

Dental Connect.

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Kareen Ziadat

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Discussion of forms prototyping

Low-fidelity user prototypes (wireframes)

This type of prototype focuses on the general concept of the app rather than the aesthetic design. It is not the final look of the prototype, but it allows the customer to test the flow of the application to determine whether it is giving the required value.

They are beneficial for getting user feedback, identifying potential usability difficulties, and confirming the overall concept.

High-fidelity user prototypes (mockups)

This form is still low in technicality; it does not cover all the characteristics, but it does include the core idea. The design is quite realistic and nearly identical to the final product.

This form of prototyping allows stakeholders to define what they like and hate about the prototype, evaluate the app's usability, and make informed design decisions.

Feasibility prototype (proof of concept prototype)

This form focuses on the technical aspects of the program to ensure that the code is working properly rather than the design (minimum interface). Because the code is unlikely to be used, only the essential functionality should be created (no need for error handling, performance enhancement, and so on).

They aid in the early identification of possible technological issues.

Live-data prototypes

The key purpose is to collect genuine data that will assist in determining whether a concept works. We will send actual data to be evaluated. Like the previous prototyping forms, it will not be fully scalable, fully functional, SEO, or fully capable of error handling, etc.

They are useful for testing and evaluating the application's behavior in a real-world setting.

Assessment of forms prototyping

Low-fidelity user prototypes

Advantages

- Very quick when compared to the other forms, making it cost effective.
- Help validate the value proposition and if the application is usable.
- Enables early communication and feedback with stakeholders on the suggested usability and value, enabling rapid feedback inclusion.

Disadvantages

- No feedback is collected regarding the visual design as the visuals aren't like the product.
- The aesthetic of the application plays an important role in the user experience therefore the comprehensive user experience isn't tested in this form.
- Since not all the functionalities of the application are included in the prototype, testing isn't complete.

Appropriateness to Testing Outcomes

This form of prototyping is mostly appropriate for early-stage testing. Feedback gathered will challenge the usability, concept, value proposition and application flow allowing quick feedback. It is not comprehensive as it lacks the visuals and full functionality of the product.

High-fidelity user prototypes

Advantages

- An extremely realistic interface in comparison to the final result, allowing for comprehensive aesthetic feedback.
- Capable of testing usability and user experience. (Is it simple to use? What emotions does the design evoke? Is it friendly to the target customer? Etc.)
- Allows the designer to know what the stakeholders are looking for and what message they are trying to communicate through the design.

Disadvantages

- The time required to create this prototype is significantly increased because it will be extremely visually realistic and detailed. As a result, it is costly to produce.

- Isn't completely focused on the functionality, which may cause the application to miss the targeted value proposition.

Appropriateness to Testing Outcomes

This form is most appropriate when we want to test the usability and the visuals, especially when that is the focus of the product for example, VR headset. They're useful for evaluating general user experience, spotting potential design faults, and making design decisions.

Feasibility prototype

Advantages

- Ensures that the technical aspects of the application have been thoroughly tested. As a result, fundamental functionalities have been tested and are feasible.
- Ensures that the frameworks and technologies are compatible.

Disadvantages

- Because visuals are not the primary focus, we will be unable to test the user experience.
- Non-functional needs are not thoroughly checked.
- Usually throwaway code, therefore time consuming and costly. (Transition from feasible to fully functional isn't smooth)

Appropriateness to Testing Outcomes

They are useful for evaluating technical features and identifying potential constraints or obstacles, as well as determining the feasibility of implementing specific technologies.

Live-data prototypes

Advantages

- Allows us to test if the application performs as expected using real data. (Simulation to test behavior of the application)
- Allows us to know whether the application is scalable.
- Analytics can be done to gather meaningful insights to allow informed decision making.

Disadvantages

- Complex (hard to handle large amounts of data if done incorrectly)
- Not all features are covered.

Appropriateness to Testing Outcomes

This form aids in making educated decisions and adjustments based on actual user behavior by assessing the functionality and performance of the program using real data.

Review of standard prototyping tools

A comparison of various tools is shown below.

Tool	Platforms	Strengths	Weaknesses	
	Figma	Online, macOS, Windows	Collaborative, easy-to-use, has all features you may need.	Some features may be challenging for beginners, limited vector editing capabilities
	Adobe XD	macOS, Windows	Great vector editing, allows voice prototyping	Limited support for design systems, has a steep learning curve
	InVision Studio	macOS, Windows	Great at responsive design, Collaborative.	Limited vector editing capabilities, can be slow with large files
	JustInMind	Online, macOS, Windows	Interactive prototypes, conditional logic, collaboration	Can be slow with large files
	Proto.io	Web, iOS, Android	Drag-and-drop editor, animations, mobile app prototyping	Limited vector editing capabilities, limited collaboration options

How they can be utilized to successfully identify and test user requirements.

Figma

Figma includes a plethora of functionality, such as vector editing, prototyping, and design version control. Its ease of use, adaptability, and collaborative features make it popular among designers.

Designers will be able to create interactive user interface prototypes and mockups. This will be displayed to the stakeholders, enabling easy feedback incorporation and progression to the next iteration. Figma prototypes can be used for usability testing (how stakeholders interact with the application), allowing validation and refining of user requirements.

Adobe XD

Another popular design and prototyping tool which is used to create interactive prototypes, wireframes, and UI/UX designs. It has powerful features and Adobe Creative Cloud integration.

Enables users to produce wireframes and interactive prototypes. Designers may make aesthetically appealing designs by utilizing its vector editing skills (high fidelity user prototypes). Sharing the prototypes will allow to do user testing to ensure all user requirements are met and if not, refinement is needed.

InVision

InVision has capabilities such as design versioning, real-time collaboration, user testing, and connection with common design tools. It is frequently utilized because of its ability to expedite the design feedback cycle and allow effective communication among design teams.

The timeline animation tool in InVision helps designers to model and test complicated interactions. Designers can validate user needs with InVision by seeing how people move through the prototype and engage with the interface.

JustInMind

It provides a variety of pre-built UI elements, animations, and interactions to help create working prototypes rapidly. It enables drag and drop as well as conditional functionality.

Designers can create interactive prototypes using conditional logic. Designers can evaluate user requirements by simulating different user scenarios and testing the responsiveness of the interface.

Proto.io

Proto.io is a web-based prototyping tool that offers a variety of UI components, gestures, and transitions for creating realistic and compelling prototypes.

It may have restrictions in vector editing and collaboration possibilities, which should be considered when using it to define and test user requirements.

Review of end user categorizations, classifications, and behavior modelling techniques.

End user categorizations, classifications techniques

The most effective forms of end users' categorization/ classification:

- Demographic segmentation: categorizing end users based on gender, age, education, occupation, and income.
- Geographic segmentation: classifying end users based on their geographic location, such as country, region, city.
- Lifestyle segmentation: End users are divided into groups depending on their attitudes, interests, opinions, activities, and values.
- behavioral segmentation: End users are classified based on their behaviors, such as their purchase habits, brand loyalty, and decision-making processes.
- business customer segmentation: classifying based on the scale of the business or the type of the business.

Behavior modelling techniques

According to BJ Fogg's behavior model the following elements contribute significantly on the end users' behavior.



1. Motivation: Pleasure and suffering motivate us physically, anticipation and emotions stimulate us emotionally, and a sense of belonging motivates us socially.
2. Ability (Simplicity): The ability for a behavior to be considered simple is determined by elements such as the availability of time, its alignment with routines, the amount of physical effort necessary, the amount of money available, adherence to society standards, and the absence of cognitive overload.
3. Triggers: classified as a spark for people who have ability but lack motivation, a facilitator for those who are motivated but lack ability, and a signal for those who have both ability and motivation but require a clear action to motivate them to act.

Prototyping methodologies

There are four main prototyping methodologies:

- Rapid throwaway prototype: A quick prototype built to test ideas and gather feedback, with no plans for future development or improvement.
- Evolutionary prototype: A prototype that gradually changes and improves because of user feedback and iterative refining.
- Incremental prototype: A prototype created by gradually adding and testing new features, gradually extending functionality.
- Extreme prototype: usually used in web development.

Prototyping Plan

Generic product description

The app is a platform that connects dentistry students with patients who need free dental care. Dentistry students can use the app to facilitate the process of finding the specific dental case during their clinicals (year 3 – 4), decreasing the stress of not finding the correct patient. The app also decreases the likelihood of no-shows by including a down payment system that incentivizes patients to show up for their appointments. Pharmacy owners and dentistry doctors can sign up patients who may not be able to access the app themselves. The app is free to use for both dentistry students and patients and is available on mobile devices.

Business requirements

Goals

1. Increase the dentistry student's satisfaction in their clinicals by 60%.
2. Reduce the DMFT** score by 10 - 15% in 4 years.
3. Get more training hours and credibility as a dentist student.

**The "DMFT" index: Decayed, Missing, and Filled Teeth. The prevalence and severity of dental decay in a population is measured using this index. A lower DMFT score suggests improved oral health and fewer dental issues.

Objectives

1. Increase the dentistry student's satisfaction in their clinicals by 60%:
 - Conduct a survey among dentistry students to assess the current level of satisfaction with their clinicals.
 - Introduce the students to the application by spreading QR codes in campus.
 - Reconduct the survey and assess the level of satisfaction with their clinicals after being introduced to the application.
2. Reduce the DMFT score by 10-15% in 4 years:
 - Increase the availability of oral health care services available (more people can access dental care).
 - Take note of the current DMFT score in the target population.
 - Take note of the updated DMFT index,

Needs

- Reduce stress and headaches caused by not finding patients to successfully complete their clinicals.
- Help the community by increasing access to dental care (free dental care).
- Reduce no-shows in clinicals.

User requirements

Stakeholders

1. Dental students
2. Patients
3. Application developers
4. Pharmacy owners and dentists

Expectations

1. Dental students:
 - Decrease the time needed to find a patient.
 - Get more training.
 - Have more real-life experience/training increasing their credibility.
2. Patients
 - Get free reliable dental care.
3. Pharmacy owners and dentists
 - Help their community.

System requirements

Functional requirements

Each user segment will have a different user interface depending on the functional requirements they need.

For all users:

1. User Authentication: The app should allow users to create an account, log in, and manage their account information.

For dentistry students:

1. Appointment Scheduling: The app should allow dentistry students to schedule appointments with patients and allow patients to approve or decline those appointments.
2. Appointment Management: The app should allow dentistry students to see their upcoming appointments and approve checkup appointments.

For patients:

1. Online Initial Checkup: The app should allow patients to do an online initial checkup to help dentistry students search for specific cases.
2. Appointments managing: They can approve and reject appointments.
3. Down Payment System: The app should allow patients to make a down payment before their appointment, which they will get back if they show up for their appointment and rate the student.

For dentists

1. Sign up form: The app should allow pharmacy owners and dentistry doctors to sign up patients who may not be able to access the app themselves.
2. It should allow the dentists to see the rating of all dental students.

Non-functional

- High performance with no delay.
- Simple interface, easy to understand process.
- Colors are not too bright, cohesive.
- High security.

Product end users and behavior modelling techniques

I am mainly using demographic segmentation since the difference among end users is based on characteristics like age, profession, income level. To classify and categorize the end user, I talked to a sample of potential end users and understood their needs, preferences, characteristics, and behaviors (early user research).

End user segmentation

Segmentation types	Segmentation Chosen Ex: age, region, ...etc.	Segmentation criteria Ex: age>18, region=Amman, ...etc.
Demographic Segmentation	Profession	Profession=Dentistry student or dentists. For patients any profession is ok.
Geographic Segmentation	Country	Country=Jordan
Lifestyle Segmentation	Interests and activities	Interests and activities=any
Behavioral Segmentation	Browsing habits	Browsing habits=doesn't have much time
Business Customer Segmentation	Business size	Business size=individual use

Based on my analysis of end user segmentation, I have identified three categories based on profession for my users: dentists, students, and patients (regardless of their profession). Using this demographic segmentation, I have created the following user personas:

Personas created from early user research.

- User 1:



Dalia
Dentistry student

Age: 22
Children: 0
Employer: Not yet

Personal Traits

Patience	90%
Flexibility	40%
Problem-solving	70%

Bio

Dalia is 22 and is a 4th year dentistry student. She is currently doing the clinical trials and is looking forward to graduate and start working.

Needs

- Dalia wishes for the clinicals to go as smoothly as possible.
- She wishes to spend more time relaxing and spending time on herself.

Frustrations

- People not showing up
- Academic stress
- Dirty house

Free Time

Usually, Dalia does not have any free time. Her average free time to herself is 30 to 40 minutes. Sometimes she browses the internet.

- User 2:



I work so hard and earn so little
- Ahmad M.

Personal Traits

Adaptability	72%
Curiosity	45%
Open-minded	60%
Analytical	20%

Me Time

Browsing the Internet, watching YouTube tutorials, driving around and playing cards with my friends.

Goals

Jonathan is ambitious and wants to be a the first self-made millionaire in his family.

Challenges

- Ahmad has to work full time during office hours, sometimes has to work ahead for a meeting or a conference call.
- The money he is currently making isn't sufficient
- Ahmad doesn't have medical insurance

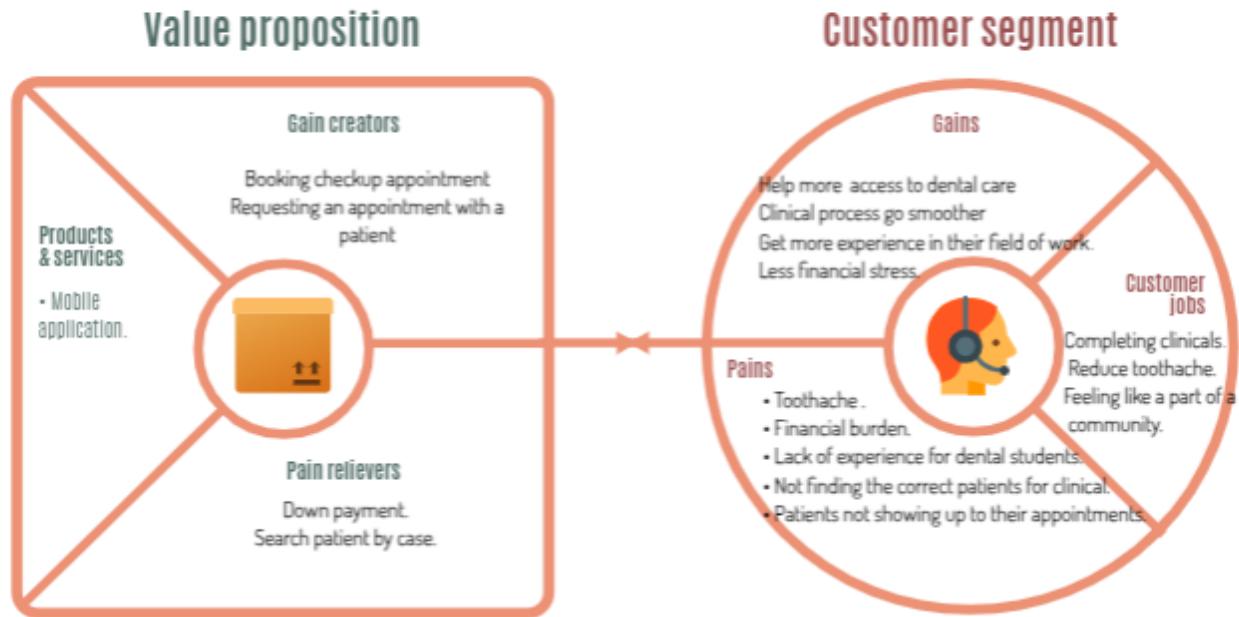
Information

- Age: 25
- Location: Irbid, Jordan
- Annual Income: 6,000 JD
- Education: B.A in business

Value map



VALUE PROPOSITION CANVAS



Behavior modelling techniques

According to BJ Fogg's behavior model the following elements contribute significantly on the end users' behavior.



I've employed this model as follows:

Note, all patients should provide a deposit payment before their appointment, and they will be refunded after they arrive and rate the student's performance. This will reduce no-shows and improve the dependability of the appointment booking process.

1. Motivation:

- Letting patients rate the student, often known as the gamification technique, incentivizes dentistry students to give high-quality care in a timely manner.
- Any money collected but not refunded when patients fail to show up for appointments will be donated to the dentist with the highest rating.
- The down payment option will encourage patients to attend their appointments because they will have a financial stake in it.
- The fact that this session is free and will relieve their suffering (toothache) motivates patients to go.
- Doctors and pharmacy owners feel more connected to their community by assisting dentists in reaching a larger number of patients and helping patients in accessing free dental care.

2. Ability (Simplicity):

- The process required for signing up patients is extremely simple and quick.
- The application doesn't require constant use or a routine (patients simply open the app when a notification appears asking them to confirm appointments and students only open the app when potential patients with their needed case)
- None of the functional requirements need high effort.
- The application is essentially free to use.
- The application will be designed so it doesn't require a lot of thinking, i.e., the process is easy, and everything is simple to understand.

3. Triggers:

- Since the application doesn't require a lot of ability but some patients might be facing fear of going to the dentists, a spark is needed. This will be in the form of a notification.
- A notification to remind the patients and the dentistry students to remember their appointments.

Prototyping methodology chosen.

I'll start with a rapid throwaway prototype, drawing what the key interfaces will look like on paper, to test the overall concept. I'll show it to the users and write feedback on the prototype (later discarded). I'm doing this because the quick throwaway will allow me to experiment with new concepts without incurring too many costs (in terms of time and resources). I'll use the evolving prototype when I've decided on the core idea. This approach of prototyping allows for gradual refinement, and I want to continue enhancing what the requirements are (get a clearer picture). I won't use incremental prototype because the program isn't that large and is all interconnected. (I am also one person I cannot work on multiple features in parallel.)

The right tools to prototype my idea.

Initially my tools will be pen and paper for the rapid throwaway prototype. Then I will be using JustInMind for my wireframes, mockups, and high-fidelity prototype as I find it to be versatile and user-friendly. JustInMind offers pre-built UI elements facilitating the process of making the application interactive and professional looking. Moreover, since I am using the same tool, it will be easier for me to iterate and improve my prototypes. It is also a great tool for gaining feedback through user testing.

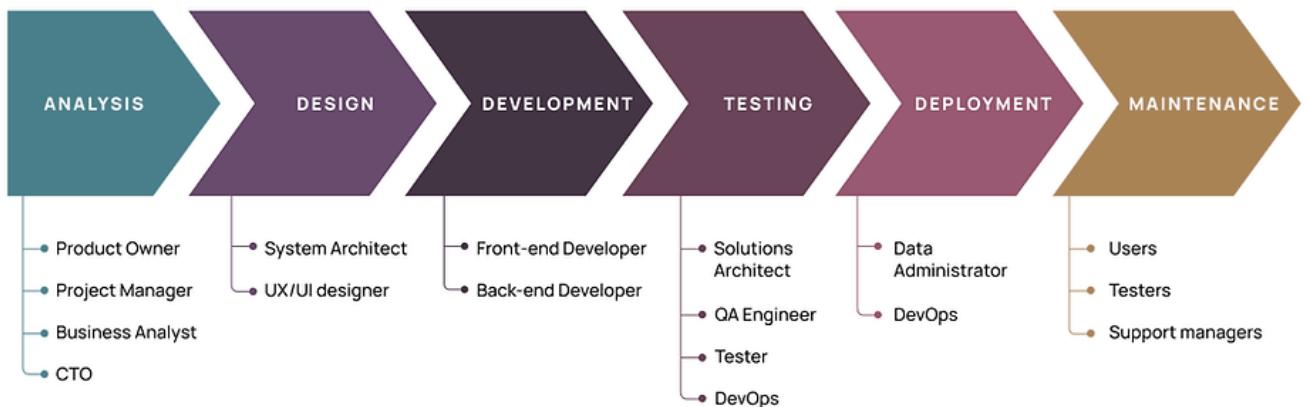
Testing methods used.

To begin, I will interview (3) dental students to completely understand their pains and needs to design the most relevant application. Following that, I will create wireframes on paper and test the overall concept with the same user demographic. After developing digital wireframes, I will expose them to a broader user group to obtain and iterate the layout. Building on this feedback I will produce a mockup, receive feedback from the same demographic, and iterate. And based on this a high-fidelity prototype is produced.

Usability testing will be used at this point. This type of testing is performed by observing real users while they use the application to identify potential faults. There are two types: moderated and unmoderated. I will be employing the latter as it is faster, less expensive, and more natural. I will provide the users with the prototype and a list of tasks (testing functionality) and I'll ask them for feedback. I will also do moderated usability testing to watch how users interact with the application and make sure they are giving honest feedback.

Evaluation of common prototyping methodology within the software development lifecycle.

Below are the phases of SDLC. Starting with analysis where the user pains and needs are understood, and the requirements are outlined. Then the software is designed, developed, tested then deployed and from release the system will always be maintained. This process is iterative in nature as the system is designed, tested, and designed again to refine.



Common prototype methodologies have a substantial impact on the software development lifecycle (SDLC). These iterative approaches serve a critical role in enhancing the overall development process and assuring the success of software projects.

Prototyping can be included into the SDLC at many stages, such as the design phase. Evolutionary prototyping is a popular prototyping methodology that helps developers to construct a functioning model of the software early on. This model can be shared with end users, who can then provide comments and enhancement suggestions. Developers can better understand consumers' requirements and expectations by incorporating them in the prototype process, resulting in a more user-centered design.

The iterative nature of the SDLC and prototyping approaches encourages a "fail fast" mindset. Developers may discover and address issues early on by rapidly iterating and gathering feedback, lowering the likelihood of serious problems occurring during deployment. This method saves important resources, time, and effort that might otherwise be spent on a software product that does not match customer needs.

Prototyping also enables the identification and reduction of risks during the development process. Developers can simulate the behavior of software and uncover potential dangers or flaws by constructing a functioning model. Because hazards are detected early, proactive measures can be done to mitigate their impact. By addressing risks throughout the development process, the likelihood of problems after deployment is greatly minimized.

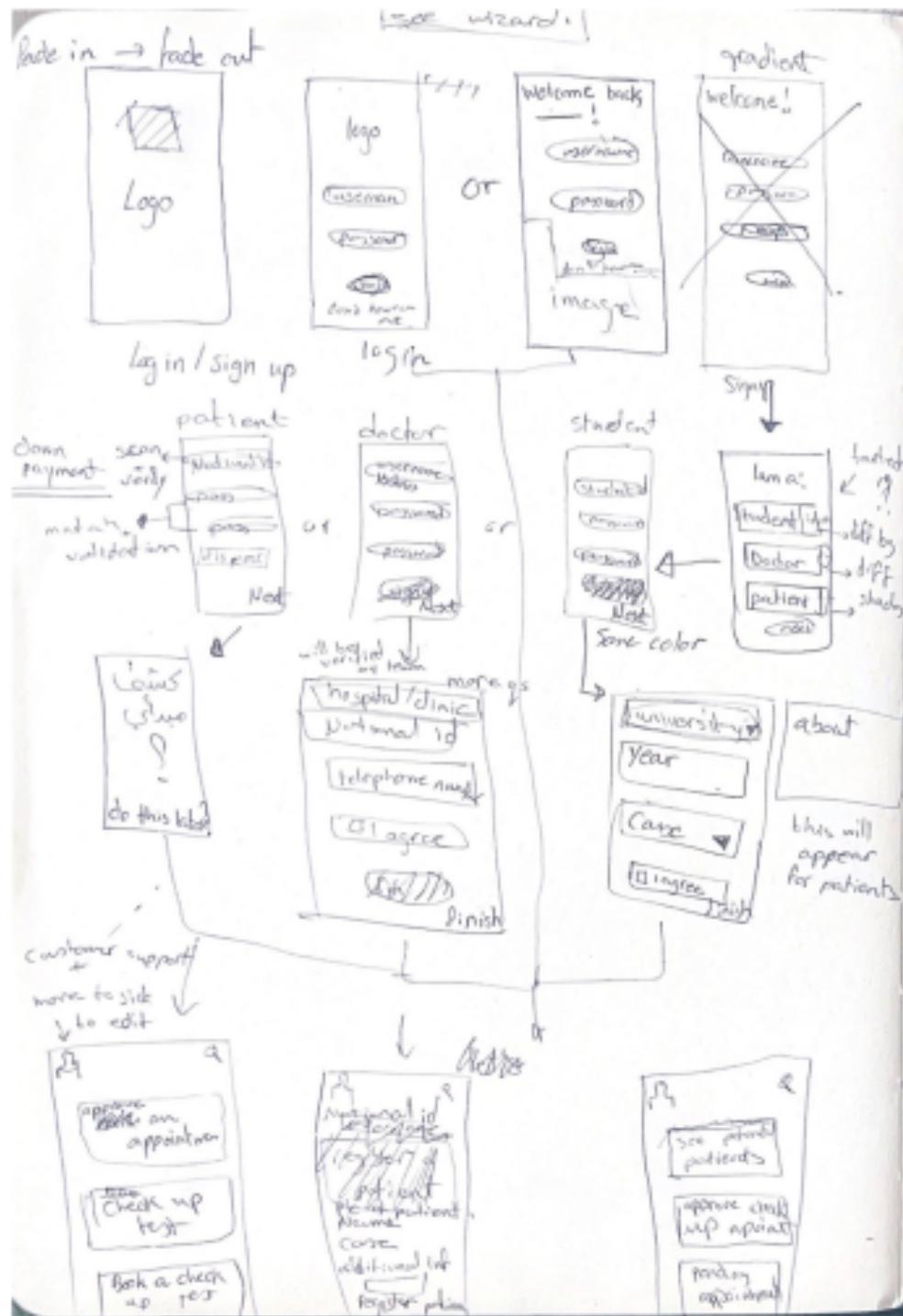
Furthermore, prototyping promotes effective communication among developers, designers, and end users. Prototyping software visually bridges the gap between technical and non-technical stakeholders, allowing for better and more precise communication. This results in improved collaboration and a common knowledge of the software's functionality and design.

Overall, using prototyping methodologies in the SDLC improves the development process by allowing for early user feedback, lowering risks, optimizing resource usage, and encouraging good communication. Software projects that use prototyping can achieve better alignment with user needs, higher quality solutions, and increased overall customer satisfaction.

Low-fidelity Wireframe

Rapid Throwaway wireframe to test with end users.

All the suggestions made by the user population is written directly on the prototype.

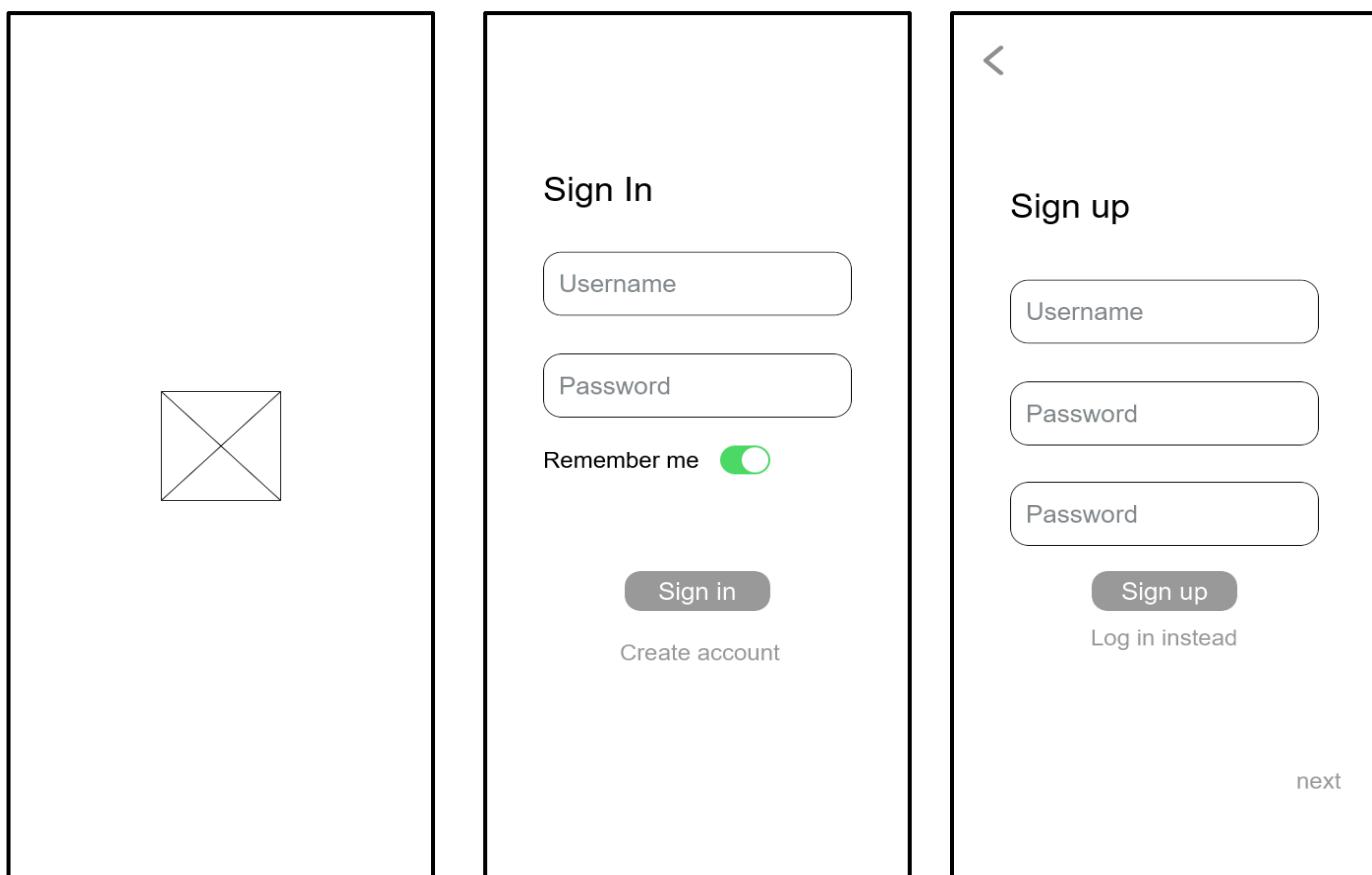


Iteration 1

Feedback:

- It doesn't make sense that the "welcome back [name]" is put before the user even logged in.
- The log in should be based on the user segment meaning doctors, dentists and medical staff should have a separate interface.
- Allow the users to not do the initial checkup as some might not have time or they downloaded it for future appointments. (No need for an appointment currently.)

Wireframes done in JustInMind based on feedback from rapid throwaway prototype.



Sign up for students.

The first screen shows a selection of user types: Student, Medical Staff, or Patient. The second screen is a standard sign-up form with fields for Username, Password, and Confirmation, plus Sign up and Log in instead buttons. The third screen is a setup screen with dropdowns for university, dental case, and year, a text area for About, and an I agree with terms checkbox. It also has Finish and next buttons.

I am

Student

Medical Staff

Patient

Sign up

Username

Password

Sign up

Log in instead

next

Let's get you started

university

Dental Case

Year

About (this will appear for patients)

I agree with terms

Finish

Sign up for patients.

This sequence is identical to the student sign-up process, featuring the same three screens for selecting user type, entering sign-up details, and performing initial setup.

I am

Student

Medical Staff

Patient

Sign up

Username

Password

Sign up

Log in instead

next

Let's start with an initial setup

Where is the pain

For how long

new value 1

More details

Do this later

Sign up for medical staff.

The image shows three sequential mobile application screens for user registration:

- Screen 1: "I am"**
A list of three options:
 - Student
 - Medical Staff
 - Patient
- Screen 2: "Sign up"**
Fields for entering personal information:
 - Username
 - Password
 - Re-enter Password

Buttons:
 - Sign up
 - Log in instead
- Screen 3: "Register patient"**
Fields for patient registration:
 - National number
 - Patient name
 - Dental Case (dropdown menu)
 - More details (text area)

Buttons:
 - Register

Screens after Login for patients.

The image shows three screens for a patient after they have logged in:

- Screen 1: Home Screen**
Options:
 - Approve an appointment
 - Initial check-up test
 - Book a check-up
- Screen 2: "Aprove Appointments"**
Text:

...
...
...

Buttons:
 - Button
 - Button
- Screen 3: Initial Setup**
Text:

Let's start with an initial setup
Where is the pain

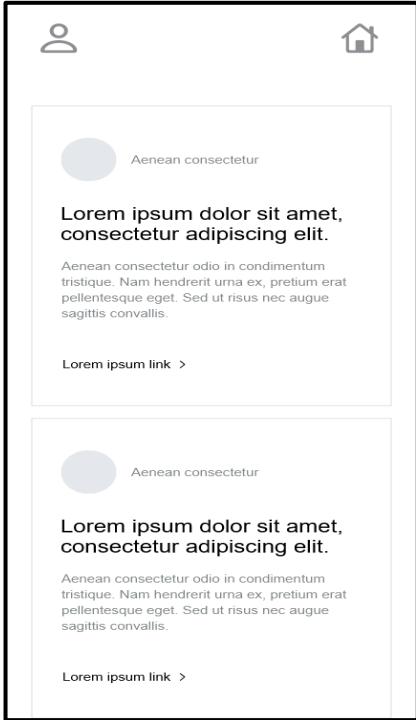
For how long

new value 1

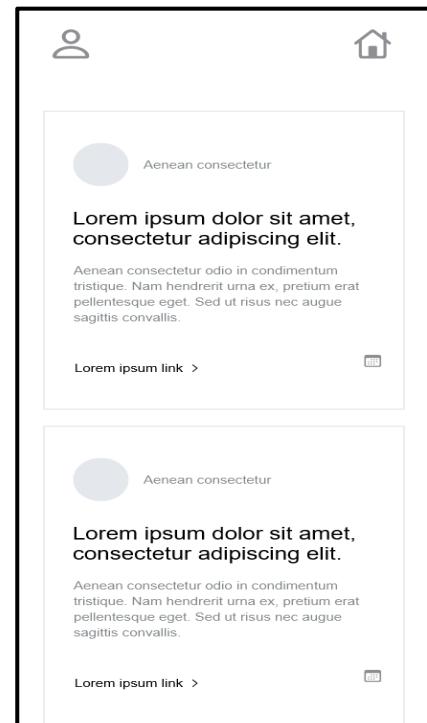
More details

Do this later

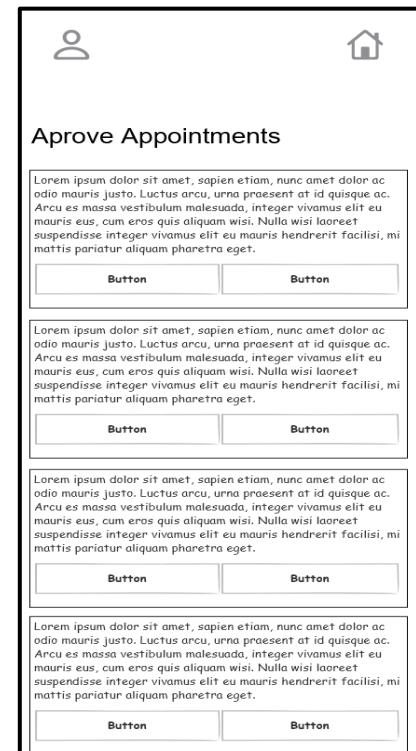
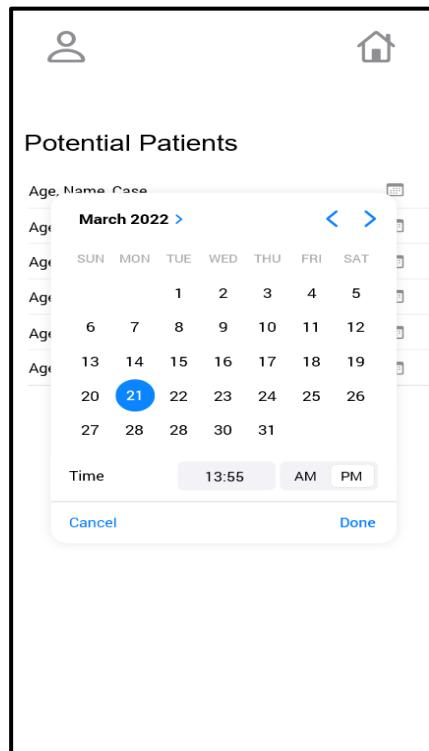
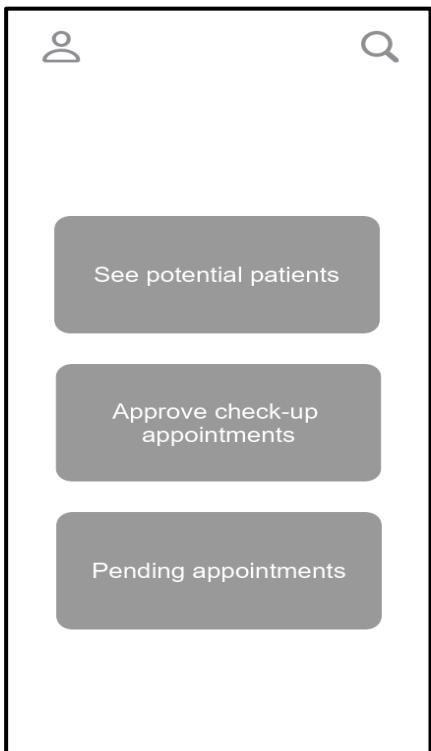
Book a checkup page for patients.



Pending appointments for students.



Screens after login for students.

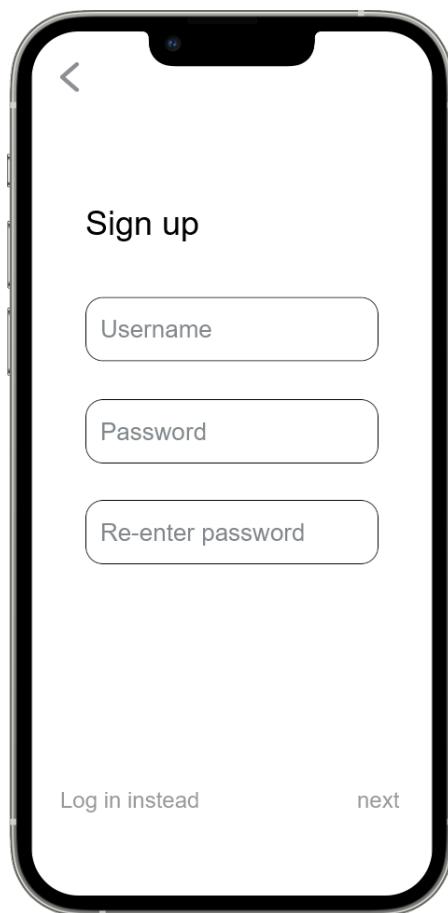


Iteration 2

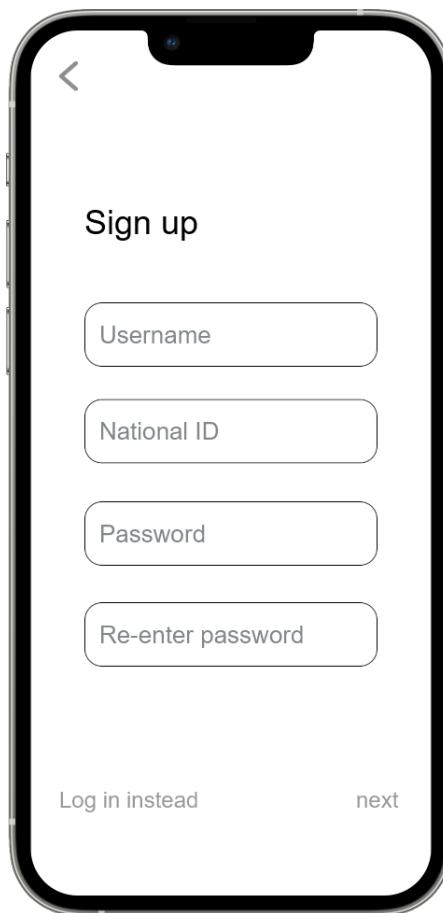
Feedback:

- Have the freedom to go back in sign up pages and to login instead.
- Fix layout of sign in
- Have a submit button for the checkup form.
- Clarify type of identification needed for the users.

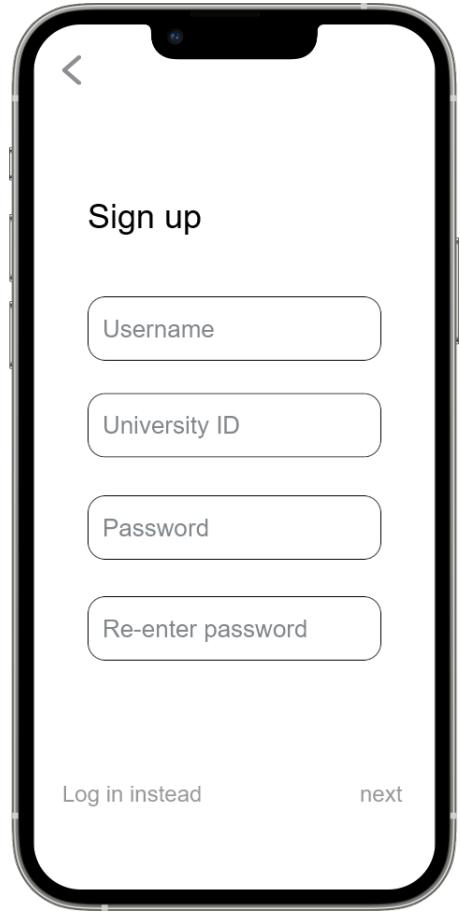
Updated wireframes



Medical staff



Patients



Students

Login instead options added and type of identification needed, have the freedom to go back in sign up pages

The wireframe shows a 'Sign In' screen with rounded corners. It features two input fields: 'Username' and 'Password'. Below these is a 'Remember me' toggle switch, which is turned on. At the bottom are two buttons: a grey 'Sign in' button and a smaller 'Create account' link.

Sign in page layout

The wireframe shows a screen titled 'Let's start with an initial checkup'. It asks 'Where is the pain' and provides a large rectangular area with a diagonal cross inside for marking. Below this is a section for 'For how long' with a dropdown menu set to 'new value 1'. A 'More details' text area is present. At the bottom are two buttons: a grey 'Submit' button and a smaller 'Do this later' link.

Submit for the form.

At the end of the wireframe, I got the following feedback:

- 1) the initial checkup should have an obvious image and do it on two pages instead of one.
- 2) I should include how severe the pain is in the initial checkup.

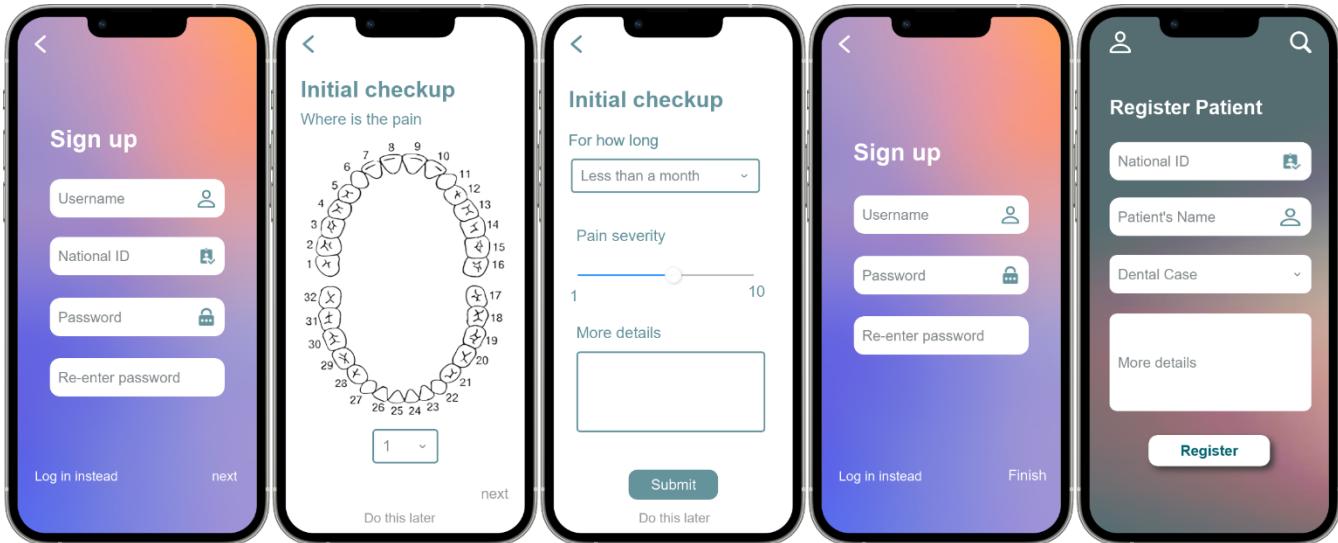
Mid-fidelity Wireframe

Mockups screenshots before applying feedback.



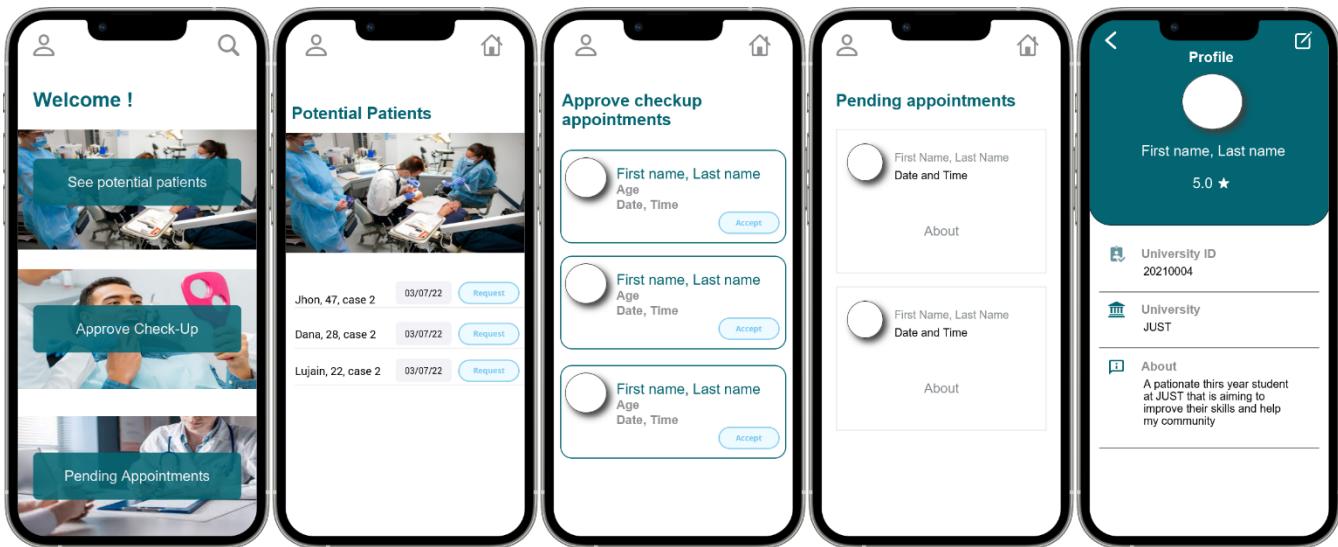
Wireframes showing the login and sign-up process of users.

Students sign up.

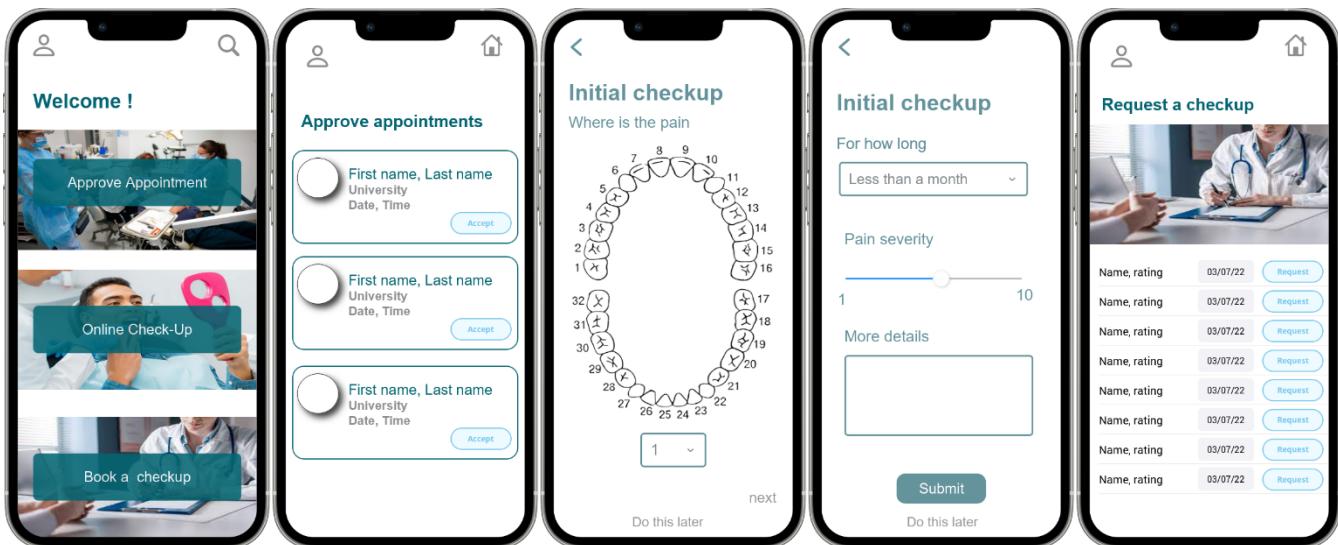


Patients sign up.

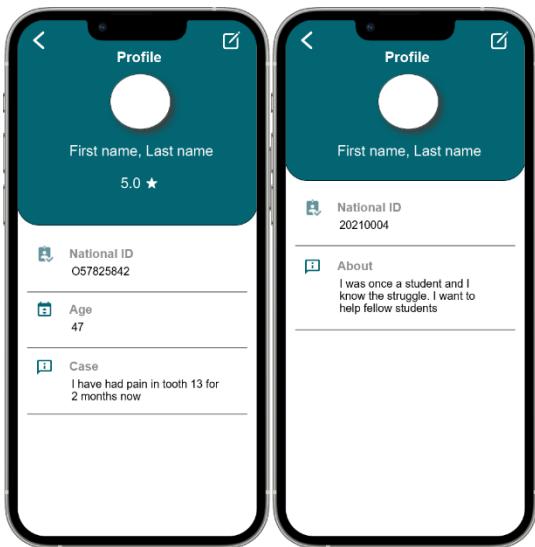
medical staff sign up and main page.



The student's main page, options, and personal details page.



The Patient's main page, and options page.

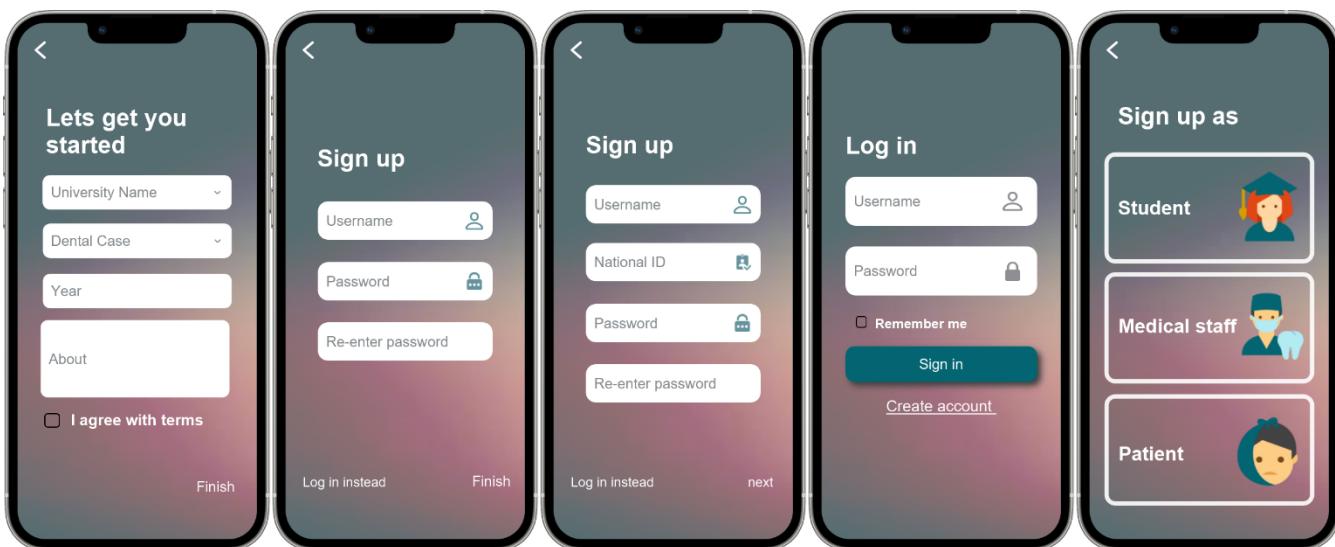


Patients and medical staff personal details page

Iteration 1

FEEDBACK:

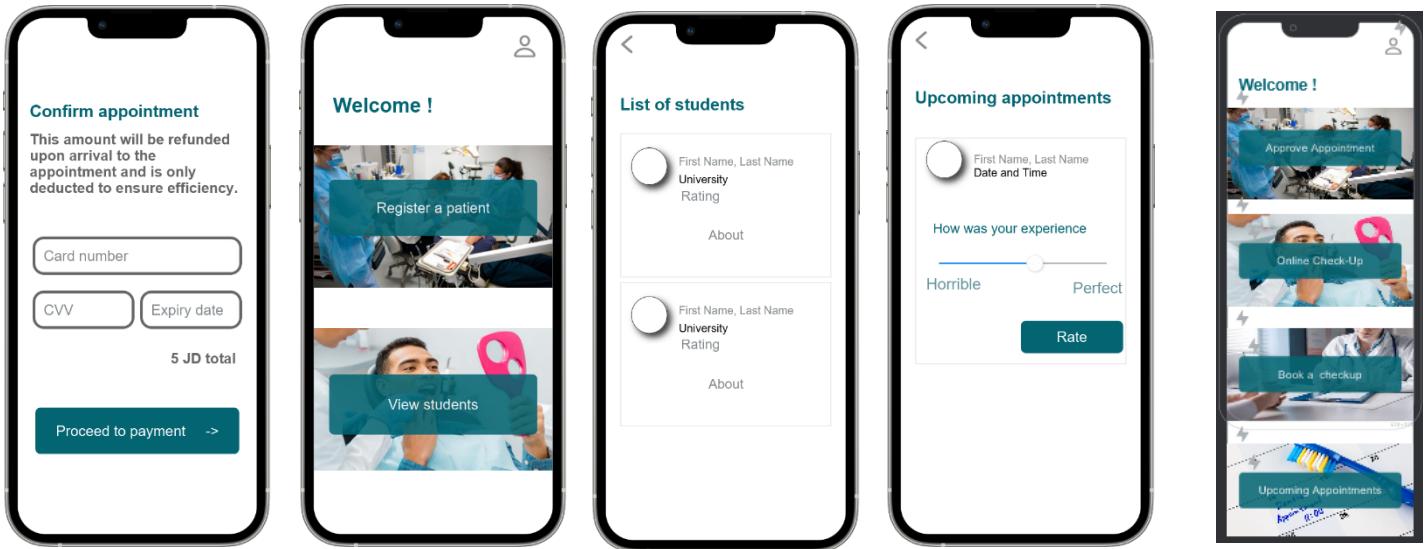
The background color doesn't match the house style.



Iteration 2

FEEDBACK:

1. I was reminded of the down payment that should be shown once the patient agrees to the appointment. I was also told to change the checkbox color to white but that isn't possible in justinmind.
2. the users kept pressing the personal button expecting the back button.
3. It was suggested to add a functionality that allows the doctor to view the dental students with their rating to see potential interns.
4. It was suggested to add functionality to view the upcoming appointments for the patients as well and rate their experience.
5. I also stopped showing the password as recommended to increase security.



High-fidelity Prototype

Outline of the added features to build the high-fidelity prototype.

Interactions added.

1. I added an on-page load interaction to the first page that contains the logo to simulate loading screen feel.
2. When the create account word is pressed it navigates to the sign-up page.
3. The sign-up process is different depending on what the user chooses to sign up as.

4. All the back buttons work and return to the previous page.
5. The next button works to navigate to the page expected after.
6. The “login instead” returns the user to the sign in page.
7. The finish button at the end of the sign-up process prompts the user to the main screen of the application.
8. The drop-down menus work and have realistic data in them.
9. The profile icon opens the profile details page of the user.
10. The date fields used opens a calendar when pressed and change the value to the one chosen.
11. The home icon found allows the user to go back to the main screen.
12. The patient will be promoted to pay a down payment of 5 jds once they accept an appointment (refundable once they show up to the appointment).
13. The request, accept button shows a success message that has a continue button that returns to the main interface.

Validations added.

1) Only the following credentials allow login:

Username: daliathedentist

Password: dalia123

Who logs in as a student.

Username: ahmadmohsen

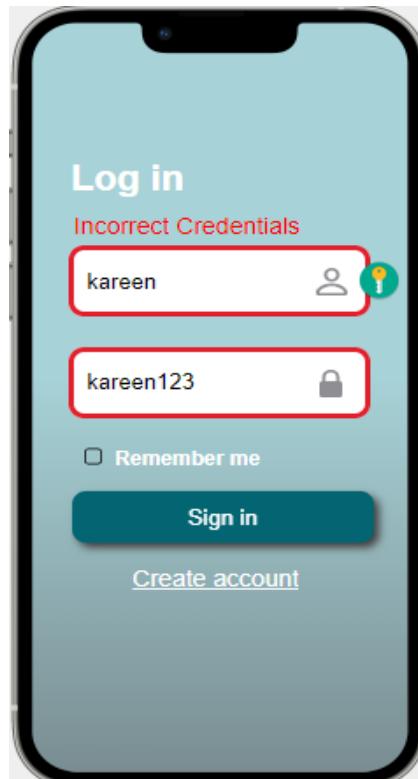
Password: ahmad123

Who logs in as a patient.

Username: ghazaldoctor

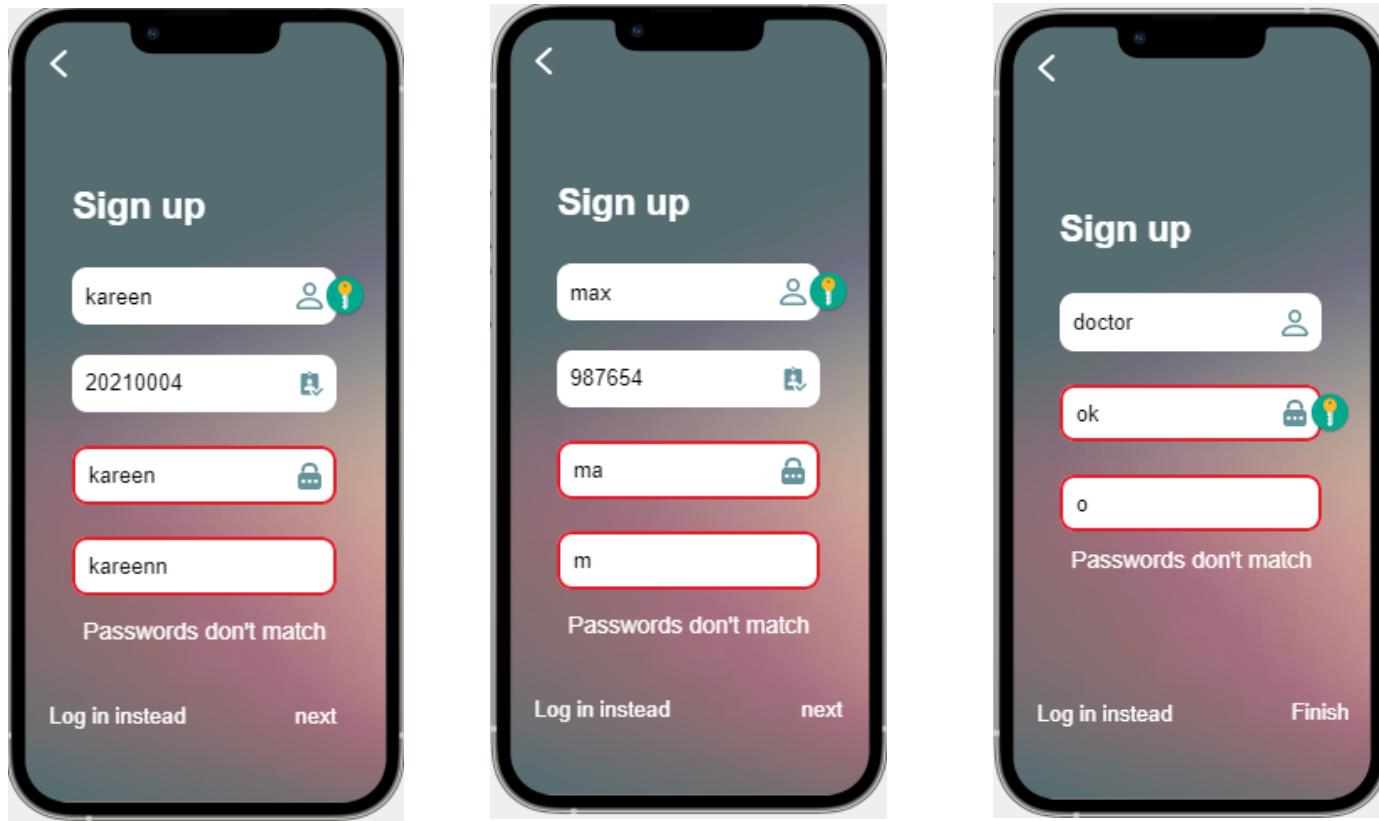
Password: ghazal123

Who logs in as a doctor.

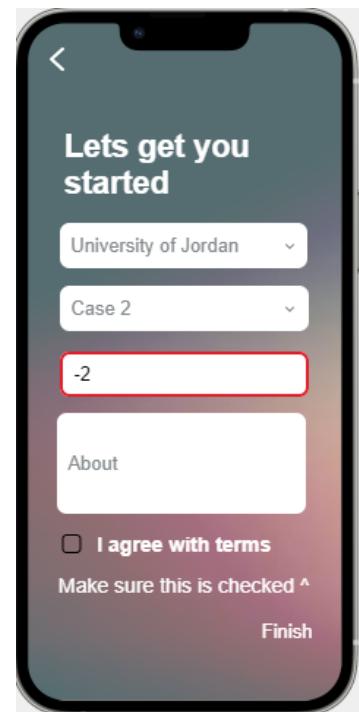


Incorrect credentials used.

2) in sign up forms, when the password and repeated passwords don't match, an error is shown.



3) The year of university the student is in is also validated to make sure it is greater than 0 and the user agrees with the terms.



Review end-user feedback from multiple iterations of your prototype and justify the updates to the final prototype based on end user feedback and testing.

Here are the revisions and justifications for the final prototype based on feedback from end users:

1. Users requested separate interfaces for different user segments (doctors, dentists, medical workers) in the throwaway prototype. This update addresses their individual requirements and provides a more tailored experience, enhancing usability and productivity.
2. Based on initial feedback, the "Welcome Back" message appeared before the user checked in, which didn't make sense. The message is presented in the final prototype once the user successfully signs in, ensuring a logical sequence.
3. Some users expressed an interest to skip the initial checkup if they did not have time, and others downloaded the app for future appointments. In response to this input, the final prototype incorporated the ability to skip the initial checkup, making it more flexible.
4. Users asked for the opportunity to return to sign-up pages and use the login option. These adjustments were implemented into the final prototype, which improved the user experience.
5. The feedback identified issues about the sign-in arrangement, which I corrected in the final prototype. In addition, I added a submit button to the checkup form to provide consumers with a clear call-to-action.
6. Users were confused about the form of identification required. The final prototype included a more particular type of identification, resulting in a more seamless onboarding procedure.
7. One user advised splitting the initial checkup into two pages and using obvious visuals to make it more user-friendly. I modified the final prototype to improve usability and make it easier for consumers to move through the checkup process. The same user proposed including a question about pain severity in the initial checkup to provide essential information to dentistry students.
8. In the mockups, the feedback was mainly positive, but it was mentioned that the background color didn't align with the established house style. I adjusted the colors of the final prototype to represent the suitable color scheme, ensuring consistency and brand coherence.
9. One user reminded me about the down payment and suggested that the checkbox color be changed. While changing the checkbox color in Justinmind is not feasible, this proposal should be implemented in the final prototype.
10. It was natural for the users to touch the left side of the screen to go back. So, I switched the back and removed the personal to only be obvious in the main page. Also, the password was hidden.
11. During the moderated usability testing, I was told that it would be beneficial for the doctor to see the ratings of the patients. Also, the user didn't know where they could rate the student so I added that functionality to my high fidelity prototype.

The final prototype's updates and adjustments are justified by end-user feedback, with the goal of improving usability, addressing user requests, and aligning with the desired user experience. With these modifications, the final prototype delivers a more personalized and user-friendly interface for diverse user segments, enhances the onboarding and checkup processes, and maintains brand consistency.

Critical evaluation of the prototype against the original plan and how user feedback and testing was implemented.

When comparing my initial vision of the application to the real prototype, I must say that the actual prototype successfully retained the core of the original plan while also addressing business and user criteria. Based on user feedback and testing, the prototype went through multiple revisions and upgrades.

The prototype met the functional criteria indicated in the original proposal by providing various user interfaces for dentistry students, patients, and pharmacy owners. The prototype also incorporated important features including appointment scheduling, appointment management, an online initial checkup, and a down payment system. User feedback and testing assisted in determining the necessity for different interfaces as well as numerous changes such as the addition of navigation buttons, validity checks, and error messages. These modifications were justified because they enhanced usability, addressed user needs, and provided a more personalized experience.

The prototype used features from BJ Fogg's behavior model, with the goal of motivating and enabling users to interact with the app. Users provided positive feedback on the app's motivation and simplicity, indicating that the prototype successfully handled these areas. Users appreciated the usage of patient ratings and the down payment mechanism because they incentivized dentistry students to offer high-quality service and encouraged patients to attend appointments.

Interviews, wireframes, mockups, and high-fidelity prototypes were among the testing methods used, allowing for incremental adjustments depending on user feedback. Users' feedback and recommendations were solicited at various phases of the prototyping process, and changes were made as needed. The testing methodologies used, especially the unmoderated usability testing, provided useful insights into the app's functioning and usability. The input provided justified the prototype adjustments, ensuring that user needs and preferences were addressed.

Based on user input and testing, the prototype adjustments were well-justified. The final prototype addressed users' requirements for separate interfaces, logical message sequencing, the opportunity to bypass the initial checkup, and the inclusion of a submit button. User suggestions for the sign-in arrangement, identity criteria, and pain severity inquiry were implemented, which improved the overall user experience. In addition, based on user feedback, the color scheme changed to better match the established house style.

References

DeviceLab (2022). *What are the 4 Types of Prototyping?* [online] Devicelab Medical Device Design & Medical Product Development | DeviceLab. Available at: <https://www.devicelab.com/blog/what-are-the-4-types-of-prototyping/> [Accessed 19 Jun. 2023].

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mainly relied on the slides.