User-centered based application concept development and evaluation

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Abstract

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The thesis is about redesigning existing app. The thesis consists of two parts: the product that was created for the real customer and the report describing the background studies and detailed product creation process. The goals of the thesis are to show the importance of the covered topic and to create a successful product at the end using preliminary studies and preparations.

The report part covered background theory about such fundamental design topics as: User Experience, User Interface, Usability, User-centered Design and design tools. The author opened up each topic by summarising knowledge from trusted sources.

The final product is the app design prototype that was requested by the self-service car wash company (called "SAM") that is located in Russia. The author created the app by following all design stages: research, data analysis, design and prototyping. User testings were conducted as the final stage of the project. The author invited three users for final test and asked them to perform certain task with the final prototype while observing them. Each test was video-recorded for futher analysis and error recognition.

Based on the final user feedback and test results, the project was succesfully completed: users were happy with the final product and managed to accomplish all given tasks. The project had a big potential and made a contribution to self-service car wash "SAM" business. New app is an opportunity to grow new customers as well as to keep customer loyalty.

Implementation of the thesis was carried out following Haaga-Helia guidelines and rules and under supervision of academic advisor.

Keywords
User Experience (UX), User Interface (UI), mobile app, usability, self-service carwash

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1. Introduction

The thesis topic is "User-centered based application concept development and evaluation" and the main objective is to use the research to dive deeper into the topic in order to be able to create a truly working and useful product in the end. The real case of app redesign was used for this thesis.

The executive from self-service car wash contacted me and requested to redesign their mobile app. The company "SAM" is located and operate in Russia (original name in Russian "CAM"). It has 7 physical spots around the city Tula and region. "SAM" provides contactless self-service car wash services where customers come to a physical place and use the provided equipment to wash the car themselves. The company's vision is to provide customers with great results through fast, qualitative and at the same time available for everybody service.

Digital components: company has the website and the app. On the website one can find all information about the company, instructions for provided services and physical locations on the map. The app was created for digital token sales several years ago, but in practice customers do not use it.

Initially, the app was created to provide customers with more useful and fast ways to buy tokens, and as a result, increase the number of customers and sales. Unfortunately, it was not designed properly and customers used it very rarely because the process of buying digital tokens in the app was unclear and time-consuming. That is why an occasion for update has arisen.

Starter requirements for the app redesign from the company were:
- Provide fast and easy way to buy tokens
- Possibility to make several orders at once (for several car wash sessions)
- Easy navigation (show customers the closest car was)

The list of requirements will be checked and expanded during the research stage.

The thesis is product-oriented which means that its methodology consists of two parts that complement each other: the thesis report and the product itself. The product itself is the redesign for mobile app that was created for real customer. And the thesis report includes the theory part that links the final product with relevant background knowledge.

Thesis report includes background studies of such topics as: User Experience and User Interface - the importance, principles and the workflow, Usability, User Centered Design

and design tools. Further, all the background knowledge was applied in practice when creating my product and also product creation stages were described in my report.

The step-by-step project plan as below:

- Background study and Research (aimed around User-centered Design approach)
- First user testing
- Interview
- Transcript coding
- Persona
- User Stories / Scenario
- Information architecture
- Moodboard and general style concept
- Sketch Low-fidelity (lo-fi)
- High-fidelity (hi-fi)
- Prototyping
- Testing
- Handoff and Product Launch

Author would like to note, since the company is located in Russia and mostly used within Russian audiences, all interviews, prototype and testing were initially implemented in the Russian language but it was translated to English for this thesis work.

2. Research Question and Research Method

The final product and the main goal of this thesis is an updated version of mobile app.
This research opens up such questions as:

Why is there a need for mobile app at all for a carwash?

How new concept will appeal the user?

 Let us take a couple of steps back and look at the customer flow when he just entered the self-service car wash.

 To be able to use the service, one needs to:

- Either buy "car wash token" from the token-machine (works with cash only)
- Or buy a "digital car wash token" (QR-code) from the app

Circumstances where a customer does not have cash happens every day, especially with first-time clients like passing by truck drivers. The truth is that these days we do not even carry bank cards with us anymore when we leave the house, and cash is even more of a rare thing. That is why such digital solution as a mobile app brings a lot of value to my client.

Nevertheless, customers find the process of buying digital tokens too complicated because the current app is unclear and hard-to-use. Quite often they just get lost in the app. For the client it means loss of client loyalty as well as loss of new clients and as a result - loss of money.

To sum up, an updated mobile app could become the main piece in the customer flow and a great solution for the problem. As the main priority the client wants to make this app easy-to-use and the process to be "buy-in-one-click" - fast and efficient. In addition, during the interview were found other cool features that the client would like to add to interest and benefit his customer. Interview and the findings will be covered in further chapters.

As it was already mentioned in the introduction, the thesis is product-oriented and its methodology consists of related researches and the creation of final product based on the background studies. Both parts were completed according to User-centered Design (UCD) approach which is based on fact that it always puts user in the center and (SPRING2 innovation, 2019). It includes such methods as interviews, user persona creation, analysis, design and testing. Author covered UCD approach in more detail it in further chapters.

3. Related Researches

For related researches author covers the meaning of design in modern world as well as such topics Usability and User Centered Design. Besides, User Experience and User Interface topics were opened up through definition, fundamental principles, examples, design workflow and design tools.

3.1 Definition of Design

Thinking about design, what comes to your mind first? For most people, design is associated with the way something looks, with the feelings they have when touching or observing things. Good design equals something pleasant and beautiful (Design Disruptors, 2016). Most likely, thinking about design, we imagine some physical object or recall performing some task that gave us that moment of joy and appreciation of the beauty of design (remember unpacking a new iPhone or any other Apple product). Sometimes, design is also associated with something frustrating and unclear- we all know that moment when you come to open the door and try to pull it instead of push.

Steve Jobs used to say that he does not know what design really means since it is a complicated term including a lot of components. He believed that design is more about how things work than the way they look (Rajaan 2018.) Such an approach shows the real meaning of design in the industry: there is a huge process hiding under just a beautiful picture and a pleasant feeling. Being that, great design is invisible - it is transparent, but as soon as we are in touch with it we already know how it works without thinking about it.

Proto.io collected 44 inspiring quotes from the world's greatest designers and I found valuable to examine their thoughts about design. An interesting fact is that many designers used the phrase "problem-solution" in their quotes (Proto.io 2016). To sum up, they all claim that design is the way you communicate with users, through creativity, through visuals and through a complete understanding of needs. It is a process that most importantly serves to solve user problems and get things done more efficiently.

On the other hand, Don Norman who is famous for his work in the design and psychology industries claims that good designers should not only solve problems and reduce frustration, but also bring joy and happiness to people. He describes design as a total experience that brings emotional satisfaction to people (Norman 2013, 293). Experience is the key to success, and this topic will be covered more about it in next chapters.

As was said in the documentary Design Disruptors (2016), "Design isn't finished until somebody is using it". This documentary shows that even though designers have a huge power to transform ideas that are floating around to something real, the biggest challenge is still how to design less for yourself and more for people who are different from you. Design is about touch points people have with your product or service and that is why people should always be in the center. Furthermore, the documentary covers the business side of the field. The Role of designers is constantly changing, because technology changes and business changes too. Designers make choices that at the end affect billions of people and as a result either benefit or detriment the business. Therefore, designers should be involved in business processes and take one of the main roles in decision making.

Looking at different opinions of many great designers one can make an output that design has a lot of definitions because each person sees it differently and each definition is correct. Nowadays, we live in a digital world and that is why in the thesis, the attention will be paid mostly to the meaning and the purpose of digital design (in other words design in the IT world). Digital design includes lots of sub-categories such as visual design, user experience design (UX), user interface design (UI), graphic design, animation design, and much more. Topics of UX and UI design will be covered in next chapters and to see in practice how design choices can influence company success and business in general.

3.2 User Experience

User experience is the first fundamental topic of my research. In this chapter will be discussed the importance and fundamental principles of the topic, showed good and bad examples of user experience and went through common user experience designer workflow.

3.2.1   Definition

UX stands for User Experience. This term was first mentioned by "the father of design field" Don Norman around the 1990s (Allabarton 2021.) Norman also wrote the book "Design of Everyday Things" where he highlighted the importance of usability and human interactions with products / services and their experiences.

There are tons of different definitions and interpretations of the term UX. I will use the official one that Allabarton put in her article (2021), "A person's perceptions and responses resulting from the use and/or anticipated use of a product, system or service". In simple words, UX is the overall experience and feelings that a person (user) has while contacting a product or service.

UX is like a science that constantly investigates the users through research and testing to be able to give them exactly what they are searching for. The product is easy and enjoyable to interact with if it has good UX, and hard or unclear to interact with if UX is bad, that is why this experience must be the best possible. Talking about what makes UX good, Mathew (2019) in his hackernoon article notes three main aspects:

- Usability - user should always see how to get from point A to B;
- Accessibility - such as clear navigation and proper buttons position;
- Value - it all should make sense to the user.

There will be taken a deeper look at these three aspects in usability chapter.

3.2.2 UX process and stages

Full workflow of a UX designer is quite dense - it includes a lot of steps from research to design to testing…In this chapter will be covered each step by combining the core path described by Allabarton in her actionable UX guide and some advices from the famous design book by Steve Krug "Don't make me think".

Preliminary (but very important) step is recognition of real problem. Everything starts with the customer who comes and says: I need a new website (or app or any other digital solution). This customer sees and communicates the problem like: "I do not have many users on my website because [his assumption #1] and [his assumption #2]".

The UX designer is NOT an employee who starts drawing new websites straight away. He is a professional who does a lot of research and first identifies the correct problem. Krug (2014, 218) wrote that professional designer always starts the work from defining a real problem instead of diving deep into the issue that was given. It is very important to find a real problem because that will help the team to define the final product and business goal of the project.

Before creating any piece of design, one must do proper research and learn everything about users of a future product, their needs and preferences, and also about existing competitors. As put by Allabarton (2021) in practice research can include:

- **Background study** (for pre-existing products and services). It is important to start testing as early as possible and an already existing product is a great opportunity for that. With early testing one examines the good and bad sides of the product and clearly sees what works and what does not.
- **User interview or online survey.** Get to know your users: talk to them, ask questions, watch and listen carefully - it will help to understand the real problem (Allabarton, 2021). Usually interviews are recorded for future rehearing. In case an interview is impossible to organize, one can conduct an online survey and collect valuable insides from it.

Why does all this matter? Working on our assumptions about some "average" user statistic, one misses the possibility to meet real user needs and improve his experience with the product or service. Krug (2014, 108) claims there is no average user, because each of them is absolutely unique, and each reaction is individual and based on so many variables. That is why a designer is not allowed to guess, he observes, learns and makes decisions according to the research.

After research, all primary data is collected. But just the pure data itself does not bring any value and meaning to the product. Now a designer needs to sit down, analyse all collected information and find valuable insides, which as a result will help to emphasize important parts and build the correct path to the final goal. There are different approaches and analyse tools that helps designers at this stage, such as:

- **Transcript coding.** For this method a designer needs to have a transcript of performed interviews with user answers (basically a plain text). Next process is followed by reading through each transcript carefully, annotating, creating different categories and segments of the data (highlighting words with different colors is a useful way for it), deep diving into the segments and exploring the results out of it (Canary, 2019).
- **Affinity diagram.** This method is basically allocating all the data to different groups according to their relationships to each other or to common topics (figure 1). As a result of such sorting, designers come up with the list of requirements.

Figure 1. Sorted affinity diagram example (Vasilev, 2020)

- **Persona.** Persona creation is the process of representing the real audience of a future product. Allabarton (2021) defines persona as a customer that are already exists rather than the customer you would like to have. Designers create several personas to understand who will be using the product.
- **Information architecture / User flow.** This approach stands for building a good navigation for the application or website. Designers build this path by following Krug's second law of usability where user can do as many clicks as he wants if each click is harmless and clear (2014, 43). The goal of this approach is to build

seamless and intuitive user movement. Also, it is always good to let the user take a step back where appropriate.

Now moving to the more creative and fun part of the project - wireframing. Wireframing is the process of building a core structure for the future design, considering all research outcomes. As put by Allabarton (2021), it includes:

- The allocation of space on that page
- The distribution of images and content
- How content is prioritized
- What functions are available
- What behavior is intended and accommodated

Designers use wireframes to connect the visual design of the site to its information architecture. When wireframes are ready, designers start to add some "live" to it, by adding colors, images, styling and so on. This step gives a vision of the final product. Usually this part of the job is handled by UI designers, that is this process will be described in more detail in the following UI chapter.

To make the design even more realistic and close to the final product designers use prototyping. It is a process of connecting frames with each other so that users can move across all of them by clicking on different elements. Prototyping helps UX designers to assess the big picture, check the functionality of the product and track errors (Allabarton, 2021).

Testing is the last and, in a way, the most important part of the whole process. At this stage it becomes clear if all the preliminary work was done correctly or not. In practice it is a process when designers ask real users to contact the design and perform some tasks. At the same time designers are watching and documenting each user's step. It is not a good idea to conduct testing with friends and relatives, they will not be completely honest and objective because of your relationships, better to test with real users. Testing gives the opportunity to notice and correct mistakes, improve the design, check if user needs are met… and all that in the early stages without wasting tons of time and money on development.

3.2.3   UX principals

The challenge and at the same time the main goal of design is to make a product a service useful and intuitive. Even though, over the years the complexity is increasing in all design fields, people stay the same, and whatever designer creates from simple cameras to complex organization structure solution, the design principals also stay the same and that helps to reduce the complexity pressure (Norman 2013, 239).
There have always been verified principles that help designers to create a great experience. For example, seven fundamental UX design principles were described in the book

"Don't make me think" by Steve Krug. He introduces the model of seven checklist questions where he suggests to question such aspects as the meaning, the accomplishment, the purpose, the actions and the goal during the project flow (Krug 2014, 71). The idea of this checklist is that anyone using a product or service should always be able to answer all seven questions without hesitation. It is a great approach to check the design structure, clarity and usability.

Besides Krug presents one more similar question approach where:
- Users should be able to understand the site Id/name (Q: What site is this?)
- Users should be able to identify the page (Q: What page am I on?)
- Users should be able to define sections and navigation (Q: What are the major sections of this site?)
- Users should be able to define "local navigation" (Q: What are my options at this level?)
- Users should be able to understand where he is at the moment / "You are here" indicator (Q: Where am I in the scheme of things)
- Users should be able to search (Q: How can I search?)

Asking questions is always a great way to check how your design really functions. Nevertheless, apart from questioning, down below there are mentioned more generic UX principles covered by Babich (2016).

Principle 1: Remove Clutter. It is important not to overload users' short-term memory with too much information, too many elements or too intense styling. Reducing the clutter will improve comprehension and will keep the attention.

Principle 2: Self-evident navigation. Familia patterns across the different products and platforms helps users to move from point A to point B easily. The path seems invisible when we do not need to think about it.

Principle 3: Seamless Experience. Designers should always keep in mind that there are many different digital devices, and user experience should be the same across all of them (phone, watch, tablet, laptop). Apple Music is a great example here: creating a playlist on the computer, a user instantly has access to it on his phone.

Principle 4: Finger-friendly design. Long story short: design should not contain too small buttons as well as buttons should sit too close to each other. Another example of finger-friendly design is the footer menu for the app instead of the burger menu on the left-side corner (which is obviously hard to reach).

Principle 5: Text Content Should Be Legible. UX designers pay attention to legibility to make text readable, otherwise users just skip the "reading part". Legibility can be improved by proper font-size (minimum 11 point for mobiles), enough line spacing and letter height.

Principle 6: Make Interface Elements Clearly Visible. Among other things UX designers also think about different circumstances for their product usage, such as using the mobile outdoors or with bad lighting. That is why all elements should be designed with correct color contrast and text size.

Principle 7: Design Controls Based on Hand Position. "49% of people rely on a one thumb to get things done on their phones" (Babich, 2016). Figure 2 below represents the thumb reach zones divided by colors accordingly and such useful elements as menu controls should always be in easy-to-reach zone.
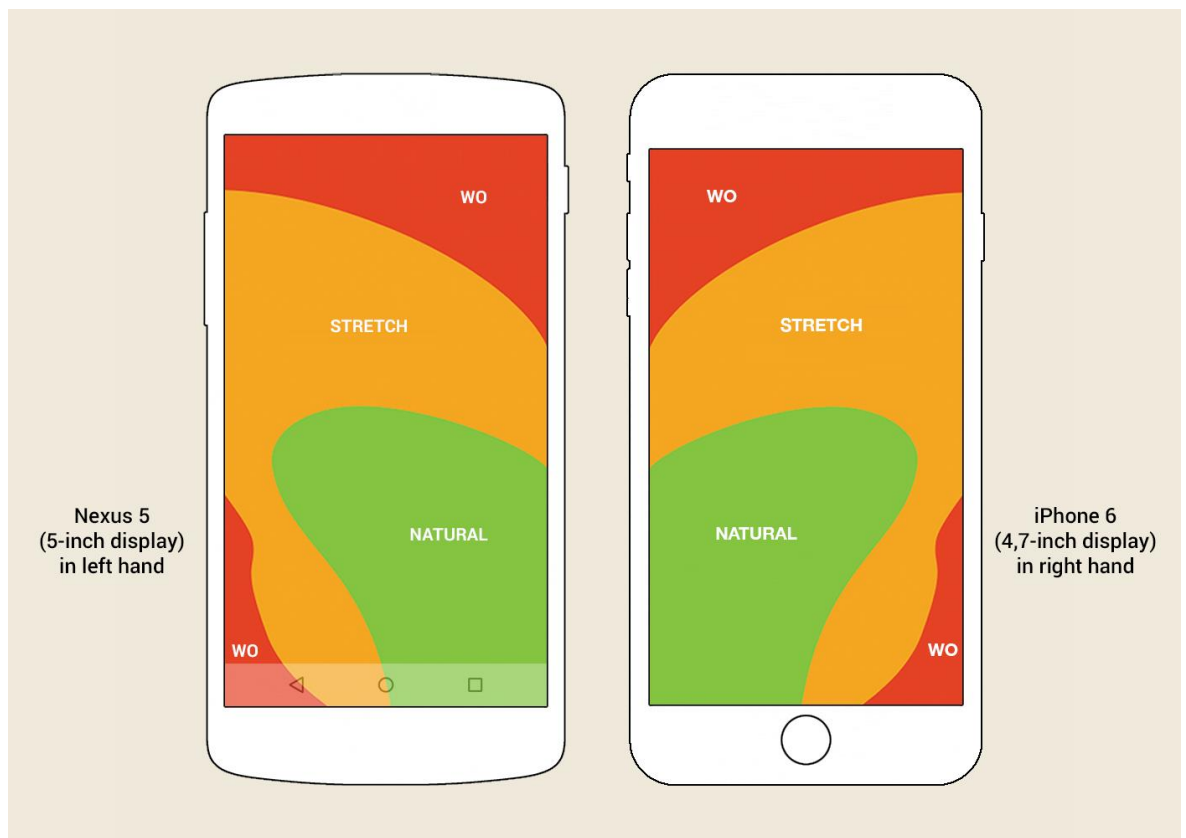

Figure 2. The thumb zone for left-handed and right-handed (Hurff, 2014)

Principle 8: Minimize Need for Typing. Typing causes too many errors (especially on mobile). UX designers try to avoid errors by shrinking forms, auto-complete and word suggestions.

Principle 9: Optimize experience for quick sessions. This one is about fast interactions such as setting the alarm or replying to a message. Experience should not be complicated and such actions should not take more than a few seconds.

Principle 10: Test Your Design. Even the laziest person will mention "testing" in his article. Obviously, it is not enough for design to look great, it should solve user problems. That is why testing with real users on a variety of mobile devices is a must in UX design.

3.2.4   Bad and good UX

We encounter bad UX everywhere: from weirdly placed price tags in our favourite grocery shop to inability to recover the forgotten password on rarely visited websites. Ability to notice and distinguish bad UX from good one is a professional skill that every designer needs to master. Anyway, people learn so much from failures, and through this chapter we can learn from other people's mistakes rather than make our own.

Each design element should be discoverable, meaning that a user should always have at least a hint in his head of what can be done with that element. Discoverability problem occurs when user does not understand what certain element is for and as a result user action does not align with the real functionality of the product (Kim, 2019). For example, Google translate used to have a weird symbol on the action panel (figure 3).
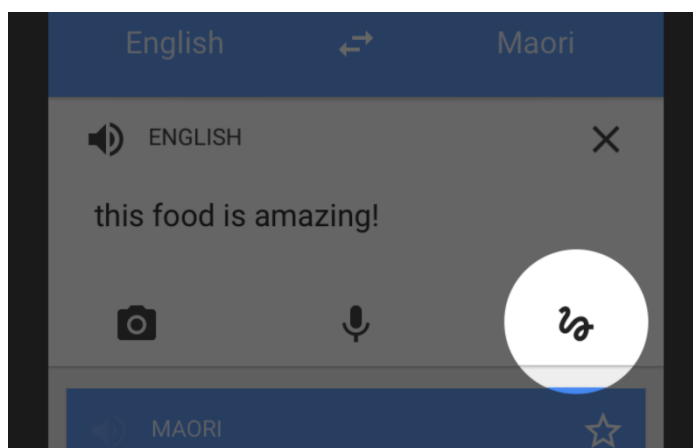

Figure 3. Google translate action panel (Kim, 2019)

For those who have never used Google translate, it looks like a snake and does not give any hint about its functionality. This button was added for "handwriting", and it is currently changed to a pen symbol (good example of how big companies distinguish such small mistakes and correct them).

Next example is from WhatsApp and it's "Delete message" function (figure 4). Even though it seems like a great idea to give users this freedom to delete any message, on the other hand, a receiver feels even more suspicious and awkward about why this message was deleted (Gupta, 2021). It provokes a receiver to ask even more questions and expand the dialog instead of cutting it, as it was planned by a sender at the beginning. In this case, user's goal and expectation does not match the final outcome.
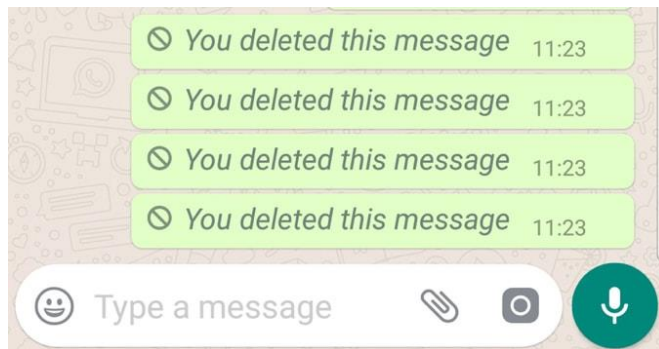

Figure 4. WhatsApp delete message function

The classic sign-in password kerfuffle that I already mentioned earlier: every user has been there at least once. This problem occurs if the password requirements list is too long and complicated (e.g. password should contain at least one number, one symbol, one uppercase, etc.). Also, users meet the problem if they are not aware of where the mistake was made: they see "login fail' message and keep retyping password several times, but the mistake might be in the email field. Besides, some websites still do not have a proper password recovery process.

In comparison, Mailchimp is a great example of a password creation process, even a complicated one. For each password requirement they put an indicator that turns green when this requirement is met (figure 5), plus they show a success message at the end of the process. Berry (2021) says that good UX guidance on sign-up or login form can provide a pleasant experience to user.

Figure 5. Mailchimp password creation guidance (Berry, 2021)

Talking about bad UX, one cannot skip mentioning websites with too many ads (especially those endless pop-up ads). Undoubtedly, ads are a great source of income, nevertheless it is good to know when to stop, otherwise users will just quit (Gokce, 2019).

The list of UX mistakes can be replenished with long page loading time (users always quit such websites), unfair clickbait, broken or invalid links and super long dropdowns (they are truly useless). Anyway, I would also like to cover a couple of great UX examples, for instance Airbnb booking experience. They did a great job with the research and clearly determined what matters the most for typical travellers (Berry, 2021). The most relevant information is placed at the homepage and it just gets the job done quickly and user-friendly.

Another good UX examples are Headspace and Duolingo, who turned engagement into a gaming experience to keep user retention. They both are adding a combination of challenge and fun to the educational process, and as a result user stay active. Besides, they keep user attention by using pleasant animations, nice illustrations and soft-toned voices (Berry, 2021).

To sum up, as a designer you always pay attention to different elements and interactions on websites and apps. Analyse and learn from the best, but also pay attention to bad to either improve it or to not make the same mistakes.

3.2.5 UX: conclusion

The main aspects of the topic such as UX principles, design process from idea to final production and discussion about good and bad examples with real companies' cases

were covered in the chapter. The only question left now is UX designer tools, but a separate chapter was allocated for this.

Creating a great memorable experience for user one should always keep in mind three aspects: usability, accessibility and value. UX is crucial since it is one of the biggest factors affecting growth and finances (Allabarton, 2021). It can either make or break a business depending on what impression it makes on users and what kind of relationship it retains.

3.3 User Interface

Next fundamental part of the research is user interface. In this chapter will be opened the topic with the main elements, principles and rules, shown good and bad examples of user interface and went through common user interface designer workflow.

3.3.1   Definition

User Interface or shortly UI is the next fundamental part that follows UX. What is UI?

> The user interface (UI) is the point of human-computer interaction and communication in a device.
> (Churchville, 2021.)

UI is the visual side of design base: what a person (user) sees while contacting a product or service from display screens to keyboards.

The job of UI designer considers two aspects: visual and human. To be able to get from point A to point B user needs to contact different visual elements, like buttons, images, icons and others. Designing those elements and screens is a visual aspect. On the other hand, user opens the app and he expect to see a familiar way to get from point A to point B: he already knows where to click, even if he uses it for the first time. Thinking about how user 's mind works and how one can guide him through the product harmlessly and imperceptibly is the human aspect of UI design (Stevens, 2021.)

3.3.2   UI designer workflow and UI Elements

Usually designers are either divided by roles to UX and UI (for big corporations) or one person can combine both UX/UI roles and responsibilities (this approach is more popular among freelancers or smaller companies). Either way, workflow for the UI design part of the job is very similar for both situations.

The general approach to the management and successful completion of the project (UI design part) described by people working in the industry was summed up in the following text.

First step is to get familiar with the project that can be done through project research and information architecture (IA further in the text). In case of big corporations, the research part is usually done by UX experts as well as building IA. Accordingly, a UI designer here goes straight to collected data and explores the prepared reports to find valuable insights. While for those who combine both UX/UI roles, the research stage will take more time and effort, however it is strongly NOT recommended to skip it as well as building information architecture of the project.

Why is research important? Describing the ideal design workflow Bahaieva (2020) claims that it is very important for designer to understand the competitors and the audience to be able to create a successful product. And research is a perfect approach for that. Research shows goals and helps you to build the path to this goal.

Moving forward, for example Khatkar (2019) in his workflow article introduces creation of Information Architecture. It shows navigation and structure of the project. Well-thought IA helps users easily move through websites or apps (more information about IA was covered in User Experience chapter).

By now, we already know the goal with objectives and have a hierarchy of the project. It is time to move to the creative part - moodboard. Moodboard is a great tool to find inspiration (Altexsoft, 2018). Usually it is a collection of images, possible color palettes and typefaces that altogether represents the overall visual style of a future product. It is an absolutely optional step, but highly recommended.

Moving closer to actual creation of the product we meet the sketching phase. It is also optional and varies from one designer to another. Bahaieva (2020) recommends drawing fast sketches with pen and paper to not forget all ideas that come to your mind. Moreover, that is a great tool for brainstorming with a big design team.

Whether a designer does fast paper sketches or not, wireframing is his next step. Wireframing is a process of creating wireframes using any preferred digital design tool. It is a more real and functional representation of the product compared to sketching. Bahaieva (2020) in her article calls it a "detailed skeleton" that gives great possibility to check functionality fast in early design stages. With wireframes a designer can test his product before investing most of time to work with visual components and tons of UI details. From the definition we know that UI is a touchpoint between user and device. Just like building a house, UI designers build those touchpoints using UI elements as bricks. To be able to create sketches and wireframes, designers need to know those fundamental

"bricks" that altogether add up to fundamental basics of digital design. There is one great article by De La Riva (2021) where she is describing 32 main UI elements. Elements are easier to understand if you see them, that is why I decided to sum up this article by creating visual examples for listed elements. They can be found under Appendice 1.

Next step is to develop the visual design of the product. In a nutshell, bring creative ideas to life by coloring it with images, icons, colors, etc. Here designers combine wireframes with moodboard, keeping in mind UI thinking, user psychology and business goals. The goal of this stage is to get to the final look and feel of the product, and that is exactly what users will see as a result. The good part is that this is the most creative and enjoyable part of the whole project.

Prototyping helps to liven up the product. In practice: user clicks the button - it steers to another screen, and that is how prototyping works. From a designer point of view prototyping is the process of building connections between screens and assigning functionality to drawn UI elements. There is built-in prototyping functionality in modern design tools as well as individual prototyping websites.

Prototyping step can also be accomplished by a UX designer, depending on responsibilities inside the company. It makes more sense to start prototyping after creating wireframes even without final design to be able to test the product with a user-testing group and observe valuable insights already in early stages. Khatkar (2019) recommends to create rapid prototypes to test and get user feedback on early stages.

To maximize user experience and awaken positive emotions from using a digital product, designers add animations to apps and websites. This step is optional, depending on a project budget, time and designer skills. Khatkar (2019) claims that we need to add motion design to our product because it enhances the experience and helps to see interactions and user behavior better.

Design is ready, and now it is time to meet the development team. Design handoff or Governance is a process of collaboration between designers and developers to create a working product out of design final prototypes.

From my personal experience, this is the most complicated step. It is crucially important to communicate all ideas that were nested to the product. Provide developers with all assets, sources and styles. Present your design properly, explain each tiny detail. Otherwise the

user experience of the final product will be bad and all you work will be just lost some-
where between code lines. Khatkar (2019) noticed a similar problem in his workflow and
advice to continuously collaborate with developers to get the best result possible.

Product is launched, but it is not finished yet (and probably will never be). For business to
be able to grow one needs to improve the product all the time, especially in our modern
and such a fast-moving world. Testing, collecting feedback, then updating and repeating
everything from the beginning again and again - is the way to go. The UX chapter above
describes more details about testing.

3.3.3   UI rules and principals

To make UI great, one follows principles and rules. There are 10 golden rules of UI that
Jacob Nielsen (2020) covers in his article for Nielsen Norman group, and he calls those
rules "heuristic" because they are not mandatory guidelines to follow, and more like gen-
eral recommendations.

Rule 1: Strive for consistency. It should be visible through functionality, terminology and
general appearance. In practice, use the same style for buttons that do the same actions,
the same font-size for similar headers, and so on. You will confuse your user by applying
a mix of random elements and unexpected functionality.

Rule 2: Visibility of system status / Offer informative feedback. Users should always
be able to answer questions in the context of browsing an app/website: where is he in and
what is happening right now. Do not make users guess, instead provide him with relevant
feedback in appropriate time and place. User believes that he has control over the sys-
tem, that is why he wants to know such details as "Error occurs during the file upload" or
"25 min left for the update".

Rule 3: Match between system and the real world / Design dialog to yield closure.
The system should use words, phrases and concepts familiar to the user, rather than spe-
cial system terms (Babich, 2016). For example, do not use terms like "Media assets", use
familiar "Gallery" or "Photos" instead. The other part of this rule is about rewarding your
user. Make sure to inform him when his action is completed successfully.

Rule 4: User control and freedom / Permit easy reversal of actions. As long as you
have an "emergency exit" - possibility to undo or redo some action - your user will be calm
and happy.

Rule 5: Error Prevention and Simple Error Handling. The worst thing you can do is to make your user feel angry because he made a mistake. Think about possible and the most common error places in the interface beforehand. Then prevent those errors by providing users with tips like "Your password must contain at least one capital letter".

Rule 6: Reduce short-term memory load / Recognition rather than recall. Users do not want to remember any extra information because they already have a bunch of other worries. Reduce user memory load by designing each element clearly self-explanatory and apply visible instructions. Good example is the iPhone silent mode button and provided message about the completed action (figure 6).
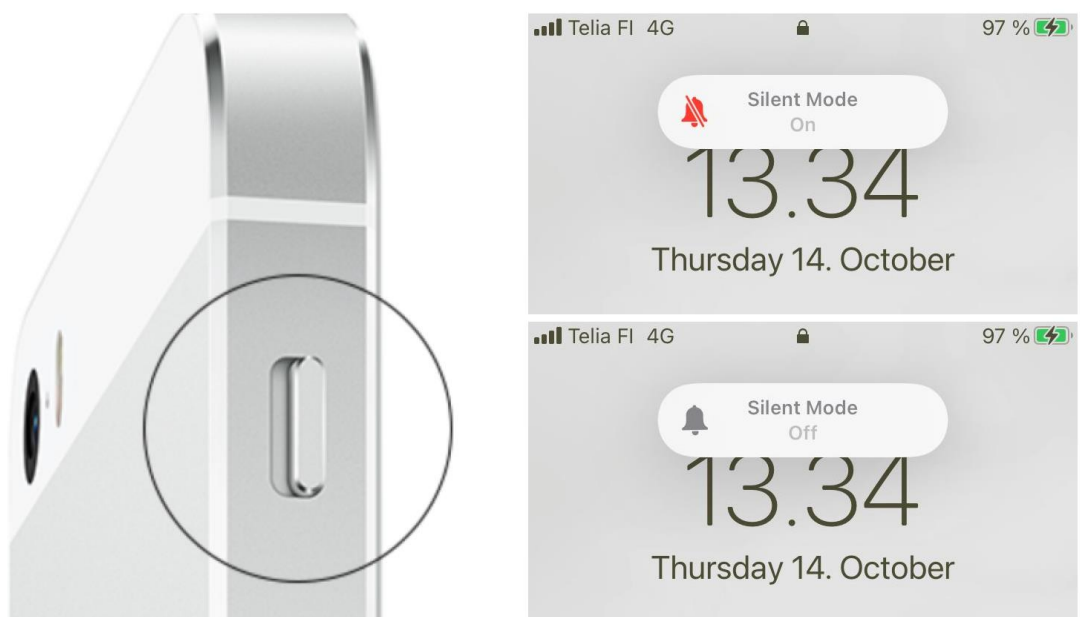

Figure 6. iPhone silent mode ON / OFF button and message

Rule 7: Enable frequent users to use shortcuts. Shortcuts are an awesome way to save user time, that is why we all love them. Along with shortcuts you can also provide users with automation of frequently used actions. For example, the ability to save and reuse the password in certain apps with the fingerprint.

Rule 8: Aesthetic and Minimalist design. Remember: "Less is More" and minimalism here is not about just an empty screen with one input field. It is about getting rid of content that does not bring any value to the user and removing all irrelevant elements that only creates visual mess and frustrate user attention.

Rule 9: Help users recognize, diagnose, and recover from errors. This brings us back to rule 5 about errors and also shows ways to recover from them. Always put error message in simple and easy-to-understand language (no technical terms). Then suggest possible solutions and again explain what happens under each of them.

Rule 10: Help and documentation. Documentation is usually unnecessary, but in some advanced cases it is worth considering. Make sure your doc is not too long and easy-to-find.

3.3.4   Bad and good UI

In this chapter I collected some visual examples of good and bad UI design from different sources. It is always good to look at both and compare because this approach learns to avoid UI mistakes in future.

I already mentioned the importance of consistency in the previous chapter, and now Dai (2018) in her hackernoon article represents an example with inconsistent (bad) page design (figure 7).
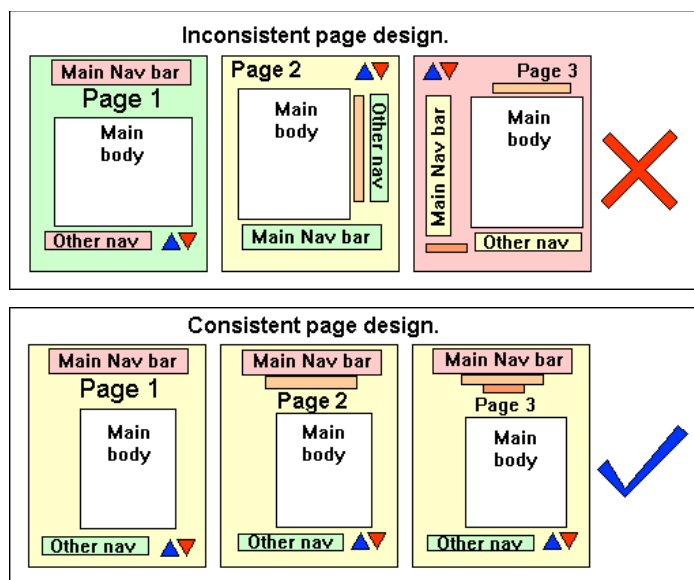
Figure 7. Inconsistent / Consistent page design (Dai, 2018)

All pages, colors, typefaces should be "from one family" and share something in common. Great example of bad work with typography was shown by Niebla (2021). In the images below, you can see such problems as too many typefaces (figure 7), no text hierarchy (figure 7), random justification (figure 8). Those small details make text hard to read, as a result user will be distracted and abandon your product.
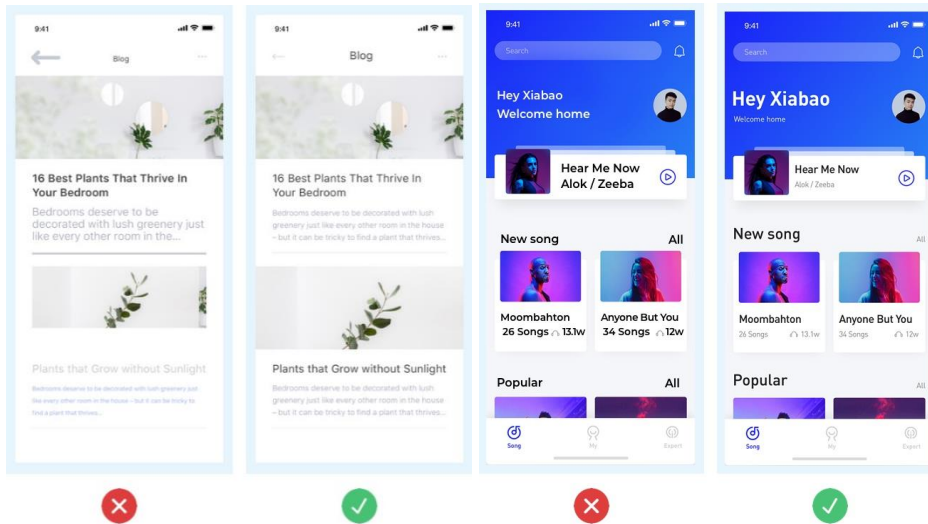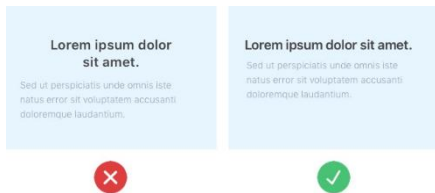
Figure 7. Bad typefaces and text hierarchy

Figure 8. Random text justification

Both Niebla (2021) and Dai (2018) mention such mistake as lack of contrast in UI design (figure 9). With lack of contrast page loses its structure because all elements are merging together, as a result user might not notice a button or important message.
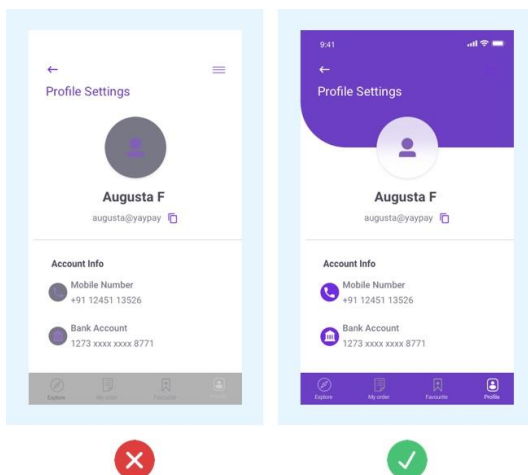

Figure 9. Lack of contrast

One more common mistake that all designers are talking about is bad forms (figure 10).
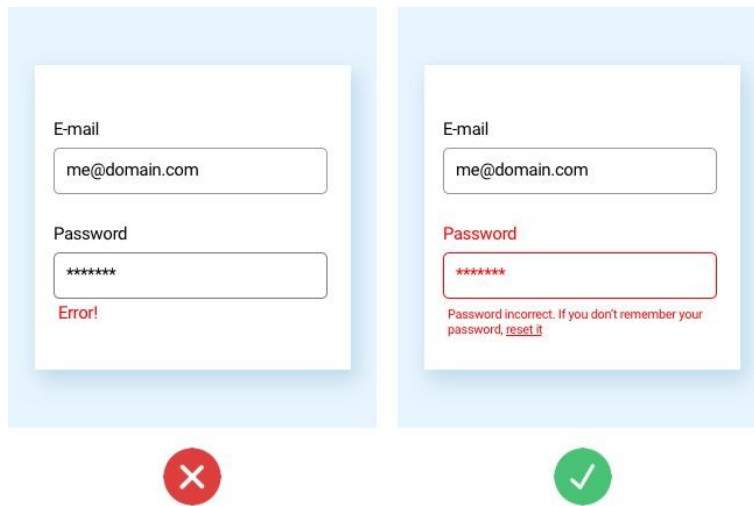
Figure 10. Bad form

Niebla (2021) calls forms a "crucial" part of user journey and that is true. The thing is: users have to communicate with forms very often. Login, signup, book hotel, buy ticket and so on, plus users are always in a hurry and they easily get angry after submitting the form several times. Forms should always be thought through: get rid of all extra fields and provide users with clear guidance before and after submitting the form.

There are still many more UI mistakes and bad design examples worth considering, such as:

- Too low or too high picture quality (picture is either blurry or loading forever)
- Not responsive design (works only on webpage and looks broken on the phone)
- Small touch targets (user cannot click the button because it is too small)
- Unnecessary Animation (extend page load - waste user's time)

That is why UI designers always pay attention to small details while scrolling the app or webpage. Good designer keeps those mistakes in mind and tries to avoid them with the next project.

3.3.5   UI: conclusion

I went through fundamental UI elements and rules and described step-by-step work process. UI newbies might still not know how and what to start from. Such questions arise: how and where to draw buttons; what typeface to use; what tools to use; etc.

UI Tools are covered in further chapters, but apart from tools designers need to study basic layouts, color theory, typography as well as more in-depth topics like golden ratio and gestalt rule. Nevertheless, UI design is available for everybody even without that knowledge base. Knowledge will come with experience, a designer should practice more than he reads, always look at the best examples (Apple, Google) and learn from them.

By the way, Apple and Google provide their in-detailed guidelines to follow. Apart from that there are tons of ready-made UI kits and element libraries. One needs to just download and start playing with it, as simple as a puzzle.

To sum up, UI makes the user way to the goal aesthetically pleasing and, in a way, invisible. Designing UI, it is important to always keep the user in mind, do not forget the business goal of the project and just let creativity do the rest.

3.4 Usability and UCD

This chapter is research about usability and User-centered design (UCD). These two important topics are combined together since they have similar context and, in a way, similar goal - satisfy the USER.

Talking about usability, from the word itself one can guess that it is a "measure" of how useful the product or service is. Steve Krug (2014, 9), known as probably the most famous usability consultant, defines the term by describing the average user (or even below average) who should clearly get how the product work without more effort that just a look. Just like that, simple and easy: a product with good usability should be clear for any user without any additionally provided instructions and guidance. That was also proved by Design Disruptors (2016) who describe usability assessment as a completely invisible design: users do not even notice it, they just use the product, enjoy it and do not think about it.

According to Krug (2014) Usability can be broken down to such attributes:
- Useful: The product or service should do something people need to be done
- Learnable: People should be able to figure out how to use the product or service
- Memorable: People should NOT relearn the product or service each time they use it
- Effective: The product or service gets the job done
- Efficient: The product or service helps user to accomplish the task with a reasonable amount of time and effort
- Desirable: People want to have the product or service
- Delightful: The product or service is enjoyable, or even fun

At the same time, User-centered design is an approach that has similar principles and tries to meet similar attributes. UCD always puts users in the center to look at their needs, capabilities, and ways of behaving. Back in the 90s, Don Norman used to call such an approach "human-centered design" and did impressive research about it. As written in Norman's book (2013, 9), user-centered design is a philosophy that always starts with understanding of people needs

Nowadays people are frustrated and overwhelmed with everyday things around them. Over years, design is getting better, but challenges are also growing. The solution is UCD that helps to find communication between user and machine. As concepted by Babich (2019), the UCD process has five stages:

1) Research - goal is to understand who the design for;

2) Concept Ideation - goal is to create an actual solution;

3) Design - the working process;

4) Develop - goal is to evaluate design decisions;

5) Test - the utilization of the developed product;

The key feature of the UCD approach is that all stages are repeated over and over (figure 11), with each cycle observing more insights and getting closer to the desired solution. Moreover, there is no place for guessing and personal opinions since every design decision is implemented based on the information designers have about users, which altogether creates a great usability at the end.
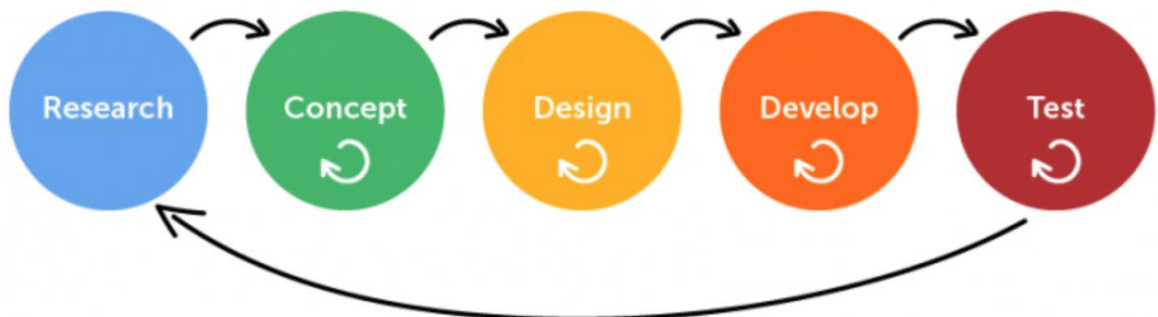

Figure 11. User-centered Design Process (SPRING2 innovation, 2019)

3.5 Design tools

In this chapter will be introduced the best rated tools for UX/UI designers. Before diving deep into professional software, one should pay special attention to simple pen and paper - tools available for anybody. It is fast, straightforward, you do not need to know how to draw to sketch ideas that are flowing in your mind.

The most commonly used professional design tools are Sketch / Figma / AdobeXD. The actual designing process takes place in one of them (no need to use all three) since all are very powerful and include lots of features. Cardello (2021) describes them as tools for building and testing dynamic prototypes.

Studio / Proto.io / Marvel / Origami - useful prototyping tools. They help to create from lo-fi to hi-fi prototypes and real interactions that look like the final product. They have nice organisation structure and are easy to learn even for design newbies (Danielyan, 2020).

We already know that before drawing any piece of design one needs to do research. For each research approach there will be its own tool from simple Google Survey forms to softwares like Treejack, Hotjar, FlowMapp and others. For instance, FlowMapp helps to build sitemaps and IA (Cardello, 2021), while Hotjar analyse websites and gives feedback from users (Danielyan, 2020).

At the final handoff and collaboration stage, Zeplin is a must know tool for those who design in Sketch and AdobeXD (Danielyan, 2020). Zeplin translates UI into CSS to make it easier for developers. In case of Figma, it has its own functionality for that.

Besides professional software, some additional websites such as Pinterest, Behance and Dribbble can be a great resource to find some inspiration, come up with the moodboard and references.

Last but not least is Google. That is not the exact tool, but it could take the first place in this list. Danielyan (2020) says that in such professions as UX/UI design, you are constantly learning because the field is developing very rapidly. For that reason, new questions and doubts occur every day, and in this case - just google it!

4. Concept Design

The project is a mobile application redesign for self-service car wash. It is aimed around UCD approach (described in UCD and Usability sub-chapter), for that reason it is started with concept design and user research. Moreover, since the company already has the working application, it was decided to conduct first user testing to discover pain-points of the product and collect customer feedback. This chapter covers preliminary testing, process of user interviews, creation of user persona and user scenario.

4.1 First user testing

For the first user testing author downloaded existing app and prepared a list of tasks and questions. Author invited several users aged from 20 to 46 years old from different occupations. Invited users were performing tasks while author was observing them and taking notes.

List of tasks included:
- Create new account
- Buy tokens (+ find out here: how many tokens you need to buy for one full wash)
- Activate QR code
- Find out how many active orders you have at the moment
- Find out how to use a "Shampoo" mode
- Get directions to the nearest car wash

Observing users, author noticed that most of them were confused at the very beginning: after login/ signup page they turn out on the "Map" page and unconsciously began thinking that buying tokens starts from choosing a specific address first. Because of this wrong thought, the task to buy token took longer than the client would prefer (also users usually do not like the feeling of making mistakes). Moreover, 80% of users could not understand how many tokens they need to buy for one full wash, and as a result they were buying more tokens just in case (that moment also gave unpleasant feeling to users because they had to spend more money just because of lack of information).

For the good part: all users noted the map. It was easy and clear to use, intuitive to move through and find the nearest car wash. As well, nobody had problems with the task about "Shampoo" mode (even though about 60% mentioned that it looks "a bit ugly").

At the end of testing author asked everybody to give some open comment about the app, like what do they feel and would they use the app regularly. Everybody liked the idea of having this kind of app, but using the app some users still had questions (e.g. how many tokens should be bought) that prompted them to leave the app before making a purchase.

Moreover, some comments described the app as "not very engaging", "boring" and "a bit ugly". Even though the look of the app is NOT as important as its functionality, still it should not be the factor to user's loss.

It was unexpecting to get so many valuable insights from just the small "pre-research" testing. First user testing of existing app was definitely worth to conduct, and already at this stage author got the list of new requirement and suggestions from users.

4.2 User interview

Preparing for user interviews author wrote a list of questions that he would like to discuss with the interviewees. Author invited several people working in different fields not related to car wash.

Before each interview session author notified the guests that the interview will be voice recorded for future research and analysis. The interview took place in the form of an open conversation, with the ability to skip or add questions during the talk, because author was collecting qualitative data. For the interview, author invited couple of students from Haaga-Helia University, as well as several people aged 30-40 years old. All in all, five people were interviewed and each interview took about 14-20 min.

To create a friendly atmosphere, author started each interview with a small talk about user occupation, general interest and hobbies. Then conversation continued with user relationship with the phone, average screen time and usage of various mobile applications. As the main topic was discussed mobile apps where users need to make purchases, author asked what they value and like there. Further, author moved on to self-service car wash topic and possible apps for them, where users were asked to imagine and describe their perfect scenario for such app usage. The full question list can be found in Appendice 2.

To sum up, author really liked how the interview stage passed, there were nice conversations with all interviewees and author found a lot of interesting ideas and insides. All interviews were transcript coded and it helped to come up with the final list of requirements for the app. Author is writing about it in the following implementation chapter.

4.3 User profile table

Based on potential users of self-service car wash author came up with the user profile table to collect all potential users of the service as well as the app. It includes twelve different individuals, preferably men (as a percentage of men and women 67% and 33% accordingly) from various age groups (table 1).

Original source: https://docs.google.com/spreadsheets/d/1FeW_anmfD6cJCKSsf5uub-POi-Eg6QWJiFEr779MEBIA/edit#gid=0

Table 1. User profile table

Male / Female	Age	Occupation	Location	Android / iPhone	Most used apps	Has a car?	Driving experience (years)	How often uses car wash services? (times / month)
Male	32	Sales manager	Tula, RU	Android	WhatsApp, Slack, Gmail, Google Maps	yes	12	4-5
Male	18	Student	Tula, RU	iPhone	Instagram, YouTube, VK, Telegram	no (but uses parent's car several times a week)	0	1-2
Male	21	Student / Waiter	Tula, RU	iPhone	Instagram, WhatsApp, YouTube, VK	yes	3	2
Male	50	Executive director	Tula, RU	iPhone	WhatsApp, Maps, Viber, YouTube	yes	30	4
Female	30	Manager	Tula, RU	Android	WhatsApp, Gmail, YouTube, Telegram	yes	4	3-4
Female	43	Currently on maternity leave	Tula, RU	Android	WhatsApp, YouTube, SkyEng, Flo	yes	20	2
Female	19	Student / Shop assistant	Moscow, RU	iPhone	Instagram, VK, Messenger, iHerb, ZARA, Snapchat	yes	1	4-5
Male	45	Interior designer	Novomoskovsk, RU	Android	WhatsApp, Trello, Pinterest, Slack, Home	yes	27	2-3
Male	37	Foreman	Moscow, RU	iPhone	Viber, WhatsApp, YouTube, Google Maps, Apple Music	yes	12	2
Female	32	Beauty master	Tula, RU	iPhone	Instagram, VK, Pinterest, WhatsApp, Viber, VSCO	yes	5	3-4
Male	22	Light entrepreneur	Novomoskovsk, RU	iPhone	WhatsApp, Instagram, YouTube, Trello, Gmail, Maps, Apple Music	yes	3	1-2
Male	28	Sales manager	Tula, RU	Android	YouTube, Instagram, Google Maps, VK, AliExpress	yes	4	3

One can see from the table that almost all users are car owners and their average use of the car wash service is 2-3 times a week. Moreover, they all are active smartphone users and one can assume here that they would as well use the car wash app regularly. Important to mention that all potential users are Russians. It is an obvious case for a small city, even though there is always a slight chance that a foreigner can come (language settings might be considered for future improvement of the app).

4.4 User scenario

User scenario is a tool used in design practice for better understanding of how user will interact with the product. To create the scenario, author come up with a brief story describing a usual day with the product (the final app). Scenario shows insides of user mind by answering questions like what makes user open the app and what is the user goal.

Usually scenarios are rewritten couple times because there is a need to think about different occasions for the product usage and keep adding missing details. Here is the final scenario for this project:

"John is a young entrepreneur. He is an active car user because he needs to drive around the city every day to customer meetings. He likes mobile services, that can provide fast and qualified result (that is the goal of his business too). He prefers to use food and clothes delivery services (apps) and he constantly makes purchases there.

Today John has a meeting with one important customer and he want to look presentable and make a good impression. This also applies to his car that need a good wash since it has been 3 weeks after his last car wash visit. John starts calling to different car wash companies and unfortunately find out that all services is booked for the nearest 3 hours. He gets upset very fast, but at this moment he receives notification from "SAM" app with the text: 'Do not forget to take care of your car and clean it in time. Buy tokens on the go in our app and get 10% from your purchase back – fast and easy. Open 24/7'.

John immediately act on notification – he opens the app and check the closest self-service car wash address from the map. On the way to the car wash, he opens the "Buy Tokens" tab, selects the advised number of tokens for his wash and quickly buys them from his connected Apple Pay account. At the carwash he activated his purchase by scanning QR-code and happily managed to wash his car in 6 minutes. The goal is accomplished – now John has a clean car and he looks presentable in the eyes of his important customer.

Later this evening John remember this moment of task accomplishment and decides to open the "SAM" app again. He finds nice instructions and recommendations for car wash there, as well as information about current promotions and cool feature to share tokens with your friends."

5. Implementation and testing

Next stage of the project is work with collected data from concept design and analyse it to come up with the list of requirements for further concept evaluation step. It includes stages of transcript codding, building information architecture for the app, creation of first sketches that will be transferred to High-fidelity proto and final product testing.

5.1 Transcript coding

All performed interviews were transformed into plain text form for further transcript coding approach. Author read interviews through several times and highlighted (color-coded) repetitive and most common phrases and words. The most attention was paid into context where users talk about their favorite features in purchase apps, as well as to the context where they mention some pain-points. Later on, author combined highlighted word into different categories that at the end helped to come up with the list of requirements for the "perfect" self-service carwash app.

According to first user testing, user scenario, interview results and based on answer frequency, full list of functions and requirements for my app looks as follows:

- Buy tokens in couple of clicks (in practice it meant to change the home screen, add there CTA for token purchase + simplify the buying process by getting rid of unnecessary elements)
- Provide clear explanation for each purchase step (user should know what will happen next after the purchase)
- Possibility to make several purchases ("My orders" page)
- Check purchase history ("My orders" page)
- Easy navigation from home to car wash (there is already a good map in the current app, I will keep it the same, but change the UI elements style a little bit)
- QA section
- Instructions section ("How to wash the car" page with new good-quality illustrations)
- Promotions (to engage the user even more we will add the new promotion feature about sales and cashback)

Apart from features discussed, the app needs a fresh visual look. It should become more modern but simple, with nice images, proper typography and grid.

5.2 Information Architecture

As a next step, good thoughtful user flow was built for the app. For better navigation author used information architecture approach and build the skeleton for the app as you can see on the image below (figure 12).

Original source: https://www.figma.com/file/B1CrOVuISmkvcVUCZ4h8DR/%22SAM%22-Information-Architecture?node-id=0%3A1
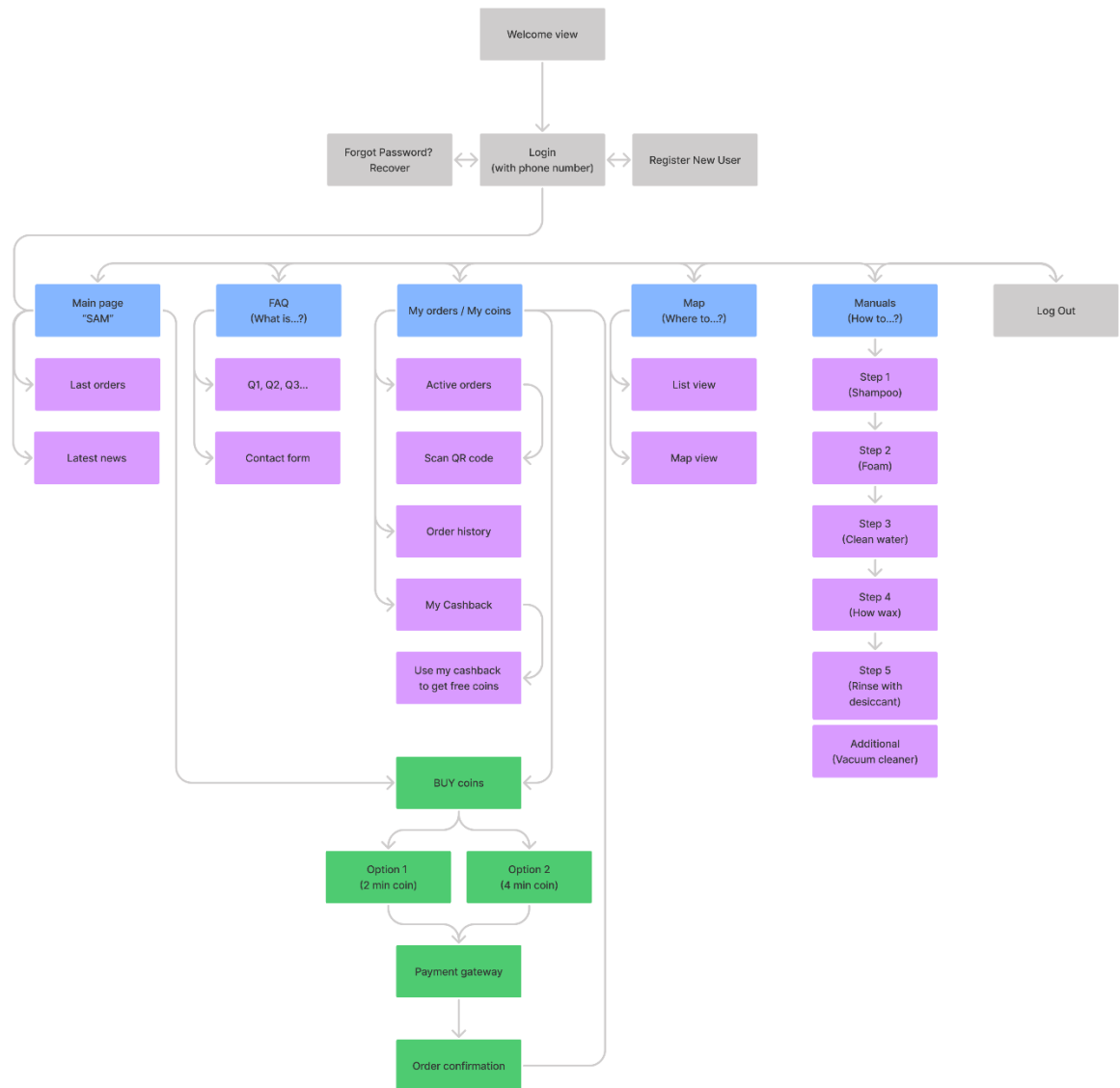
Figure 12. "SAM" Information Architecture

5.3 Sketching and Wireframing

Author prefers to start the actual design process with pen and paper and just hand-sketch some low fidelity prototypes first. There are always several ideas for each screen, and with fast sketches one can evaluate which one is the best and worth spending more time later on. Usually author draw the main views and thinking through some small details. Trying to move across the sketches and imagine what happen if one clicks this button or this image.

To connect the information architecture with visual design author starts working on first wireframes (figure 13), for this project it was done in Sketch. Wireframes can be black and

white at this stage, with some "Lorem ipsum" text instead of real content. It is more important to pay attention to each element functionality here. Good design should be clear to use even if it is black and white.
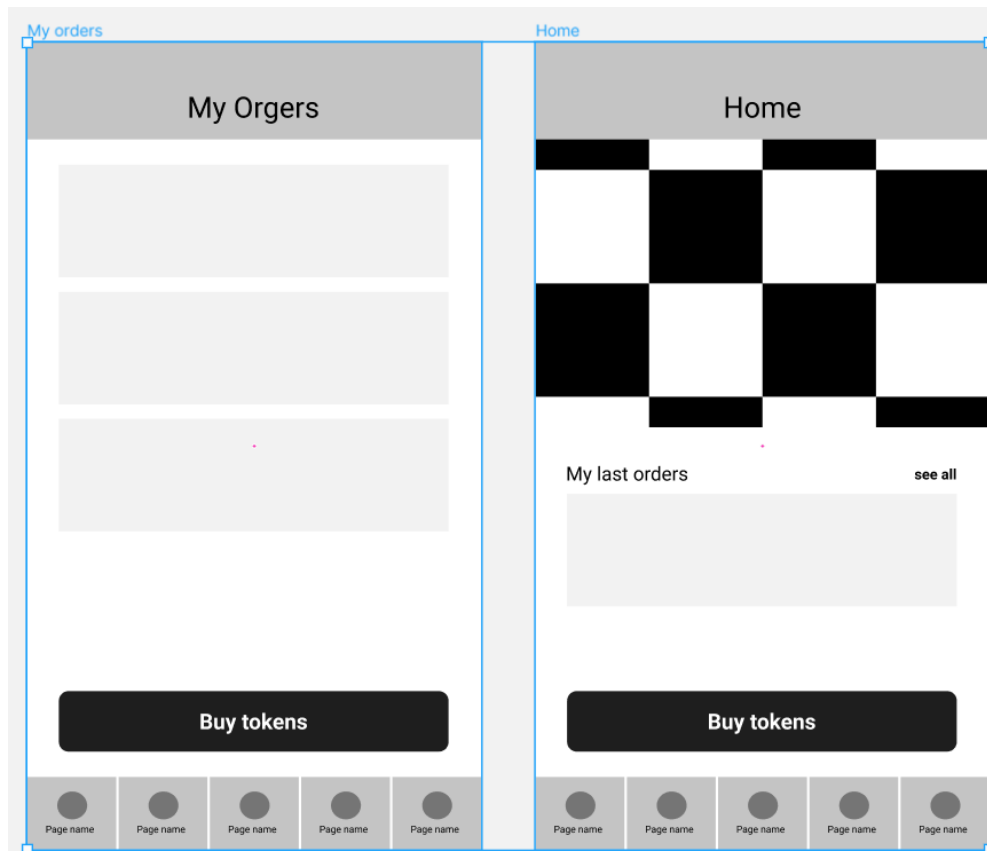

Figure 13. "SAM" Wireframing

At the wireframe stage author created all the main views and the views for the most important user flows like buying tokens process. For views with repetitive templates (e.g. instructions step 1/ 2/ 3…) author created only one wireframe.

5.4 Moodboard and general style

The app should come to live and acquire more realistic look alter adding some images and colors to the prototype. For the moodboard author searched through Dribble and Behance websites to find some inspirations from the best rated app that provides similar services.

Nevertheless," SAM" company has its brand identity that author would also like to reflect in the app by using:

- Red as the main color
- Color paleet: red / white / grey
- Simple font-family (no serif)
- Soft shapes: rounded corners on elements and rounded buttons
- Simple icons

5.5 High-Fidelity prototype

To get to the final look and feel of the product author combined the moodboard, brand identity guidelines and wireframes. This is the process or many alterations back and forth that takes time. When all views were ready author added the prototyping feature, so now the app is clickable and can be tested it with end-users. Different parts of the final prototype are represented on screenshots down below (figures 14 - 21).

This project was initially done in Sketch (design) and InVision (prototyping), but for the translated (English) version of the app author used Figma. Original source: https://www.figma.com/file/D9CZfsyWBPInCJMAHj26PC/SAM?node-id=0%3A1
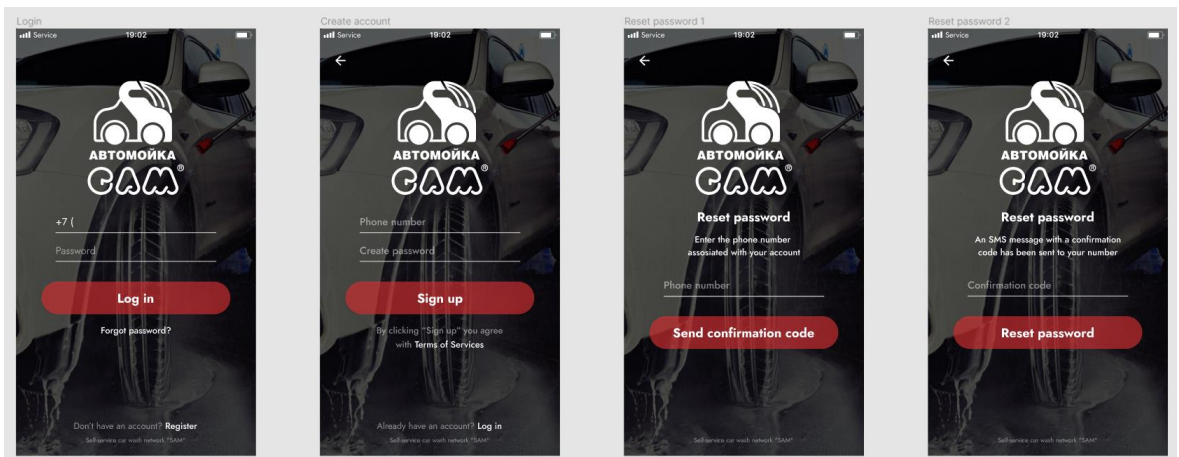

Figure 14. Login / Sign-up / Forgot password

The app starts from basic login page. Here user can login to the system with his phone number, create account and reset password if needed.
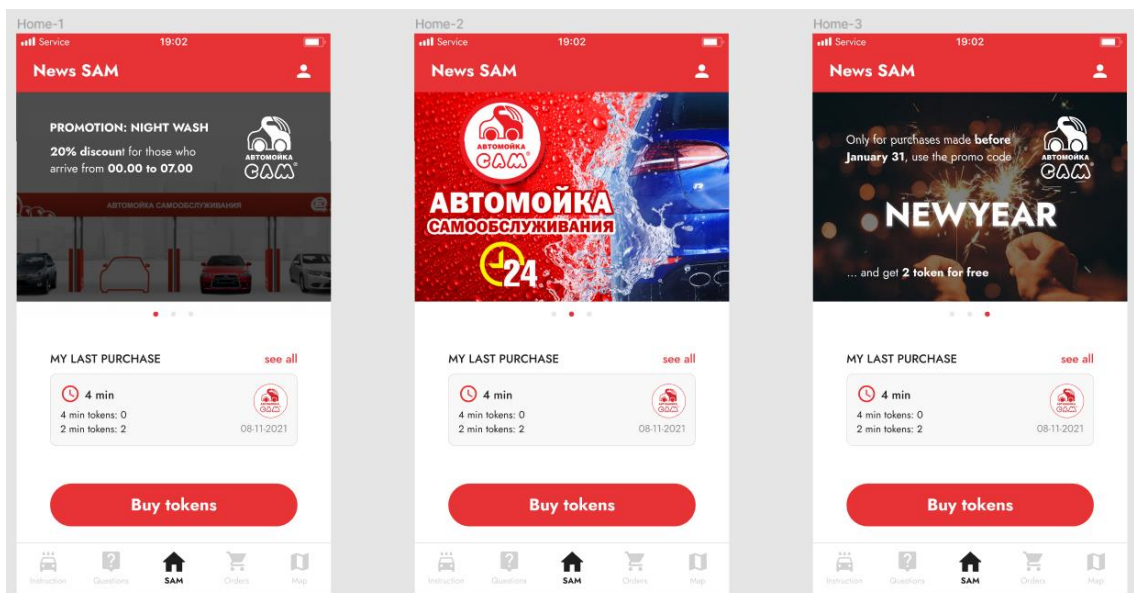

Figure 15. Main page and promotions

The first page user sees after login process is the home page of the app, it is called "SAM" (as the name of the company). Recent news and current promotions are showed in this page via moving carousel. There is information about last purchases as well as CTA - "Buy tokens" button. Home page has a simple and elegant structure that follows Nielsen's heuristics recommendation that author mentioned earlier in the related researches. It also follows Babich and Krug's UI principles about removing clutter and all unnecessary elements.

The app has bottom tab navigation with 5 pages: Instructions, Questions, SAM (home), Orders, Map. Icons for bottom navigation were added following the Nielsen's heuristic about matching the system and real world that author mentioned earlier. Users easily understand the icons because they look familiar to the same things in their real life.
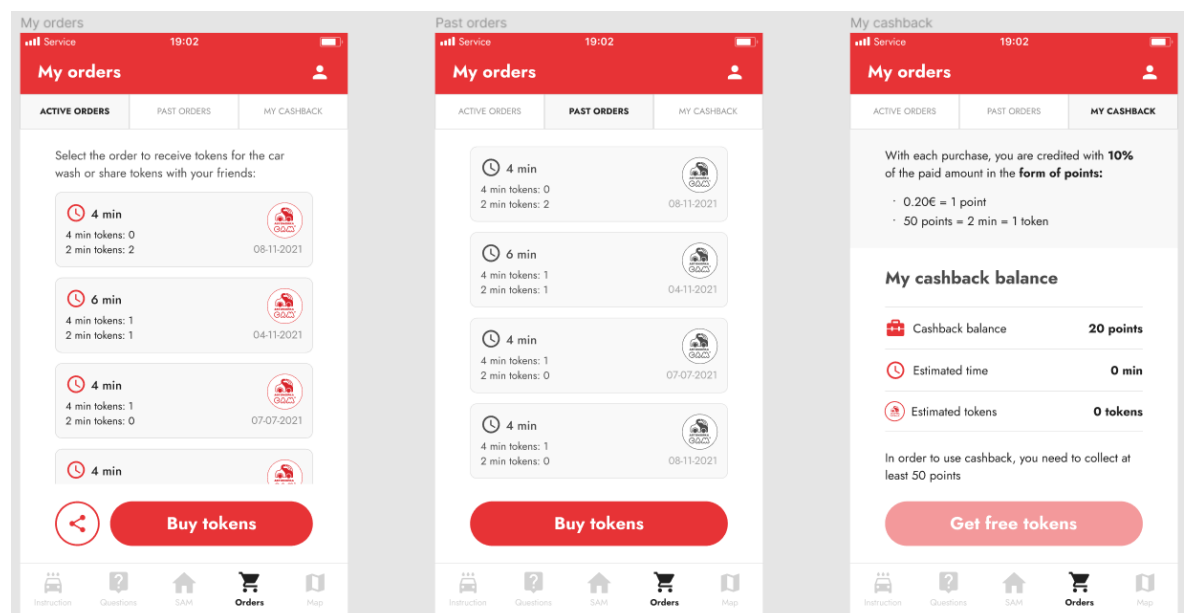

Figure 16. My orders and cashback

Orders page divided into three sub-pages that are navigated from secondary header tab at the top of the page: active orders, past orders and my cashback. Author followed Krug's advice from the research and named each page and each sub-page to give ability to user to identify his current location in the app. Active orders tab contain information about all active purchases (latest orders) and past orders tab contain information about purchases (orders) that was already used. "Buy tokens" button is placed in both tabs. Active orders page also have a "Share" button that allows to share tokens with friends. My cashback tab contains information about current cashback balance as well as general instructions how to use cashback and cashback activation button.
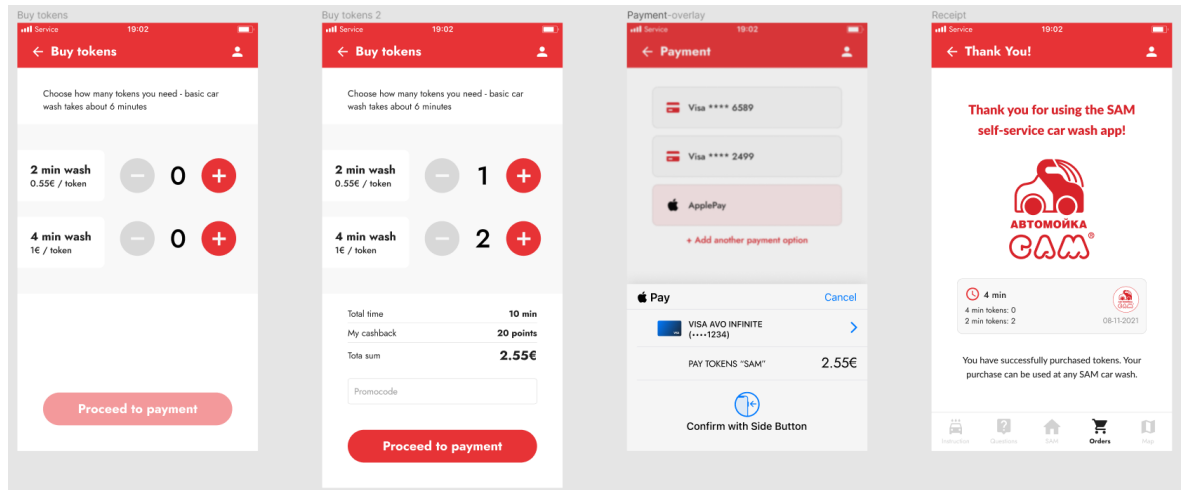
Figure 17. Buy tokens user flow

By clicking "Buy tokens" button either from SAM or Orders page, user gets into the buying process. First, he chooses the number of tokens with "-/+" buttons and then goes to payment. There are two payment options: bank card (user can add as many cards as he wants) and Apple Pay. At the end of the purchase user sees confirmation page with "Thank you" message and purchase details. According to Krug's usability laws mentioned in the research, final confirmation page ensures user that his actions were completed successfully and makes the app effective.
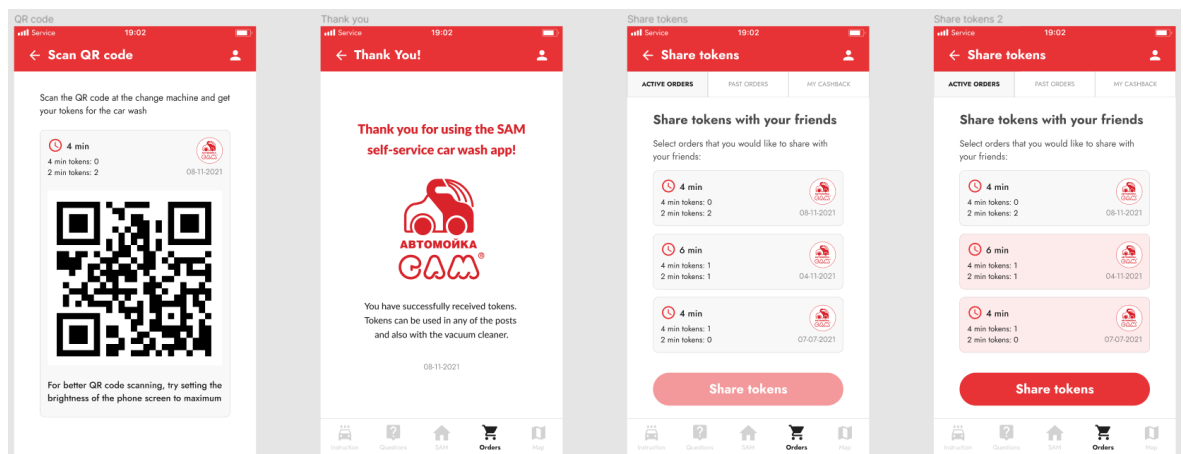
Figure 18. QR-code / Thank you message / Share tokens

When user arrives to self-service carwash he needs to activate his order and get physical tokens for car wash. To do that he chooses the order and by clicking on it he opens the order QR-code page. User scan the QR-code in special machine and get car wash tokens. When tokens are given user sees the confirmation message in the app. Figure 18 also shows "Share tokens with friends" flow. Here user just choose orders that he would like to share and send it via preferable application (WhatsApp, Facebook, etc.)
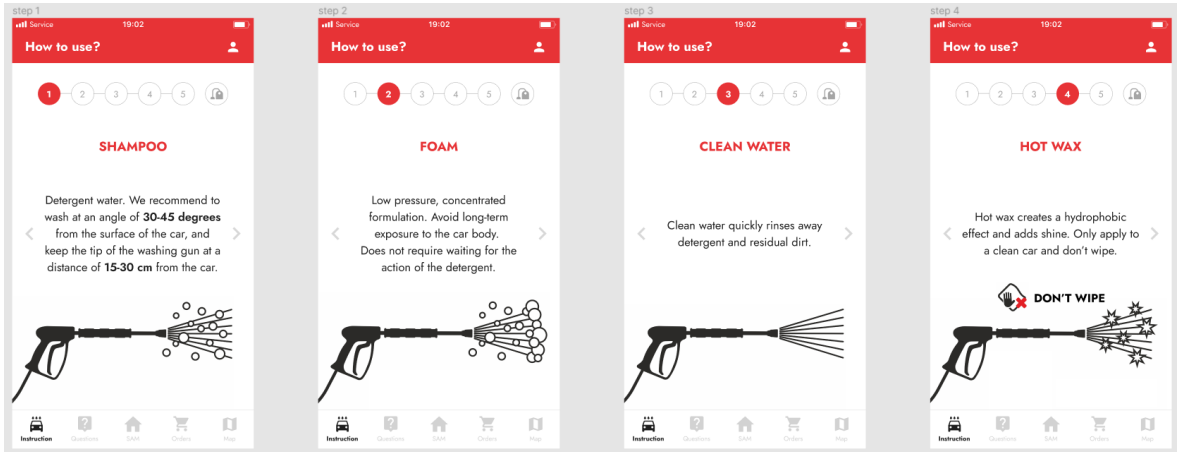
Figure 19. Instructions

Instruction page consist of six-steps recommendations for car wash. User can move through steps by clicking on side chevrons or by using step numbers at the top. The progress bar was added to this page because of Nielsen's heuristic about visibility of system status described in the research.

Figure 20. Map / Addresses

Map page has two view options. The first option is basic map view with highlighted addresses, and another option is addresses in a list format. First user testing of existing app showed that many users liked the map page and that is why the initial concept and structure of updated prototype was carried from the existing page.

Figure 21. Q&A and message form

Q&A – Questions and Answers page consist of accordion UI elements for each question and has the feedback form.
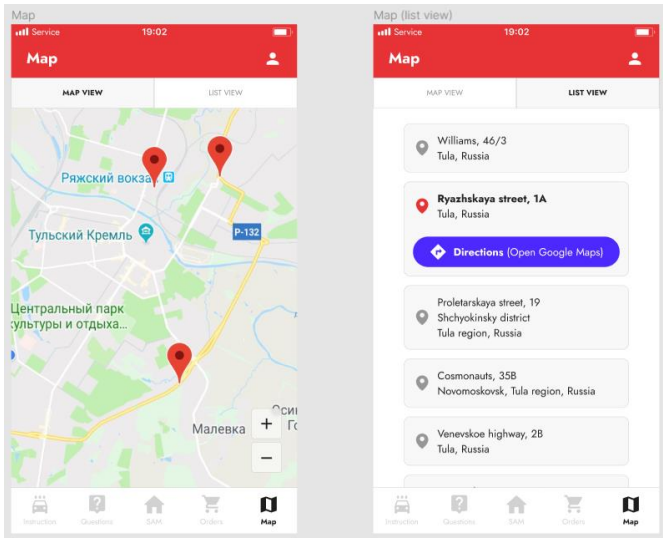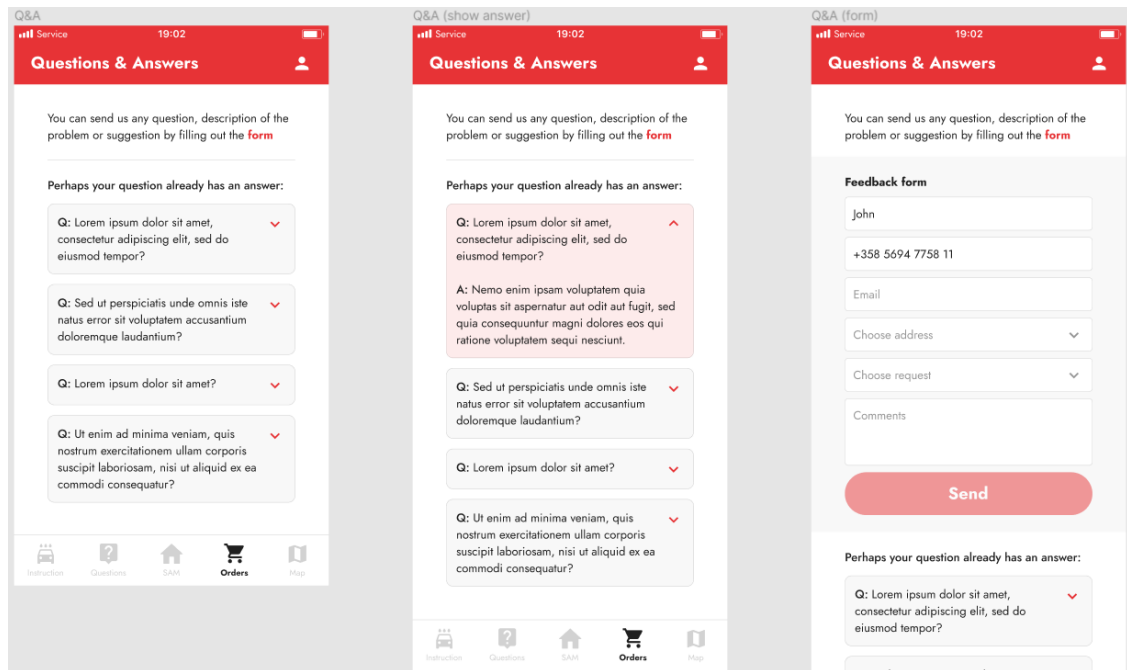
5.6 Testing

Testing is a great opportunity to discover and fix mistake at the early stage, before product is handed over to development team. It helps to avoid money and time loos in future. For the end-user testing three guests were invited and a list of tasks to be accomplished in the app was prepared. Testing were carried out in a place specially equipped with a video camera for further analysis and results definition. Each test began by asking users if they mind the video recording, and also explaining the user that author do NOT test their skills, but test the app functionality. During the testing author measured time it takes to execute the task – main tasks should have not taken more than five seconds for first user action.

For each test author introduced himself and the test topic to the user first. Then author explained the circumstances that user needs to imagine for this test, in other words read him the pretended scenario where he came to self-service car wash, and now to be able to use the service he downloaded the app to buy tokens. Author also gave the printed version of scenario to each user as well as the phone with the final prototype.

While author was observing the users and taking notes, they were performing the tasks that include:

1. Create new account
2. Buy tokens

3. Buy three 50-cent tokens and two 1-euro token
4. Is there any information about your previous purchases?
5. Activate your last order
6. Find the nearest car wash, what address does it have?
7. Find information about current promotions and sales
8. Is there any loyalty program (hint to cashback / then ask how can you use the cash-back)?
9. Find instructions about "How to use a vacuum cleaner"
10. How long does one full wash take (hint to Q&A page)?
11. Send a "present" to your friend using the app
12. Log Out
13. Pretend you forgot the password, what will you do now?

At the end of the test author asked each user to rate the app from 0-10 and give their open feedback about general experience. Author was interested in parts that they liked and did not like. No doubt, the most important question was if users found the token purchase easy and fast or not.

Final user testing showed great results and author was glad that he did not skip this step on the project. It helped to notice several pain points in the app and improve user experience in future. Testing results are covered in the next chapter.

6. Results

Based on the test results, users graded the app 8 out of 10 (in average), their general experience and comments were positive and 100% of users said that they would use the app in everyday life.

Task completion:

- All users managed to buy tokens in quite a short period of time. Moreover, none of the users made a step back - the buying tokens user flow was passed intuitively and smoothly. That was my number one priority at the beginning of the project and the biggest achievement as a result.
- Information about last orders and purchase history were clear and easy to find for everybody
- Map worked great. Some users mentioned that map feels familiar to Google maps and that is why it feels intuitive to go through it
- All users found the washing instructions and were able to intuitively scroll through them

Also, author would like to share some positive comments highlighting the good parts of the app that includes:

- Users liked the "Share tokens with friends" feature and mention that they did not expect this kind of bonus from the car wash app
- Some users liked the option to send their question / request through the app

Nevertheless, during the test couple of notes about future app improvement were considered. For example, starter screens (Log in / Sign up) look very attractive, but not very handy in practice. When a user clicks on the input field - the keyboard appears on the bottom and it overlaps with input fields and buttons. As a result, there is a need for one extra move such as to scroll up, otherwise a user does not see what he's typing and cannot click the button until he scrolls up. This issue can be easily fixed by moving input fields and buttons to the top of the screen, instead of keeping them in the middle. This small change will avoid overlapping and save users time.

Another possible future improvement includes work with the main (the very first) screen of the app. Even though it is good to keep it short and simple - that way users complete the main task and reach the goal faster - but it can still be more engaging. Author noticed that some users were trying to scroll the main page (like Instagram) expecting to see more there. One idea is to make the main page a summary of all other pages that highlight the best feature of the app on one screen and can steer to other pages with hidden links, but this change needs more research and testing.

7. Discussions

Sometimes designers collaborate with developers on the handoff stage, but since it was an external project, the customer only asked to provide design files and author was not responsible and involved into further process. Besides design prototypes, at the end of the project author provided the customer with small app design guidelines, all needed assets like icons and images and general recommendations.

Later on, the customer contacted the author again and requested to create banner images for App Store ang Google Play (figure 22).

Figure 22. Images for App Store and Google Play

As test results shows, users are happy with the final product and the main objective of the project was accomplished. During the test, main tasks were accomplished by users in given time. There were many positive feedbacks about the app: users mentioned easy navigation, intuitive and clear buying flow, simple visual design and some interesting and new feature.

Nevertheless, there is always a room for improvement, and current app prototype is not an exception. As a further app improvement, author would recommend to look deeper into user interaction with certain screens and think make more testing and research about user gestures. For example, many people are used to "swipe back" gesture to cancel any action. Also, first login / sign up pages can be slightly redesigned as was mentioned in results chapter. Apart from that, in future the company can grow as well as the app, which means the need for adding more entertainment and promotion part to the app.

8. Conclusion

The thesis opened up the topic of importance of User Experience and User Interface. Two parts were completed: the thesis report and the product itself. The research was successfully used to dive deeper into the topic and helped to create a truly working and useful product in the end.

During the collection of background theory, all relevant topics were covered including: Usability and UCD, UX and UI with all including components and process stages and favourite design tools. Background study opened up a wide range of tools and interesting methods that were put into practice for creating a product that showed great results.

The final product - app prototype for self-service car wash company - was successfully created following all design stages and rules including: research, data analysis, building information architecture, designing lo-fi and hi-fi prototypes. At the end the product was tested by real users, and showed great results as well as a couple of moments that could be improved in future.

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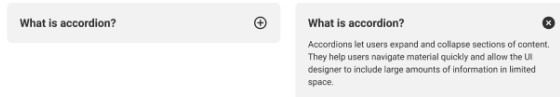
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Appendices

Appendice 1. 32 UI Elements

Original Source: https://www.figma.com/file/P82uetj3n11P3sBnlnuWss/32-UI-Elements?node-id=1%3A11

ACCORDION

What is accordion? ⊕

What is accordion? ⊗
Accordions let users expand and collapse sections of content. They help users navigate material quickly and allow the UI designer to include large amounts of information in limited space.

BUTTON

Order now!   Delete 🗑   ➕

CHECKBOX ☐ ☑

RADIO BUTTONS ◯ ◉

TOGGLE ⬤◯ ◉⬤

BENTO MENU

HAMBURGER MENU

DÖNER MENU

MEATBALLS MENU

KEBAB MENU

TAG SPECIAL PRICE CYBERSECURITY

TOOLTIP Tooltips provide little hints

LOADER

CART

★★★★☆
Cart title goes here   50$
Cards are small rectangular or square modules that contain different information
Add to my shopping bag 🛍

CAROUSEL

‹
Cart title goes here 18$
Cards are small rectangular or square modules that contain different information
Add to my shopping bag

Cart title goes here 50$
Cards are small rectangular or square modules that contain different information
Add to my shopping bag

Cart title goes here 64$
Cards are small rectangular or square modules that contain different information
Add to my shopping bag
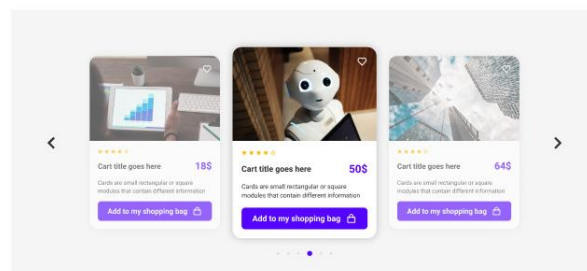›

INPUT FIELD

Email address

john.doe@gmail.com

SEARCH FIELD

Type here to search 🔍

DROPDOWN

Choose language ⌄

Choose language ⌃
English
Finnish
Swedish

FORM

Sign-up form

john.doe@gmail.com

Password

Choose language ⌄

Create account

PICKER

October 2021 ⌄   ‹ ›

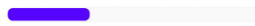| M	T	W	T	F	S	S
						1
2	3	4	5	6	7	8
9	10	11	(12)	13	14	15
16	**17**	18	19	20	21	22
23	24	25	26	27	28	29
30	1	2	3	4	5	6

NOTIFICATION

APP NAME   1h ago
Notification text goes here lorem ipsum dolor
sit amet, consectetur adipiscing elit.

ICON

✏ 🏠 📶 ↓↑ 👤 ⓘ ▢ 💬 ⧉

PROGRESS BAR

BREADCRUMB

Homepage > Women > Clothes > **Jackets**

PAGINATION

1 2 3 **4** 5

STEPPER

✓ ✓ ✓ **4** 5

SLIDER CONTROLS
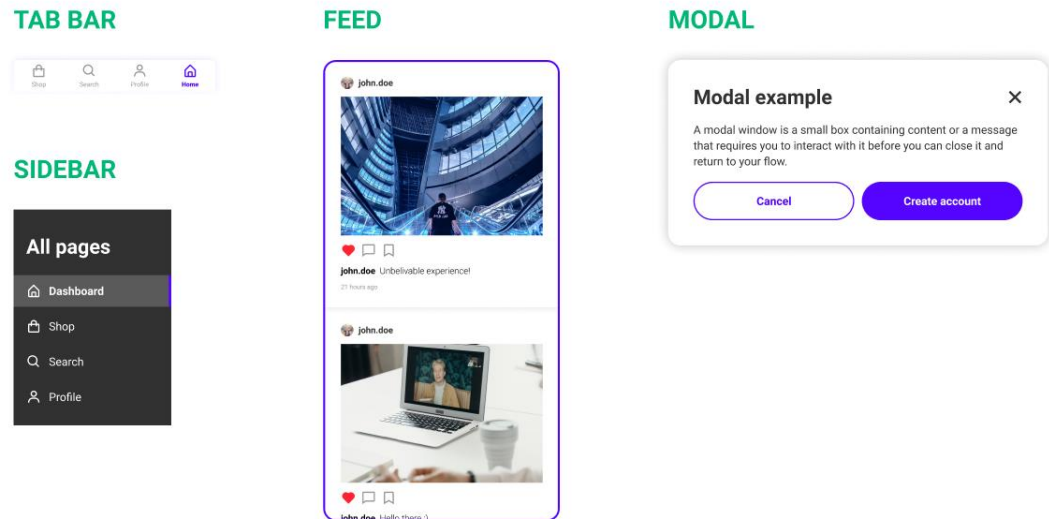
SET THE PRICE RANGE

20$ 1800$

COMMENT

Anna Doe
19 Sept 2018, 15:40
Great product! Delivery was fast and smooth. Lorem
ipsum dolor sit amet, consectetur adipiscing elit.

TAB BAR

FEED

MODAL

Modal example   ✕

A modal window is a small box containing content or a message
that requires you to interact with it before you can close it and
return to your flow.

Cancel   Create account

SIDEBAR

All pages

🏠 Dashboard

🛍 Shop

🔍 Search

👤 Profile

Appendice 2. User Interview questions

* Hi! My name is Anna and I will conduct our interview today. This interview will have an open-chat form, feel free to share your thoughts, there is no wrong and right answers. Do you mind if I record this interview for further research and analysis?

1) What is your current occupation / interests / hobbies? Do you work or study?

2) How often do you use your phone? Do you know your average screen time? iOS or Android?

3) Are there many apps on your phone? What are your favourite apps? What is your most used app? Do you use any shopping apps (which ones)? Do you make purchases in any apps on regular basis? Do you use any navigation apps (which ones)?

4) What do you like in [your favourite app]? What do you value in [app where you make purchases]? Why do you use [your favourite navigation app] / what functionality makes it stand out among other apps?

5) Do you have a car / have you ever had a car? Have you ever used self-service car wash?

6) As a car owner, would you like to have the app for your favorite car wash? Would you like to pay for car wash service through the app? Would you like to pay for the service beforehand?

7) Imagine your perfect service purchase app (or app for the self-service car wash), what does it look like / what functions would you like to include there?

8) Do you like receiving notifications about current promotions (if yes, how often)?

* Thank you for this interview!