

UKRAINIAN CATHOLIC UNIVERSITY

BACHELOR THESIS

Development of the web-application for online booking

Author:
Bohdan SHTOHRINETS

Supervisor:
Olena SHPILEVSKA

*A thesis submitted in fulfillment of the requirements
for the degree of Bachelor of Science*

in the

Department of Computer Sciences
Faculty of Applied Sciences



APPLIED
SCIENCES
FACULTY ●

Lviv 2020

Declaration of Authorship

I, Bohdan SHTOHRINETS, declare that this thesis titled, “Development of the web-application for online booking” and the work presented in it are my own. I confirm that:

- This work was done wholly or mainly while in candidature for a research degree at this University.
- Where any part of this thesis has previously been submitted for a degree or any other qualification at this University or any other institution, this has been clearly stated.
- Where I have consulted the published work of others, this is always clearly attributed.
- Where I have quoted from the work of others, the source is always given. With the exception of such quotations, this thesis is entirely my own work.
- I have acknowledged all main sources of help.
- Where the thesis is based on work done by myself jointly with others, I have made clear exactly what was done by others and what I have contributed myself.

Signed:

Date:

UKRAINIAN CATHOLIC UNIVERSITY

Faculty of Applied Sciences

Bachelor of Science

Development of the web-application for online booking

by Bohdan SHTOHRINETS

Abstract

This paper covers user experience research about how people are using online tools for booking an appointment online, their experiences and problems. Considering the information collected and UX-design best practises - developing a web-application that will cover potential users' need and also bring them high-quality user-experience.

- Live application demo can be found here: [YouCanBook application link](#)
- Source code can be found here: [Github repository link](#)

Acknowledgements

I want to thank my supervisor Olena Shpilevska for directing and mentoring me during the research and development process, for reviewing the jobs I have done, and all the consultations provided.

Contents

Declaration of Authorship	i
Abstract	ii
Acknowledgements	iii
1 Introduction	1
1.1 Motivation	1
1.2 Web application development reasons	1
1.3 Goals	1
2 Background information	2
2.1 User experience	2
2.2 Importance of UX design	3
3 Related works	4
3.1 User research	4
3.2 User testing	4
3.3 Competitors analysis	4
3.4 User persona	5
3.5 Business flow diagram	5
3.6 Information Architecture	5
3.7 Prototyping	5
4 Research approach	7
4.1 Potential users analysis	7
4.2 Competitors analysis	8
4.3 User Testing	10
4.4 General Analysis Summary	13
5 Solution overview	14
5.1 Personas	14
5.2 Business flow diagram	17
5.3 Information Architecture	18
5.4 Prototype	18
6 Conclusion	21

List of Figures

2.1	Peter Morville's UX Honeycomb (Morville, 2004)	2
2.2	Benefits of UX Investment, IBM (Mongie, 2019)	3
3.1	SWOT (<i>SWOT Analysis</i>)	5
4.1	Survey results	7
4.2	SWOT: YClients	9
4.3	SWOT: BloknotApp	9
4.4	SWOT: BeautyPro	9
4.5	User Testing: YClients	10
4.6	User Testing: BloknotApp	11
4.7	User Testing: BeautyPro	12
5.1	Persona: 19-year-old Sophia Chepyshko	14
5.2	Persona: 28-year-old Yuriy Lyba	15
5.3	Persona: 21-year-old Ihor Kravets	16
5.4	Business flow	17
5.5	Information Architecture	18
5.6	Mobile version: Home page	19
5.7	Mobile version: Booking page	20

Chapter 1

Introduction

1.1 Motivation

By technology rise, it is not a secret that the internet has become an integral part of everyday life. Today people prefer to buy things and book services online by a few clicks from the comfort of their bedrooms.

However, when it comes to booking the next visit to the hairdresser or dentist, it can become a real challenge. Most of the available services schedule those appointments in old-fashioned ways, and even if some of them use online-booking tools - after trying it, you would likely prefer to make a phone call rather than using them.

My goal is to develop an online booking service for people who like to keep pace with technologies and not wasting their time. With this solution booking your next beauty appointment will not be a problem anymore - you can do this by several clicks 24 hours a day, seven days a week, whenever it fits your schedule.

1.2 Web application development reasons

There are a few motivation factors behind developing a web application. First is business value - web apps are less expensive to build and maintain. If the business wants an app that will work on Windows, macOS, Linux and also a cross-platform mobile app - it should prepare to shell out some big bucks. Good programmers do not come cheap, and with all those versions to develop, it is no wonder many people are favouring browser-based apps.

The second reason flexible access and easy setup - it is often far more comfortable to convince people to use an app if they can get started right away. Downloading and installing feels like more of a commitment than having a play around right in a web browser. Web solution helps to remove one big step in the onboarding process effectively.

Furthermore, the application is always up to date, and users do not face the problem that they are using an outdated version and need to install the latest version.

1.3 Goals

- Explore available online-booking services.
- Identify critical features which user expects when scheduling an appointment.
- Discover how to make the online-booking process more accessible and comfortable for users.
- Develop an appointment scheduling web application for service industry .

Chapter 2

Background information

2.1 User experience

The definition outlined by the [International Organization of Standardization](#) is "User experience - a person's perceptions and responses that result from the use or anticipated use of a product, system or service." (ISO, 2009).

More simply, it is how the user feels when interacting with some product or system. UX focuses on deep understanding of users needs, values, abilities and limitations. The business goals and objectives of the product are also crucial. There are lots of factors to consider for understanding full user experience. Peter Morville has represented these factors in his [User Experience Honeycomb](#):



FIGURE 2.1: Peter Morville's UX Honeycomb (Morville, 2004)

In order for the user to get meaningful and valuable user experience, it requires a product's content to be:

- Useful: The system or product should fulfil users needs.
- Usable: Easy to use for customers.
- Desirable: Users should want to use it, so the design has to be intuitive and delight to use.
- Findable: Content should be navigable, so users can find what they need.
- Accessible: The product or system should be accessible to people with disabilities.
- Credible: Users must trust and believe what the product tells them.
- Valuable: The solution must deliver some value to customers.

Every aspect of user experience is valuable and has its unique characteristics, so in order to achieve great user experience, they should all work together.

2.2 Importance of UX design

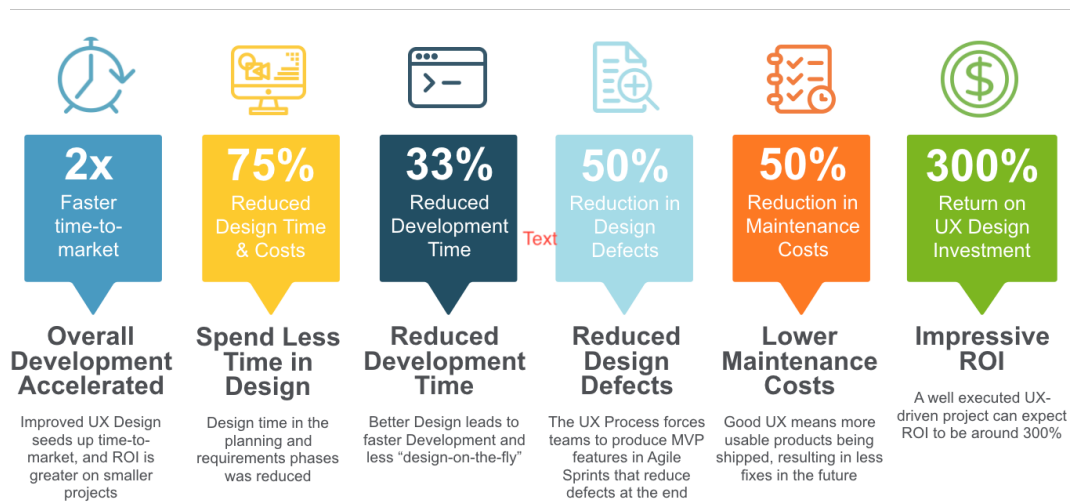


FIGURE 2.2: Benefits of UX Investment, IBM (Mongie, 2019)

Lots of people make the mistake of thinking that design is just what it looks like. However, this is much more than just good looking. Design is also about how product or service works. The good UX design creates a positive experience to users by understanding and fulfilling their needs. These things keep user loyal to the brand or product. It provides functional service to make customer's life easier, so the user wants to use the product or service because it saves them efforts, time or money. Furthermore, it makes the user feel positive when using such a service.

All successful products or services make a massive investment in UX. Without good user experience, the user sees no value or benefit to the product. It can be caused by limited functionality or by the functionality that is too difficult. As a result, the user will choose other products or service or in the worst case, find a more natural way of doing this task or find some workaround that does not involve such a product or service.

Chapter 3

Related works

3.1 User research

User research used to understand user's needs, behaviour, experience and motivations. There are two types of user research that will help to archive it (*Qualitative Vs. Quantitative Research 2018*):

- **Quantitative** research used to quantify the problem by generating numeric statistics that can be transformed into useful statistics. Some common methods are online surveys, paper surveys, online pools, website interceptors.
- **Qualitative** is a direct assessment of behaviour based on observations. It explores the user's attitudes, behaviours and opinions. User interviews, field studies, usability testing and customer calls are the most popular methods.

Significant user research helps uncover essential and useful insights about users and their needs. As long as you do not know the user's needs, emotions, feelings, you will not be able to deliver a great user experience.

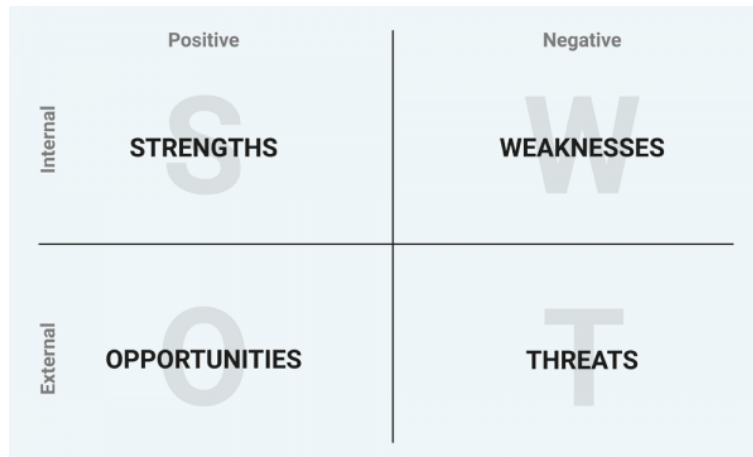
3.2 User testing

User testing is a technique which allows getting rapid user feedback. There is no difference whether you are creating a website, mobile app or prototype it will help you to know if users are capable of completing specific tasks successfully with your product and identify friction points in user experience. Testing does not require a significant sample of participants since the session aims to gather qualitative data. The earlier you do user testing, the less it will cost to fix problems in the future.

3.3 Competitors analysis

Competitors analysis is a way to collect and compare data of products and companies in the marketplace. This method used to highlight the strength and weaknesses of competitive products and helps to create a better strategy for your product. It also helps to understand the global landscape on which your product will compete, identify user types and compare the qualities of your unique products with others in the market.

One of the most popular ways to analyse competitors is the SWOT analysis. The main purpose of this method is to discover Strength, Weaknesses, Opportunities and Threats of each competitor. It is a perfect tool to recognise, fix, organise and analyse the data about competitors and based on this researches you can build or improve your product.

FIGURE 3.1: SWOT (*SWOT Analysis*)

3.4 User persona

Persona is a fictional character, which is created to represent the different user types that will use your service or product. Creating a persona will help to understand the user's needs, goals, experiences and behaviours. It can help to clarify that different clients have different needs and identify users that you are designing for. The persona should base on real-life examples and cases, so it is better to conduct user interviews before creating personas. All in all, the more time you invest in research of potential users - the better personas you will create.

3.5 Business flow diagram

A business flow diagram is one of the simplest and most traditional ways to represent main business processes. The primary goal is to give a more sophisticated understanding of the process, people, inputs, controls and outputs and potentially simplify it. It is a time-consuming process which requires time and discipline to complete this mapping, but the payoff can be significant over time.

3.6 Information Architecture

According to Peter Morville (Morville, 2012) - the purpose of Information Architecture is to help the user understand, where they are, what they have found, what is around and what to expect. IA is a skeleton of every design process. It guarantees the high-quality final product cause it reduces the possibility of usability and navigation problems. A well-thought information architecture saves both time and money as it will reduce the amount of fixing unexpected bugs that may occur by improper architecture design.

3.7 Prototyping

A prototype is an early representation or version of a product that design or front-end team creates during the design process. The main goal of the prototype is to test the flow of the design solution and gather valuable feedback on it before constructing the final product.

Tom & David Kalley perfectly figured out the importance of this process in one sentence: "If a picture is worth 1000 words, a prototype is worth 1000 meetings." (Kelley, 2018). A prototype helps UX designers to show stakeholders how the final product will look. It also saves both time and money because you can test the near-final product on test groups of users and highlight areas which are less user-friendly for users.

Chapter 4

Research approach

4.1 Potential users analysis

The global market size of online booking market is growing fast each year. Based on statistics given by [bookedin.com](#) (Schmidt, 2018), scheduling software showed one of the highest growth and its size would reach \$360 million by the end of the 2024 year.

After conducting my own survey, I have received more than 200 responds, which pointed out the critical information about our potential users which I showed in a table:

	Youngers	Adults	Elders
Number of participants	200+		
Age	18-24: 88%	25-44: 9%	45-54: 3%
Gender	Male: 56% ; Female: 44%		
Devices	Smartphone: 72% ; Tablet: 17.5%; Laptop/PC: 10.5%		
Average time spend on booking	2min.		
Dissatisfied with booking tools	31%		
Most popular features	<ul style="list-style-type: none"> ● Calendar scheduling: 93% ● Price: 90% ● View the list of available services: 80% ● Choose a specialist: 79% ● Automatic notifications: 63% ● Hot offers: 54% ● Online payment: 53% 		

FIGURE 4.1: Survey results

The results of the survey showed up that our potential user's age is between 18 and 35 years, both men and women. It showed that the significant part of the participants had an experience of using some online scheduling software and were dissatisfied with existing solutions. They are also really appreciating their time, so do not want to waste it on a long booking process. Moreover, it showed that most of the time, they use smartphones and are owners of both Android and IOS devices proportionally. Those facts made no doubt for choosing web-application to develop which will be OS independent and support both mobile and desktop devices.

4.2 Competitors analysis

Competitors analysis will give a better picture of what people use and also will show strong and weak points of each product that we can improve in our solution. For competitors analysis, I chose three services which now available on the local market:

- **YClients** - an online booking service and automation platform for the service industry. This platform can be attached to your website as a plugin by just attaching an Html-code and script to your website. After this step, you will have a widget for online-booking, CRM-system, financial accounting, analytics, SMS and email mailing, integration with cash register equipment. One of the oldest and most popular systems in Ukraine, Russia and some European countries.
- **BloknotApp** - CRM app for beauty salons, clinics. This system offers online booking, booking management, analytics, staff monitoring, financial reports, SMS mailing features. Young and not yet a popular system in Ukraine.
- **BeautyPro** - service for business automatization in the beauty-industry segment. It includes such features as online booking, client's analytics, email integration and mailing, analytics, staff monitoring, clients database, reports. Has a web plugin that can be integrated with your website and also a mobile app, which is only available for business owners.

For competitor analysis SWOT method fits perfectly. This is one of the most popular ways of analyzing the product's strength, weaknesses, opportunities and threats. After writing up the SWOT table for each competitor, we can sum up "strong features" and use them in our product and also fix "weak features".

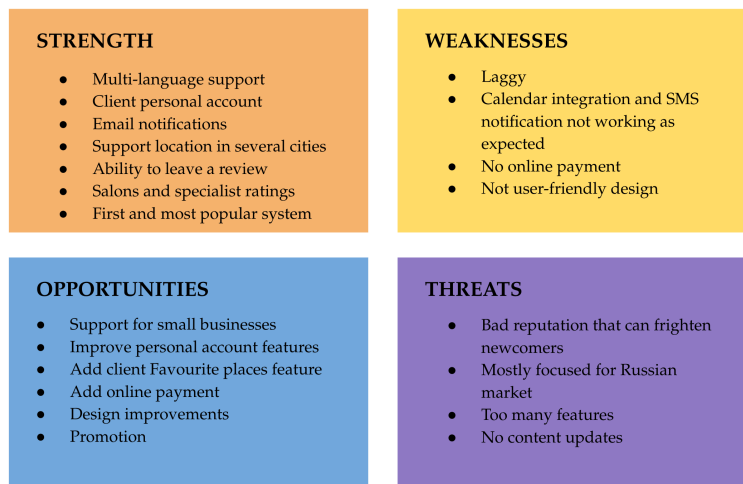


FIGURE 4.2: SWOT: YClients

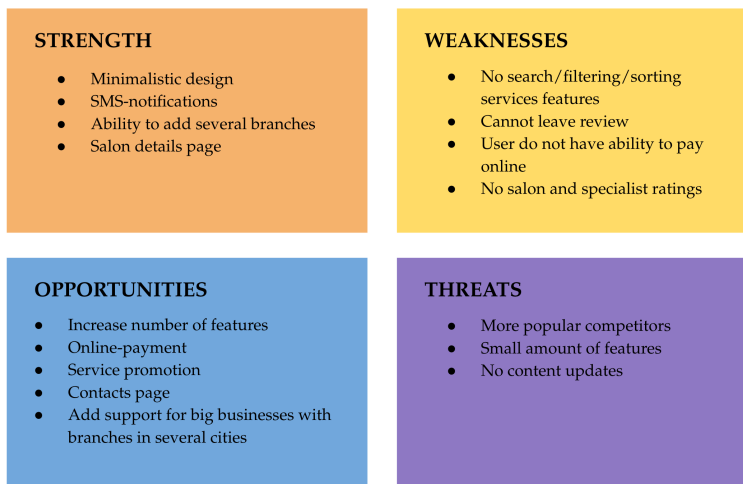


FIGURE 4.3: SWOT: BloknotApp

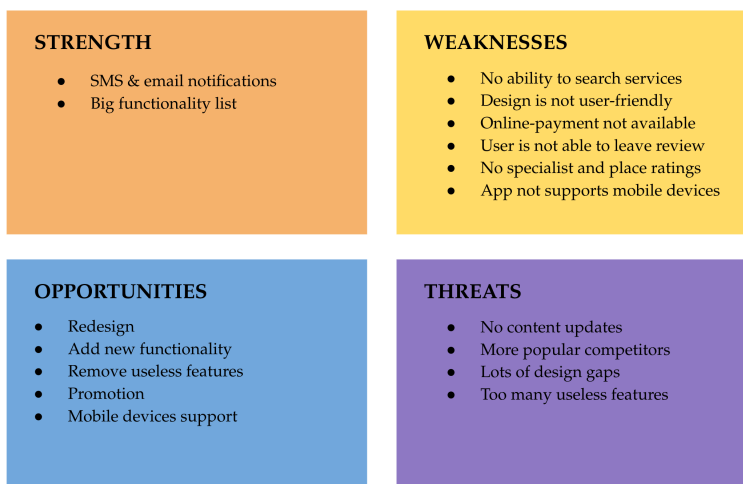


FIGURE 4.4: SWOT: BeautyPro

4.3 User Testing

After performing SWOT analysis which gave a massive list of functionality that can be implemented in my solution, I went to other iteration of my research called "User testing". It is a common technique used to check how usable the competitor's solution is. For this research, I chose six candidates (two for each service) that suit our potential user's characteristics. They were asked to book their next appointment to the hairdresser by using the given app. After the testing participants passed the survey with the following questions:

- Have you successfully booked a service desired?
- Was booking service quick and intuitive?
- Will you use an app for the second time?
- Can you share us with your feedback about using this app?
- What you like the most in the app you were using?
- What are the pain points of using this app for you?

The results of this survey will give me the whole picture of the principal strength and weaknesses of each competitor, and based on this information I will build the functionality list for my solution.

	Person #1	Person #2
Successfully booked service	+	-
Quick & Intuitive booking	+	+
Will use app for the second time	+	-
Like most in service	<ul style="list-style-type: none"> • Ability to watch ratings of specialists • Location, contacts and pricing • Successful booking • Notifications on email 	-
Pain points	<ul style="list-style-type: none"> • Laggy • No online payment • A lot of functions which are not related to booking which really confuses 	<ul style="list-style-type: none"> • Could not book service as the app got stuck
Comments	During usage had problems when choosing service (too much functional) and have not received any notification after booking for a while. Generally, enjoyed it and might use for the second time.	I have managed to book an appointment, but got the following problem - the app got stuck on specialist choosing and even reload did not help.

FIGURE 4.5: User Testing: YClients

	Person #1	Person #2
Successfully booked service	+	+
Quick & Intuitive booking	+	+
Will use app for the second time	+	+
Like most in service	<ul style="list-style-type: none"> • SMS reminder after booking • Short and convenient booking form without extra functionality 	<ul style="list-style-type: none"> • Minimalistic design • Calculates total price when choosing several services • A convenient calendar where can choose time slot needed
Pain points	<ul style="list-style-type: none"> • No specialist ratings • Hard to find service needed in a huge list • Lack of search and sorting features • No salon contact info 	<ul style="list-style-type: none"> • No option to add some extra comments to the booking form • Lack of the reminder option about the day of appointment in the calendar or by phone call • Need to add a more colourful design
Comments	<p>This service has minimal functionality that needed for appointment booking. The major minus I faced was service choosing page - the list of service was too big, so I spent a lot of time finding needed service. I think they also need to work on design because now it looks like a simple Google form.</p>	<p>Enjoyed such option to book my next appointment to hairdresser online. Although there are some things that I was really missing in the booking form. Firstly, they should add additional comments option which is needed when a person has some extra suggestions. What is more, the design of this service is too wearing, so I think they should add more colours to make it more friendly.</p>

FIGURE 4.6: User Testing: BloknotApp

	Person #1	Person #2
Successfully booked service	-	+
Quick & Intuitive booking	-	-
Will use app for the second time	-	-
Like most in service	-	<ul style="list-style-type: none"> • Rapid feedback - a reminder about appointment booking was sent immediately after booking
Pain points	<ul style="list-style-type: none"> • Too many services which are not grouped • No contacts, location info • Specialists ratings are not available • Can not book service by mobile phone 	<ul style="list-style-type: none"> • Services are badly grouped, as a result, really hard to find service needed • No online payment • After click on submit button no notification on UI that service was booked
Comments	<p>It is almost impossible to use this service. When I tried to book my next visit to the hairdresser by smartphone - it turned out that this platform is not mobile device supportive.</p> <p>Furthermore, there is a vast services list which not grouped, so my attempt to find needed one was unsuccessful.</p>	<p>When I first entered the home page of this app, I have literally got lost. There is a huge amount of services available, and it is really hard to navigate with them because they are not grouped and unfortunately - not filtering or search features implemented. Also, other major problem that I faced - when you click submit button after filling in user information form you get no notification about if your booking was completed or not. Instead, you get just a blank page. As for me, this app is now impossible to use, and it needs a lot of work to complete to make it user-friendly.</p>

FIGURE 4.7: User Testing: BeautyPro

4.4 General Analysis Summary

Finally, after all investigations done, we can form our list of improvements. Here is the list of all competitors and references advantages that we can use to improve our project:

- Add several business branches
- Support smartphones and tablets(responsiveness)
- Home page where available all places that user can book
- Add tabs to display General information and Contacts
- User can select several services by multi-select
- Show progress of booking in steps/breadcrumbs
- Display the total cost of booking calculation
- Service and specialist ratings/ overviews
- Add Alerts/toasts to inform the user about some errors occurred
- Notifications to keep user informed about his completed actions
- Client information form validation hints
- Add additional comments field in user info form
- Option for reminding about the scheduled appointment at the day before
- Add tooltips for buttons/links
- Special offers and sales on home page
- Integration with google maps
- Calendar integration
- Online payment
- Search, filtering and sorting features
- Ability for user to leave feedback

Chapter 5

Solution overview

5.1 Personas

Research gave us a big set of information for further development. In this section, I came up with three personas, who represent different types of users that might use our app.

Let us explore the first persona (Figure 5.1). It is 19-year-old student Sophia, who spends lots of time on studying in medical university and also combines it with a part-time job. As a result, she has short of spare time during the week, so she needs convenient and not the time-consuming tool which will allow booking an appointment she wants without any pains quickly. Also, she wants to provide this system in her parents' clinic because she thinks it may attract new clients.

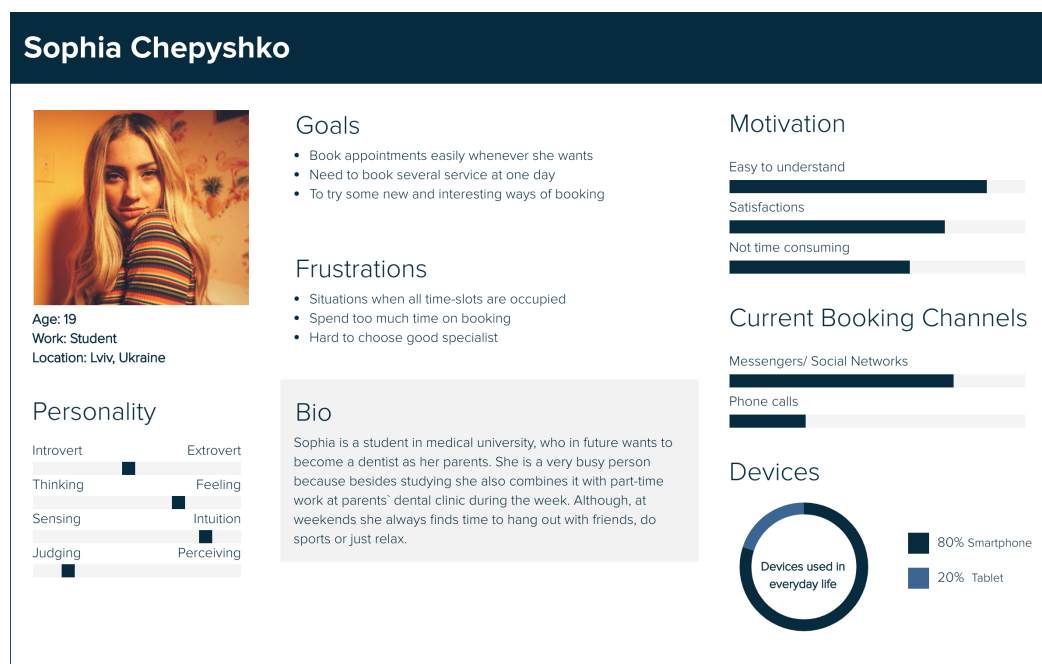


FIGURE 5.1: Persona: 19-year-old Sophia Chepyshko

The second persona is 28-year-old software developer Yuriy (Figure 5.2). He has no fixed schedule, so he can manage his time as he wants. Although, he is a very active person who does not like to spend his time ineffectively and uses lots of online-tools which help him to control his schedule. He also wants to have such a tool that will allow to book appointments online and automatically integrate with his calendar so that he will not forget about this due to his tight schedule. Yuriy has

previously tried, so systems for online booking in the local barbershops and was disappointed with their design and app performance, so he is interested in something new. He also wants it to have the ability to pay online because he does not use cash often.

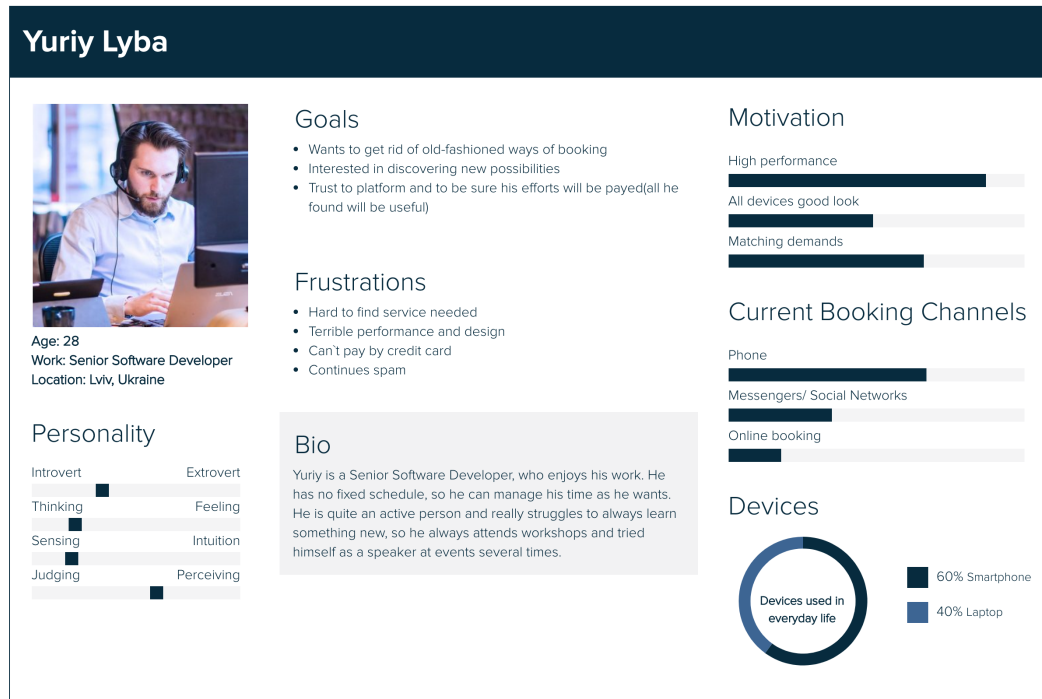


FIGURE 5.2: Persona: 28-year-old Yuriy Lyba

The last persona is 21 years old boy Ihor (Figure 5.3) who is studying in university on law faculty. He is quite an unstable person with really changeable interests. He does not like booking something because it is a long and monotonous process, so he usually asks somebody to do so for him like parents or friends. The typical problem for him forgetting about such appointments because he holds everything in his head and has no any reminders.

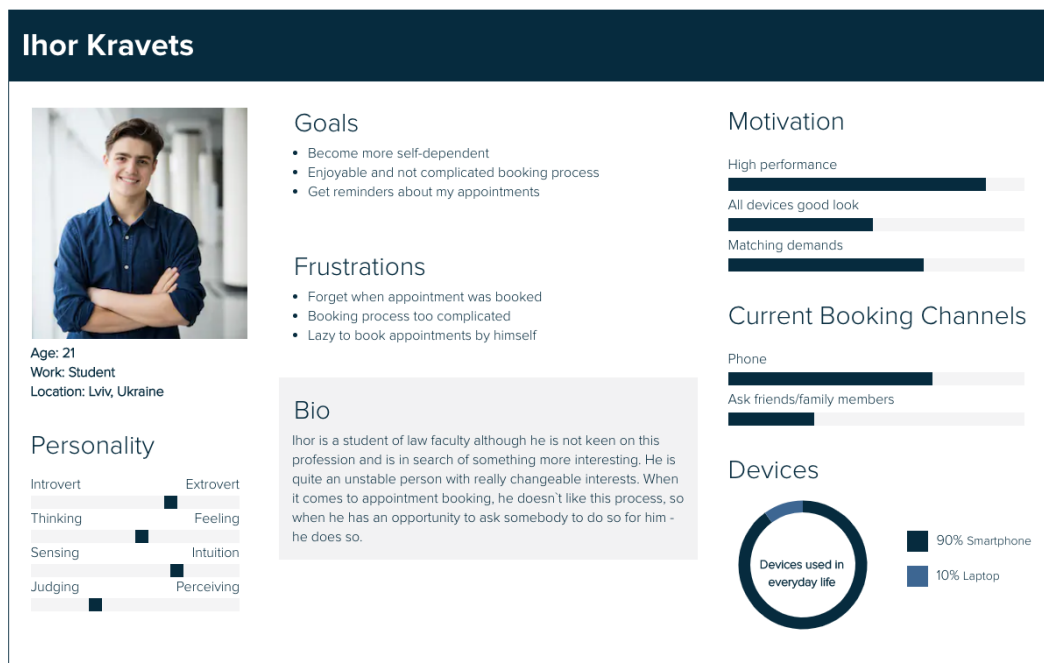


FIGURE 5.3: Persona: 21-year-old Ihor Kravets

5.2 Business flow diagram

This section gives the representation of the primary business process of application in the form of Use Case diagram (Figure 5.4). The Booking process requires five main steps to complete for a successful appointment booking: choosing a place, choosing services, choosing a specialist, picking date and time slots and finally filling in confirmation form that requires the input of personal user information. All these steps described as extensions of the foremost "Booking Appointment" step in the diagram.

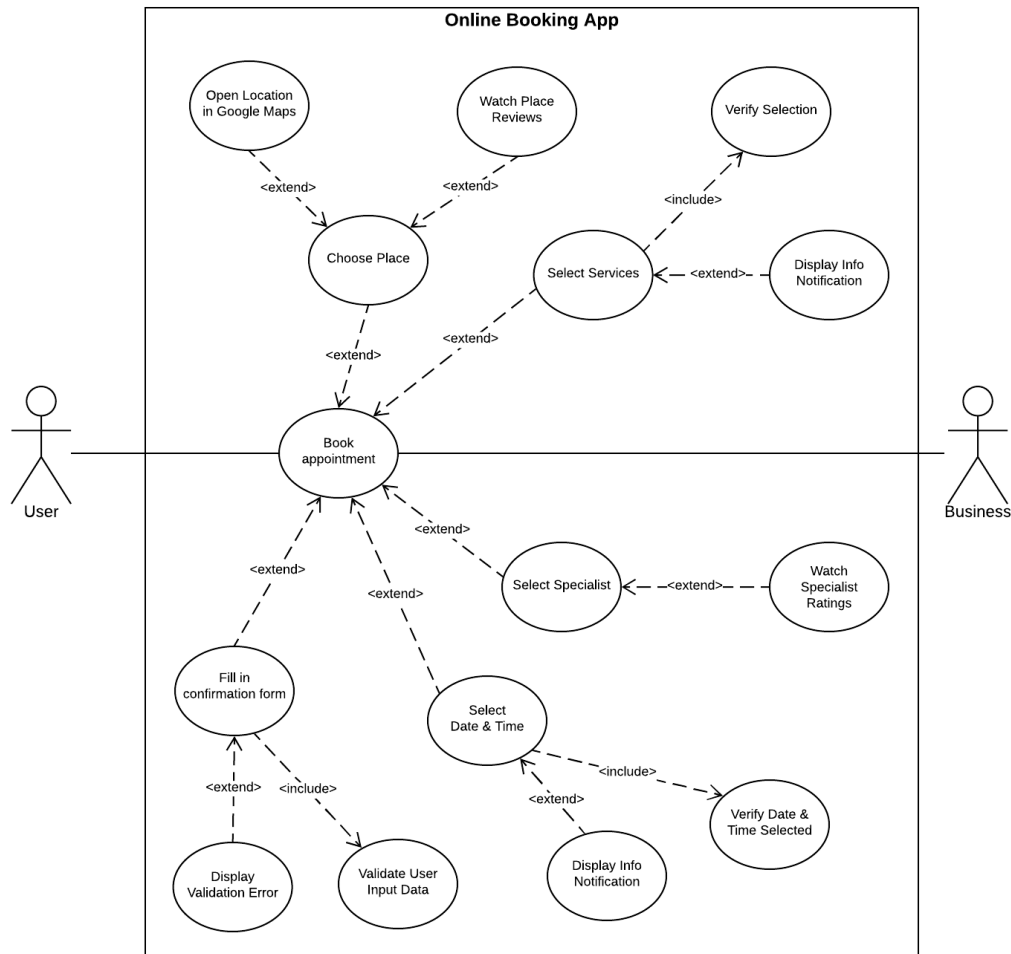


FIGURE 5.4: Business flow

5.3 Information Architecture

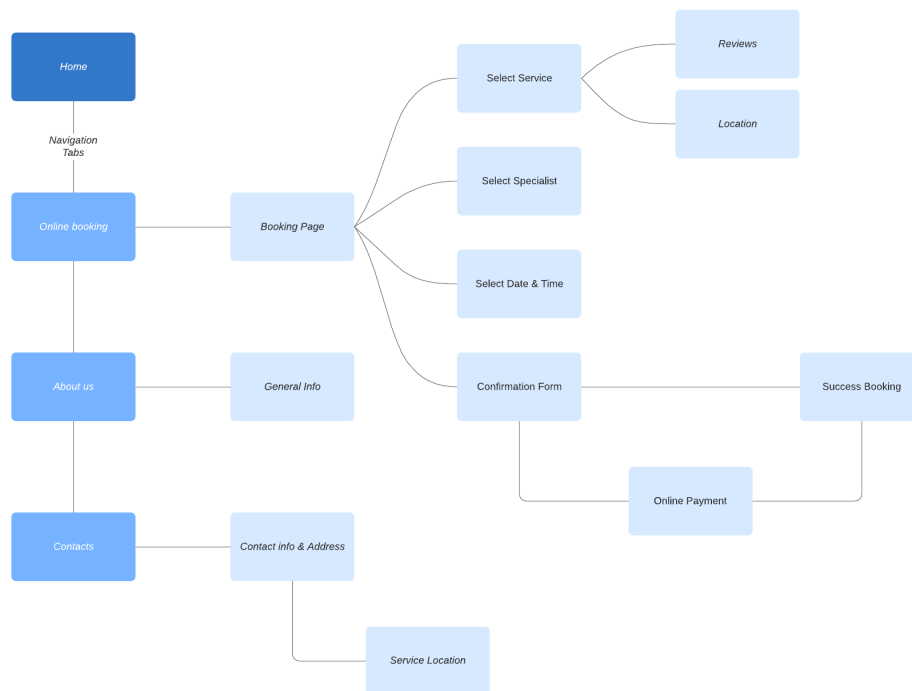


FIGURE 5.5: Information Architecture

5.4 Prototype

The app contains two main blocks: Home page and Booking page. It does not need registration, so as you entered - you are ready to book the first appointment.

The Home page (Figure 5.6) consists of three tabs: Online-booking, About us, Contacts. Online-booking is the primary tab which opens when you enter the app. On this page, you can choose the place where you want to book an appointment, see reviews and location of service. About us tab contains general information about service. The last Contacts tab is the place where the user can find contact info, social media links and address of the place which he or she wants to attend.

The next section is Booking page (Figure 5.7), where the user redirected when clicks "Book appointment" button on one of the services available. This page consists of four steps where the user has to choose services, specialist, date and time of booking and finally fill in general contact information. The service choose step provided to the user for quickly and without any pain choose the service or several services that the client wants to book. This page has such features like search, where user can find service desired by only typing its name. All services all grouped by the similarity that helps the user by the title of section understand if this section consists service desired. When the user chose at least one service, the app shows notification where the user sees a summary of the price that you should pay and approximate time that you will spend. After the user chose service, the app redirects to the next step, where you can select a specialist. The rating feature helps the user to compare and choose the best one easily. The following step "Choose date time" requires a

user to choose date and time slot for a visit. Finally, the user is redirected to the step where he should confirm the booking by entering contact info. On this page, the user can also manage his booking by toolbar on the bottom of the form and change some parameters if they are not correct.

When all those steps are done, the user will see the page with notification about successful booking. On this page, you can return to the home page or directly book one more service.

[Link to the Application Live Demo](#)

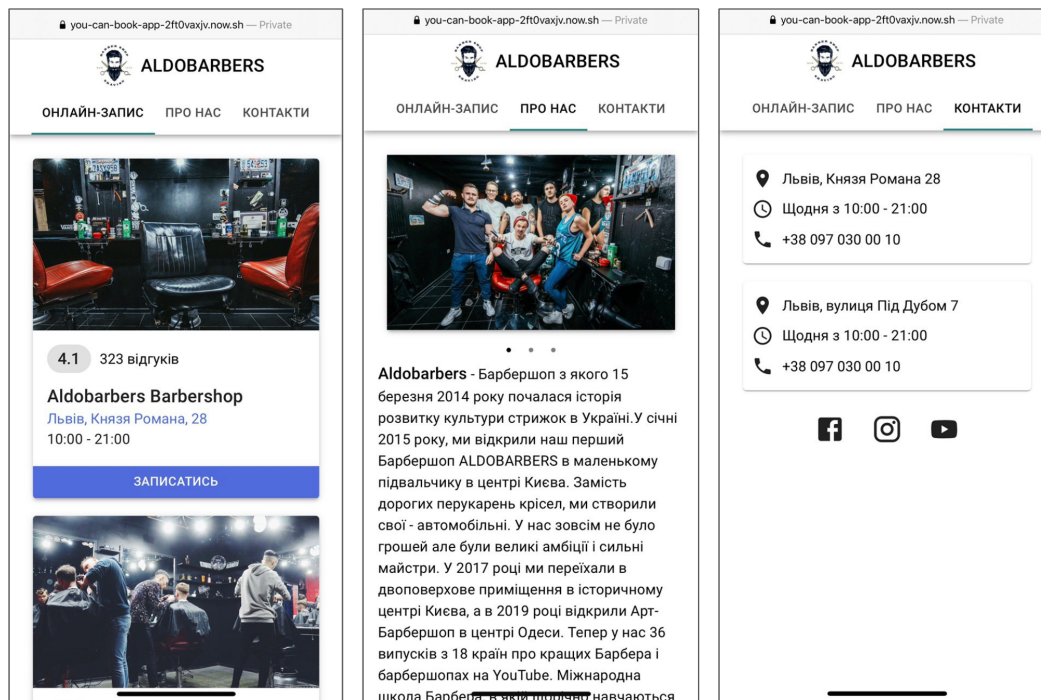


FIGURE 5.6: Mobile version: Home page

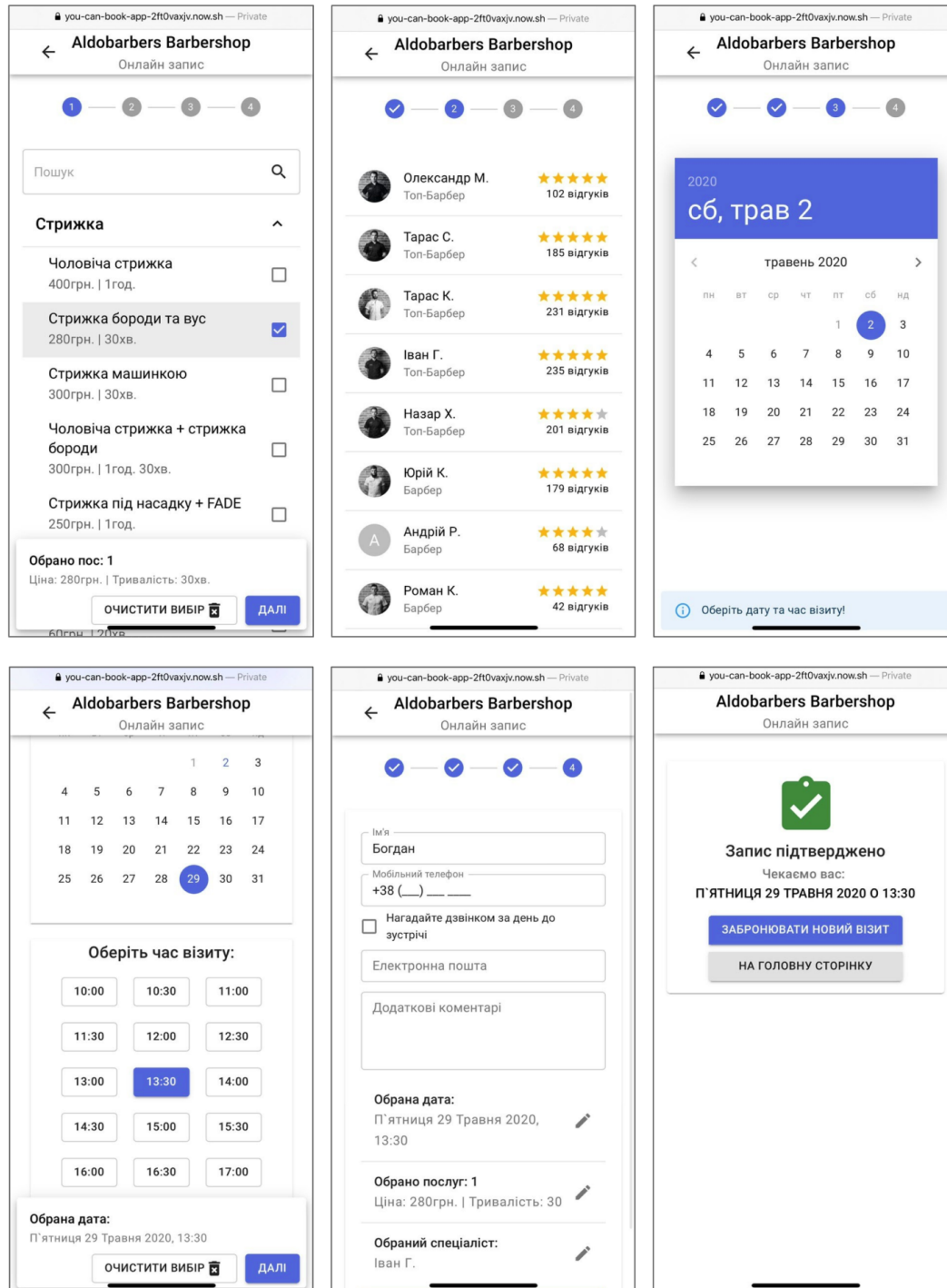


FIGURE 5.7: Mobile version: Booking page

Chapter 6

Conclusion

In this work, I used lots of UX tools which helped me to perform complex product research. Based on the results, I developed a modern and convenient online-tool which might improve the booking process for lots of people and also help businesses to get more customers and, as a result, higher income. Of course, this is just an MVP version with only basic functionality which requires lots of further testing and might change by the time passes. However, the first testing stages with real users got positive feedback and showed that this product has a bright future and the right to live.

Bibliography

- ISO (2009). "Ergonomics of human-system interaction - Part 210: Human-centered design for interactive systems". In: *ISO FDIS 9241-210:2009*. URL: <https://www.iso.org/obp/ui/#iso:std:iso:9241:-210:ed-1:v1:en>.
- Kelley, Tom David (2018). "A Prototype Is Worth 1000 Meetings". In: *Prototypr.io*. URL: <https://blog.prototypr.io/a-prototype-is-worth-1000-meetings-b9ec8107befc>.
- Mongie, Mark (2019). *The True ROI of UX*. URL: <http://www.uxdesigndoc.com/2019/05/15/the-true-roi-of-ux-part-1>.
- Morville, Peter (2004). "User Experience Design". In: *Semantic Studios*. URL: http://semanticstudios.com/user_experience_design.
- (2012). *Understanding Information Architecture*. URL: <https://prezi.com/aafmvya6bk7t/understanding-information-architecture>.
- Qualitative Vs. Quantitative Research* (2018). URL: <https://www.ikoninternational.org/news/2018/2/26/qualitative-vs-quantitative-research>.
- Schmidt, Leanne (2018). *Online Appointment Booking Statistics*. URL: <https://bookedin.com/blog/online-appointment-booking-statistics>.
- SWOT Analysis*. URL: <https://www.designmethodsfinder.com/methods/swot-analysis>.