consumer comfort is a leader, account must be taken of users' characteristics such as the age or environment in which the mobile application will be used. If a target audience is mainly made up of children or users will use the application primarily when having fun with friends, a larger font and a correspondingly fewer number of characters per line may be considered.

#### **DISTANCE**

When it comes to small screens, empty space is of particular importance. When the distance between the lines, between the text and the lines on the screen is greater, reading becomes easier. Typically, it is between 10 and 20%. It is also a good idea the distance between the paragraphs to be larger so they can be easily recognized and the users not to have a sense of congestion with information.

## COLOR

Color and contrast help make text easier to read, regardless of the amount of light at the user's mobile application location. There are two different views on how to choose the color and contrast. The first is that greater contrast makes reading easier. The classic solution is based on this principle - a black font on a white background. The opposite view is that excessive contrast actually loads sight, tired of eyes, especially when one reads a text longer. Therefore, gray is often preferred. Determining the level of contrast is a complex task. Due to the differences in screens of many types of smartphones and tablets and the environment they are used in - from a sunny day to a low-lighted street at night. The solution is to adhere to content accessibility standards designed to help all users, including those with vision problems, read the text of the mobile app. According to them, the contrast between the color of the text and the background on which it is located must be between 1 and 21, depending on the intensity of the light emitted by the screen.

## FLEXIBILITY

In mobile applications with predominantly written content, which in most cases is long, users can be given an option to increase and decrease the size of the text they read. In such cases, a few basic rules must be observed that practically prevent people from making the wrong choice. The smallest possible font size should not be less than 11 pt. Also, the weight should be either standard or average. This is because the light and heavyweight fonts make the text difficult to read when the font size is small. Changing the font should not result in high density and overlapping of the text.

## FONT STYLE

The choice of font style is huge, and new and new fonts are being invented every day. For beginners, it is necessary to determine how many fonts to use in the design of the mobile application. It is advisable to limit them to one or two. This avoids fragmentation of application and content. Most fonts can confuse users and create tension and load. This "limited" choice does not mean, however, that typography will be boring. There are many creative ways to achieve aesthetics and uniqueness.

First of all, the style of the font should match the overall look of the mobile application design and, accordingly, the tone and mood it will set. For example, if major design elements are large and bright images, the font should be simpler and lighter [4]. This way they will be able to stand out even more, and at the same time, users will get the important information in a clearer way.

When selecting a font, "technical" criteria are applied - the symbols must be clearly distinguishable and easy to read. The more practical fonts actually work better than the decorative ones, because they help in clear communication, and it is a top priority. In this line of thought, there is nothing wrong with choosing a conventional style that is often used. It can be uniquely designed by size, weight and color. When combining fonts, the goal is to achieve a visual hierarchy, as well as making text more readable. You can choose one title font and another for the text. Their styles must contrast, but not too much. The idea is to direct users' attention to the right places while preserving the integrity of the content.

## VI. CONCLUSION

Mobile app design is not like web design. Sure there's color theory, setting type, and maintaining grids, but there's so much more to consider when the device changes. Designers often say that great design is invisible, people who use it focus on their own goals and not the interface. The designers should strive to create invisible interface because such interfaces satisfy users needs and deliver great user experience.

## VII. REFERENCES

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