American International University-Bangladesh (AIUB)

Department of Computer Science

Faculty of Science & Technology (FST)

VIRTUAL REALITY THERAPY FOR PHOBIAS

A Software Engineering Project Submitted
By

Semester: Summer_21_22		**Section:**	**Group Number:**	
SN	Student Name	Student ID	Contribution (CO3+CO4)	Individual Marks
1	Md. Tamjid Hossain	22-46460-1	20%	
2	Mohammed Ridwan Hasnain	22-46463-1	20%	
3	Afia Sultana	22-47097-1	20%	
4	S.M. Monirul Hasan	22-46202-1	20%	
5	Sagor Saha	21-45074-2	20%	

The project will be Evaluated for the following Course Outcomes

CO3: *Select* appropriate software engineering models, project management roles and their associated skills for the complex software engineering project and evaluate the sustainability of developed software, taking into consideration the societal and environmental aspects	Total Marks	
Appropriate Process Model Selection and Argumentation with Evidence	[5 Marks]	
Role and responsibilities in your group for the selected process model	[5Marks]	
Evaluate the sustainability of the developed software in terms of both society and the environment (Impact identification)	[5Marks]	
Submission, Defense, Completeness, Spelling, grammar and Organization of the Project report	[5Marks]	
CO4: *Develop* project management plan to manage software engineering projects following the principles of engineering management and economic decision process	Total Marks	
Develop the project plan, its components of the proposed software products using WBS and testcases	[5Marks]	
Identify all the activities/tasks related to project management and categorize them within Project estimation, and schedule of the tasks using appropriate resources	[5Marks]	
Identify all the potential risks in the specific project and prioritizing/categorizing those, and also mitigation plan to overcome the risk factors.	[5Marks]	

Description of Student's Contribution in the Project work

Student Name: Md. Tamjid Hossain
Student ID: 22-46460-1
Contribution in Percentage (20%):
Contribution in the Project:

- Project Proposal
- Functional Requirements
- Activity Diagram
- Sequence Diagram
- Software Process Model
- Role identification
- Wireframing
- Testcases
- Work Breakdown Structure
- Timeline Chart 1
- Timeline Chart 2
- EVA Analysis
- Risk Management

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Signature of the Student

Student Name: Mohammed Ridwan Hasnain
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- Class Diagram
- Use Case Diagram
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- Wireframing
- Testcases
- Work Breakdown Structure
- Timeline Chart 1
- Timeline Chart 2
- EVA Analysis
- Risk Management

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- Work Breakdown Structure
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Student Name: S.M. Monirul Hasan
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- Wireframing
- Testcases
- Work Breakdown Structure
- Timeline Chart 1
- Timeline Chart 2
- Risk Management

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- Software Process Model
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- Wireframing
- Testcases
- Work Breakdown Structure
- Timeline Chart 1
- Timeline Chart 2
- EVA Analysis
- Risk Management

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Signature of the Student

1. PROJECT PROPOSAL

1.1 Background to the Problem

In contemporary society, mental health has become an increasingly prevalent concern, with phobias standing out as a significant contributor to the global burden of mental health disorders. Phobias, characterized by irrational and intense fears of specific objects or situations, can severely impact an individual's daily life, limiting their functionality and overall well-being. Traditional therapeutic approaches for phobias often involve exposure therapy, a method that can be challenging, time-consuming, and demanding for both patients and therapists.

Acknowledging the limitations of traditional treatments, this project capitalizes on technological advancements, particularly Virtual Reality (VR), to revolutionize phobia therapy. VR offers an immersive and interactive environment for exposure therapy, enabling individuals to confront their fears realistically. However, the development of VR therapy requires a multidisciplinary approach, integrating expertise from software engineering, psychology, and user experience design. The project aims to bridge the gap between conventional phobia treatments and cutting-edge technology by creating a sophisticated, user-friendly VR therapy platform. Grounded in the belief that VR can overcome barriers to mental health services, the project seeks to democratize phobia therapy, making it accessible and effective for a broader audience. Collaboration among software engineers, psychologists, and clinicians is emphasized to design an evidence-based and collaborative solution that addresses existing limitations, fostering transformative and scalable outcomes in mental health care.

Root Cause Analysis and Significance

The persistent challenge in phobia therapy occurs from limitations in traditional methods, particularly exposure therapy. This traditional therapy system is effective but sometimes faces logistical constraints and relies on specific stimuli availability. Individuals' reluctance to confront fears in real-world scenarios contributes to a treatment gap, hindering timely and effective

interventions. Untreated or inadequately treated phobias significantly impact individuals and society, leading to heightened anxiety, social isolation, and decreased productivity.

The associated socio-economic burden emphasizes the need for innovative solutions. Leveraging virtual reality technology offers a patient-friendly alternative, closing the treatment gap and improving mental health outcomes. This project aligns with the global shift towards technology integration in healthcare, addressing mental health challenges and contributing to the advancement of phobia therapy, emphasizing the significance of understanding the root cause for impactful intervention development.

1.2 Solution to the Problem

Project Objective: The primary objective of this project is to design, develop, and implement an innovative Virtual Reality (VR) therapy platform specifically tailored for the treatment of phobias. Our aim is to overcome the limitations of traditional phobia therapies by harnessing the immersive and interactive capabilities of VR technology. By doing so, we seek to provide a more accessible, efficient, and engaging solution that addresses the root causes of the challenges associated with phobia therapy.

User Advisory: Prior to using the VR therapy app, users will be informed that the application serves as a supplementary tool and not as a standalone solution for all phobias. It will be emphasized that certain phobias may necessitate specialized treatment, and, in some cases, the use of the app may be contraindicated or potentially unsafe. Users will be required to provide explicit consent, acknowledging the app's limitations, and understanding that professional consultation and assessment may be crucial for certain phobia cases. This advisory ensures responsible and informed usage, prioritizing user safety and well-being throughout the virtual therapy experience.

Basic functionalities:

- **Highly immersive VR environments:** Utilizing state-of-the-art VR technology, the proposed solution aims to provide immersive and lifelike scenarios tailored to individual phobias, complete with 360° visuals, spatial audio, and haptic feedback to maximize engagement.
- **Personalized exposure therapy:** Personalized exposure programs will be created based on the severity of the phobia, gradually increasing in difficulty to enable users to confront their fears in a controlled environment.
- **Cognitive behavioral therapy (CBT):** Techniques such as relaxation exercises and cognitive restructuring will be seamlessly integrated into the VR experience, empowering users to challenge negative thought patterns and develop effective coping strategies**.**
- **Data-driven progress tracking:** Integrating biometric sensors and sophisticated data analytics for real-time monitoring of physiological data, including heart rate and skin conductance, alongside user feedback, will allow for precise tracking of progress and connection on smart watch customization of therapy sessions.

This functionality ensures the safety of users by allowing therapists to promptly assess and respond to adverse reactions. Real-time monitoring also contributes to the legal aspect of patient safety, establishing a robust framework for responsible VR therapy usage.

- **Therapist oversight and support:** Additionally, remote therapist guidance and monitoring features will ensure user safety and provide immediate support during exposure sessions, even from a distance. By merging technology with traditional practices, the platform acknowledges the importance of cultural diversity in mental health treatment.

- **Cross-Platform Accessibility:** Ensuring accessibility by developing a platform that can be used on various devices, including VR headsets and mobile devices.

Target Group of Users: The primary target group for the virtual reality therapy platform includes individuals suffering from various phobias, such as fear of heights, spiders, or public speaking, stand to gain from exposure therapy conducted in a secure and regulated environment. Particularly for children grappling with phobias, VR therapy offers a less daunting and more captivating alternative. Furthermore, this solution holds promise for extending its utility to tackle additional anxiety disorders, including social anxiety and obsessive-compulsive disorder (OCD). Additionally, mental health professionals, therapists, and clinicians constitute a secondary target group who will utilize the platform to administer and monitor the therapy sessions.

Benefits for the Target Users:

Phobia Sufferers:

- **Personalized and Controlled Exposure:** Users benefit from immersive virtual environments tailored to their specific phobic triggers, enabling controlled exposure therapy in a safe and customizable setting.
- **Accessible and Convenient Treatment:** The platform's user-friendly interface allows individuals to engage in therapy from the comfort of their homes, overcoming geographical barriers and encouraging consistent participation.

Therapists and Clinicians: Real-time monitoring and feedback mechanisms provide therapists with valuable data on physiological responses and user behavior during sessions, facilitating data-driven insights for treatment adjustments.

Impact on Societal, Health, Safety and Other Issues: The VR Therapy app for phobias has far-reaching impacts across societal, health, safety, legal, and cultural dimensions. Societally, the app addresses the growing mental health needs by providing an accessible and innovative therapy solution. Health-wise, it contributes to mental well-being, potentially reducing the societal burden of phobias.

Safety is prioritized through real-time monitoring, ensuring users are supported and therapists can intervene if necessary. Legally, the app emphasizes informed consent, user privacy, and adherence to ethical standards in the mental health domain. Culturally, the app recognizes diverse therapy preferences by allowing users to customize their VR environments.

A creative solution involves incorporating culturally sensitive therapy scenarios, acknowledging that certain phobias may have cultural nuances. By blending technology with cultural

understanding, the app not only becomes a therapeutic tool but also a bridge between mental health and cultural sensitivity.

Contribution to Scientific Development:
The project will make significant contributions to the development of scientific results, which are identified and well-documented through extensive research and testing.

- **Advance VR Technology:** This project will play a pivotal role in enhancing VR technology customized for therapeutic use, catering to specific needs in mental health treatment.
- **Conduct Clinical Research and Data Collection:** Through meticulous examination of the solution's effectiveness and its implications, the project will enrich the scientific understanding of VR therapy. By conducting rigorous research and data collection, it will provide valuable insights into the efficacy and potential of VR-based interventions for various mental health conditions.
- **Establishing Standardization and Best Practices:** The project has the potential to guide the development of standardized protocols and best practices for VR therapy across a spectrum of phobias and anxiety disorders. By setting benchmarks and guidelines, it aims to optimize the therapeutic outcomes and ensure consistency in treatment approaches.

Literature Review: Some of the existing studies and research related to this project are: Initially designed for the treatment of phobias, the use of virtual reality in phobic disorders has expanded to other mental health disorders such as posttraumatic stress disorder, substance-related disorders, eating disorders, psychosis, and autism spectrum disorder. The goal of this review is to provide an accessible understanding of why this approach is important for future practice, given its potential to provide clinically relevant information associated with the assessment and treatment of people suffering from mental illness. Therapists can use VR for exposure therapy, which is a mainstay of phobia treatment. It involves gradually exposing a person to what they fear in small, manageable steps with their consent.

So, most of the research aims to elucidate the significance of incorporating VR into mental health practices, highlighting its potential to offer clinically relevant information for the assessment and treatment of individuals grappling with mental illnesses.

Utilization and Extension in Current Study: Our study advances the field of virtual reality therapy for phobias by integrating and extending key aspects from previous research. Utilizing sophisticated machine learning algorithms, we enhance personalization by dynamically adapting exposure scenarios based on individual phobia severity, preferences, and progress, addressing the need for more adaptive approaches in the literature.

Drawing from existing studies, we integrate real-time monitoring with biometric sensors and feedback mechanisms, documenting its impact on therapy outcomes and providing valuable insights for timely adjustments, thus overcoming limitations identified in prior research. Inspired by literature on blockchain in healthcare, we incorporate blockchain technology to ensure secure data management, extending its application to the context of mental health treatment and

contributing to ethical considerations and data privacy in the intersection of technology and mental healthcare.

Additionally, our study recognizes the importance of interdisciplinary collaboration, offering practical insights into the challenges, benefits, and outcomes of collaboration between software engineers, psychologists, and clinicians, thereby providing a roadmap for future interdisciplinary research in mental health technology.

Existing Software Solutions:

1. **Virtual Reality Therapy Platforms:** Several virtual reality therapy platforms exist, offering exposure therapy for various phobias. These platforms may include customizable virtual environments and scenarios to simulate real-life situations. Some of the apps include oVRcome, Face-Your-Fear, etc.
2. **Mental Health Apps:** Various mental health applications offer features such as anxiety management, stress reduction, and exposure exercises. While not all may be VR-based, some incorporate immersive elements to enhance the user experience. Some of the apps are MindShift, Calm – Meditate, Sleep, Relax, etc.

Our proposed solution extends existing approaches in virtual reality therapy for phobias by introducing innovative elements. Our solution ensures dynamic adaptation of exposure scenarios based on real-time user data, surpassing static personalization seen in previous studies. We advance the understanding of real-time monitoring by integrating biometric sensors and feedback mechanisms while comprehensively documenting their impact on therapy outcomes. Additionally, the extension of blockchain technology to mental health treatment ensures secure data handling, contributing to the literature on ethical considerations and data privacy.

Moreover, our project not only acknowledges the importance of interdisciplinary collaboration, as recognized in prior studies, but also provides practical insights into its challenges, benefits, and outcomes, offering a roadmap for future research. These extensions collectively aim to deliver a more comprehensive, user-centric, adaptive, and secure virtual reality therapy for phobias, addressing identified limitations and providing an innovative mental health treatment option.

2. SOFTWARE DEVELOPMENT LIFE CYCLE

2.1 Software Process Model:

The Scrum model is best suited for the development of the Virtual Reality Therapy for Phobias application. Given the project's complex nature, Scrum's iterative and incremental approach aligns seamlessly with the need for continuous adaptation to evolving requirements.

The Scrum method involves communication within the development team, ensuring transparency within the whole team. Overall, Scrum's flexibility, adaptability, and iterative development cycles make it the most suitable model for successfully developing the Virtual Reality Therapy for Phobias application.

Why We Selected This Model:

We selected the Scrum model for the development of the Virtual Reality Therapy for Phobias application due to its iterative and flexible nature, aligning well with the dynamic requirements of our innovative project.

This adaptability is crucial in the context of virtual reality therapy, where user feedback and advancements in technology need constant refinement.

The application's extensive functional requirements, ranging from user registration to real-time monitoring and feedback, benefit from Scrum's ability to deliver tangible results in short development cycles. Scrum's emphasis on regular customer feedback, coupled with the opportunity for frequent user testing and refinement, ensures that the application remains closely aligned with the expectations and needs of both phobia sufferers and therapists.

Scrum's emphasis is on short development cycles, known as sprints, which enable us to deliver incremental and functional pieces of the software regularly.

The continuous feedback loop in Scrum ensures regular input from potential users, specifically phobia sufferers and therapists. This will help us to refine and enhance the application iteratively.

The model's commitment to transparency, flexibility, and continuous improvement ensures the goal of delivering an effective and user-focused therapy application.

Why Is This Model Better Than the Other Models:

The Scrum model is better suited for the development of the Virtual Reality Therapy for Phobias application compared to other models like XP (Extreme Programming), DSDM (Dynamic Systems Development Method), Waterfall, and V-Model due to its inherent flexibility, transparency, adaptability, and emphasis on collaboration.

Scrum's iterative and incremental approach allows for frequent adjustments to evolving requirements, a crucial aspect in the dynamic field of virtual reality therapy. Unlike the rigid sequential nature of Waterfall and V-Model(Plan Driven Processes), Scrum accommodates changes and feedback throughout the development process, ensuring the application aligns closely with user needs.

XP, while emphasizing collaboration and rapid iterations, may not provide the structured framework needed for a project of this scale and complexity.

DSDM, even though it’s iterative, may not offer the same level of adaptability and structured communication and meetings as Scrum (such as sprint planning and daily scrum meeting). This potentially makes DSDM less suitable for managing the complexities associated with the diverse functional requirements of the project.

Overall, Scrum's ability to deliver incremental value, encourage continuous user involvement, and efficient communication makes it the optimal choice for a project requiring constant refinement and innovation like the Virtual Reality Therapy for Phobias application.

2.2 Project Role Identification and Responsibilities:

In the Scrum process model for the development of the Virtual Reality Therapy for Phobias application, key roles and responsibilities are defined to ensure effective collaboration and progress. The roles and responsibilities are given below:

Scrum Master: The Scrum Master facilitates the Scrum process. They are responsible for ensuring that the project is carried through according to the practices, values, and rules of Scrum and that it progresses as planned.

Product Owner: The Product Owner is responsible for representing the interests of both phobia sufferers and therapists, maintaining the product backlog, and prioritizing features based on user needs.

Scrum Team: The Scrum Team or the Project Development Team, including developers, testers, and designers, is responsible for delivering increments of the application during each sprint, actively participating in sprint planning, daily stand-ups, and sprint reviews.

The Customers: The Customer, represented by the phobia sufferers and therapists, actively participates in sprint reviews and provides valuable feedback during development iterations. Their responsibilities include clarifying requirements, validating delivered functionalities, and ensuring that the application aligns with their therapeutic needs.

Management: Management oversees final decision making, along with the agreements, standards, and conventions to be followed in the project.

Regular communication and collaboration among these roles are essential to address the functional requirements and ensure that the Virtual Reality Therapy for Phobias application evolves iteratively in response to user feedback.

Evaluation of the sustainability of the developed software in terms of both society and the environment:

The sustainability of the developed Virtual Reality Therapy for Phobias software demonstrates positive impacts on both society and the environment. In terms of societal impact, the software offers an innovative and accessible solution for individuals suffering from phobias, enhancing mental health support, and providing an additional avenue for therapy.

The application's commitment to user safety, privacy, and informed consent ensures ethical practices in the mental health domain. Furthermore, the integration of real-time monitoring and therapist support contributes to an effective therapeutic experience.

On the environmental side, the software promotes sustainability by introducing users to a virtual therapy environment, reducing the need for physical infrastructure associated with traditional therapy settings. The use of VR technology encourages remote therapy sessions, potentially minimizing the carbon footprint associated with travel to therapy centers.

In conclusion, the Virtual Reality Therapy for Phobias software demonstrates a positive societal impact by addressing mental health needs and contributes to environmental sustainability through its virtual and accessible approach to therapy.

3. FUNCTIONAL REQUIREMENTS

1. User Registration and Authentication

1.1 New User Registration: To ensure a seamless onboarding process, the Virtual Reality Therapy for Phobias platform incorporates a detailed registration procedure for both phobia sufferers and therapists. The registration process includes the following steps:

1.1.1 Click the sign-up button: Users must click the sign-up button to begin the registration process. After that they'll be able to choose the user type: phobia sufferer or therapist.

1.1.2 Input Information: Users must input information. **Phobia sufferer users** will input information like full name, date of birth, address, email, phone number, phobia type, phobia duration, difficulties description, medical records upload [Optional] to begin the sign-up process. **Therapist users** will input information like full name, date of birth, address, email, phone number, therapy specialization, qualification, upload additional professional documents [Optional].

1.1.3 Click the submit button: This is to allow the system to send a verification code to their email or phone number provided during the previous phase. Users get to choose which they want to verify; they can choose to verify both their email and phone number or verify only phone or email to continue the registration process.

1.1.4 System-Generated Unique User ID: The system shall automatically generate a unique user ID for each user after they click the submit button. This user ID serves as a secure and distinctive identifier for subsequent logins and interactions within the platform.

1.1.5 Watch tutorial or login: Once the registration has been completed and the user's information is updated in the database, users may choose to login or watch the beginning tutorial of using the app's various functionalities [Different for both user types].

1.2 User Authentication:

The Virtual Reality Therapy for Phobias platform ensures secure and user-friendly authentication processes to safeguard user accounts. The detailed functional requirements for user authentication are as follows:

1.2.1 Login with Unique User ID and Password: The software shall allow users to log in with their given user ID and password.

1.2.2 Verification with Database Records: Upon submission, the login credentials (user ID and password) shall be verified against the system's database records.

1.2.3 Successful Login Redirect: If the login credentials are valid, the system shall redirect the user to their personalized dashboard.

1.2.4 Random Verification Code for Incorrect Attempts: In the case of incorrect login attempts, the system shall generate a random verification code. This code serves as an additional layer of security and is sent to the user's registered email address or phone number.

1.2.5 Retry with Verification Code: Users with incorrect login attempts shall have the option to retry by entering the generated verification code.

1.2.6 Account Locking for Exceeding Login Attempts: The user account will be locked if login attempts exceed 3 times [Optional Function]. The account will be locked for 10 minutes if this happens.

1.2.7 User Notification for Account Lock: In the event of an account lock, the system shall notify the user about the temporary lockout period.

Precondition: user have valid user id and password

2. Sign Out

2.1 User Logout:

- Users, both phobia sufferers, and therapists, shall have a clear and easily accessible option to initiate the logout process.
- Upon successful login, a 'Sign Out' or 'Logout' option shall be prominently displayed within the user interface.
- Clicking on the 'Sign Out' option triggers the initiation of the logout process.
- Before completing the logout, users may be prompted with a confirmation dialog to prevent accidental sign-outs.
- Upon confirmation, the system shall perform the following actions:
    - Terminate the user's active session immediately.
    - Redirect the user to a designated landing page or the login page.
- The logout process shall clear any user-related session data to ensure the privacy and security of the user's information.
- Logging out should not require multiple steps, providing an efficient and user-friendly experience.
- Users should be automatically logged out after a certain period of inactivity to enhance security (configurable duration, default is 15 minutes).
- For additional security, the system may offer an optional feature to enable two-factor authentication for the logout process.
- Upon successful logout, users shall receive a confirmation message or notification acknowledging the completion of the logout.
- In the case of any unsaved changes or incomplete actions, users may be prompted to confirm their intent to log out, ensuring data integrity.
- The platform shall support a "Remember Me" feature for users who wish to stay logged in across sessions on trusted devices.

Precondition: Users must be logged in to log out.

User: Phobia Sufferers:

After a successful login, phobia sufferer users can perform these following actions in their personalized dashboard:

1. Informed Consent and User Safety

1.1 User Advisory:

- Before initiating any therapy, sessions or accessing the dashboard, phobia sufferers shall be presented with a comprehensive advisory statement.
- The advisory shall explicitly communicate that the VR therapy app functions as a supplementary tool and does not replace specialized treatment for all types of phobias.

- Emphasis should be placed on the understanding that certain phobias may require individualized and professional treatment, and the VR therapy app may not be suitable for all cases.
- A clear disclaimer shall be provided, stating that the VR therapy app might be contraindicated or potentially unsafe for specific phobias, and users should consult with a healthcare professional if uncertainties arise.
- Users shall explicitly consent to the app's limitations, risks, and the supplementary nature of the therapy offered. Consent may be obtained through a checkbox.
- If users decline to provide explicit consent, they shall not be allowed to proceed with therapy sessions. An option to exit the app should be readily available.

1.2 Dashboard Overview: After the consent, phobia sufferers shall be directed to their personalized dashboard.

1.3 Two-Factor Authentication:

1.3.1 Activation Option: Within the user profile or settings section, an option for enabling two-factor authentication (2FA) shall be available. A toggle switch or checkbox labeled "Enable Two-Factor Authentication" shall be present.

1.3.2 Phone Number or Email Entry: If the user opts to enable 2FA, they shall be prompted to select a valid phone number or email address for verification which they entered during registration.

1.3.3 Verification Code Generation: After selecting the phone number or email, a button labeled "Send Verification Code" shall be available. The system shall generate a unique verification code and send it to the phone number or email.

1.3.4 Verification Code Entry: Users shall be prompted to enter the received verification code within a specified time frame. An input field for the verification code and a "Submit" button shall be present.

1.3.5 2-Factor Authentication Activation: Upon successful verification of the code, the system shall activate 2FA for the user account. Users shall receive an on-screen confirmation with a recovery code that they must remember.

1.3.6 Recovery Options: In the event of a user forgetting the 2FA code or encountering issues, a "Recover Account" option should be available. Recovery options may include re-entering their password and using the recovery code. In case of forgetting the recovery code, users can click the contact support button to initiate further recovery.

2. VR Environment Access:

In the dashboard, there will be a dedicated button for VR Environment access. Clicking this will take the user to a different interface with VR environment selection.

2.1 VR Environment Selection:

2.1.1 Phobia Selection:

- Phobia sufferers shall be presented with an interface where they can initiate the therapy process.
- Users will be prompted to select their specific phobias from a predefined list. The platform shall include a form for users to input their phobia-related information, including the type of phobia, duration, and any specific difficulties they face.

2.1.2 Therapy Needs:

- Following the phobia selection, users shall be prompted to specify their therapy needs, such as the level of exposure, preferred therapy scenarios, or any additional preferences.
- The system shall provide options for customization so users can customize the therapy session.
- Clear instructions and tooltips shall be provided to assist users in understanding and selecting their therapy needs effectively.

2.1.3 VR Environments:

- Based on the selected phobias and therapy needs, the system shall dynamically generate or present a list of VR therapy environments specifically tailored to address the user's identified phobias.
- The environments may include immersive scenarios designed to expose users gradually to their phobias in a controlled and therapeutic manner.
- Users shall be presented with visually appealing previews or descriptions of each environment, facilitating an informed selection.
- An intuitive confirmation mechanism (e.g., "Start Therapy" button) shall be provided for users to initiate the selected VR environment.

2.2 VR Headset Integration:

2.2.1 Headset Connection:

- Users shall have the option to connect dedicated VR headsets, such as Oculus, Meta Quest, or compatible devices, to enhance the overall therapy experience.
- The platform will have a dedicated menu for headset integration, guiding users through the connection process. Clear instructions and visual cues should be provided to assist users in connecting their VR headsets seamlessly.

2.2.2 Compatibility Guidelines:

- The platform shall offer detailed compatibility guidelines, ensuring that users are aware of the supported VR headset models and necessary specifications.
- The compatibility information shall be easily accessible within the app, possibly through an "Info" or "Help" section.

2.2.3 Mobile Device Users:

- For users opting to use mobile devices instead of dedicated VR headsets, the platform shall provide alternative options to access therapy sessions.
- Mobile device users may experience a less immersive environment compared to VR headset users, and this distinction shall be communicated clearly.

3. Personalized Exposure Therapy Programs:

3.1 Immersive Scenarios:

- Upon entering the personalized exposure therapy section, users shall be presented with immersive scenarios utilizing 360° visuals and spatial audio.
- The system shall dynamically load scenarios based on the user's selected phobias and therapy needs, creating a lifelike environment. Users will have the ability to navigate within these scenarios using VR headset controls or mobile device interactions.

3.2 User-Created Exposure Programs:

3.2.1 Program Creation Interface:

- Phobia sufferers shall have a dedicated interface for creating and customizing their exposure therapy programs. There will be a menu with options for adjusting parameters such as difficulty level, duration of sessions, sound control, and frequency of exposure.
- Users will be guided through the program creation process with clear instructions and tooltips.

3.2.2 Difficulty Level:

- Users can adjust the difficulty level of exposure scenarios based on their comfort and progress.
- A slider or dropdown menu shall be provided to select the desired difficulty level, ranging from easy to challenging.

3.2.3 Session Duration:

- Phobia sufferers shall have control over the duration of exposure sessions.
- There will be an adjustable timer, allowing users to define the length of each exposure session.

3.2.4 Sound Control:

- Users may customize the auditory elements of exposure scenarios, adjusting volume levels or muting audio if preferred. The platform shall include user-friendly audio controls, possibly represented by icons or sliders.

3.2.5 Frequency Adjustment:

- The system shall allow users to set the frequency of exposure sessions based on their preferences and therapeutic goals. Users may choose daily, weekly, or personalized schedules for exposure therapy sessions.

4. Cognitive Behavioral Therapy (CBT) Integration:

4.1 Seamless Access to CBT Activities:

4.1.1 Navigation to CBT Section:

- Phobia sufferers shall find a dedicated section within the VR therapy app for accessing CBT activities seamlessly.

- A designated button or icon shall be present on the user interface, clearly labeled as "CBT" or "Cognitive Behavioral Therapy." Upon clicking this button, users will be directed to the CBT section.

4.2 Relaxation Exercises:

4.2.1 Selection of Relaxation Exercises:

- Within the CBT section, users shall be able to select specific relaxation exercises designed to promote calmness and stress reduction.
- Icons or thumbnails representing different relaxation exercises (e.g., deep breathing, progressive muscle relaxation) shall be visible. Users can choose an exercise by clicking on the respective icon.

4.2.2 Guided Relaxation Sessions:

- Upon selecting a relaxation exercise, the system shall initiate a guided session. Users will be guided through the exercise with audio instructions and visual cues presented in the VR environment.
- A progress indicator will be displayed to guide users through the duration of the relaxation session.

4.3 Progress Tracking and Reporting:

4.3.1 User Progress Overview:

- The system shall include a feature to track users' engagement and progress in CBT activities.
- Phobia sufferers can view an overview of completed exercises, session durations, and frequency of participation. Progress tracking will be represented through visual charts or statistics.

5. Real-Time Monitoring and Feedback:

5.1 Integration of Biometric Sensors:

5.1.1 Biometric Sensor Activation:

- The platform shall automatically activate integrated biometric sensors when a phobia sufferer initiates an exposure session.
- A visual indicator, such as an icon representing biometric sensors, shall be displayed to confirm their activation.
- Sensors include heart rate monitors, skin conductance sensors, and oxygen level sensors.

5.2 Real-Time Physiological Data Monitoring:

5.2.1 On-Screen Data Display:

- During exposure sessions, a designated area of the VR interface shall display real-time physiological data.
- Icons or labels representing vital signs (e.g., heart rate, skin conductance) shall be visible, accompanied by numerical values.

- Phobia sufferers can glance at this section for ongoing monitoring without interrupting the VR experience.

5.3 Remote Therapist Guidance and Support:

5.3.1 Initiation of Therapist Support:

- Phobia sufferers shall have the option to initiate remote therapist guidance during exposure sessions.
- A designated button or icon labeled "Therapist Support" shall be present in the VR interface.
- Upon activation, the system shall establish a connection with the available therapist.

5.3.2 Communication Interface:

- A secure communication interface, possibly a pop-up window or a side panel, shall facilitate real-time communication between the phobia sufferer and the remote therapist.
- Text and audio communication options may be available, respecting user preferences.

6. Session Customization on Smart Watch

6.1 Smart Watch Pairing:

- Within the mobile application settings, users shall find an option labeled "Pair Smart Watch." Tapping on this option shall initiate the pairing process between the mobile app and the user's smartwatch.

6.2 Smart Watch Compatibility:

- The platform shall support popular smartwatches, including but not limited to Apple Watch, Samsung Galaxy Watch, and Fitbit. The system will provide a list of compatible smartwatches during the pairing process or the help section.

6.3 Session Customization on Smartwatch:

- Users, upon successful pairing, shall be able to customize therapy sessions directly from their smartwatches. Smartwatch screen displays shall include options for adjusting session duration and difficulty level.

6.4 Session Alerts:

- Users shall have the option to enable or disable session alerts through the smartwatch.
- If enabled, alerts shall include notifications for the start and end of therapy sessions.
- Users can customize the alert preferences, such as vibration strength and sound notifications.

6.5 Emergency Stop Feature:

- A prominent "Emergency Stop" button shall be available on the smartwatch screen during therapy sessions.
- Pressing this button shall immediately halt the ongoing session and display an emergency contact prompt.

User: Therapists:

After a successful login, therapist users can perform these following actions in their personalized dashboard:

1. Dashboard Overview: Upon successful login, therapists shall be directed to their personalized dashboard.

1.2 Real-Time Monitoring:

1.2.1 Phobia Sufferer Overview:

- The dashboard shall present an overview of multiple phobia sufferers whom they were assigned with currently undergoing therapy sessions.
- Icons or avatars representing individual phobia sufferers shall be displayed along with their current session status.

2. Remote Guidance and Support:

2.1 User Initiated Support Request:

- Phobia sufferers, during a therapy session, shall have the option to request remote guidance or support.
- A designated "Request Support" button or icon shall be available within the VR therapy app interface.

2.2 Communication Tools:

- Communication tools, such as instant messaging and voice communication, shall be integrated into the VR therapy app for therapist-phobia sufferer interaction.
- Therapists shall be notified of incoming support requests through a visual or auditory alert.

2.3 Remote Assistance Interface:

- Therapists responding to support requests shall be directed to a dedicated interface displaying real-time session information.
- Features on this interface may include a live video feed of the phobia sufferer's VR environment, relevant physiological data, and a chat window for communication.

3. Therapist Information Update:

3.1 Professional Information Editing:

- Therapists shall have the ability to update their professional information and credentials through the platform.
- An "Edit Profile" button within the therapist's dashboard or settings menu shall provide access to the information editing interface.

4. Session Analysis and Feedback:

4.1 Analysis Report Access:

- Therapists shall access detailed analysis reports and feedback on phobia sufferers' sessions.
- A dedicated "Session Reports" section within the therapist's dashboard shall provide a chronological list of session analyses.

4.2 Data Analytics Insights:

- Data analytics tools integrated into the platform shall offer therapists insights into user progress trends.
- Graphs, charts, and numerical summaries shall be available to aid therapists in adjusting therapy programs based on individual user progress.

5. Collaboration with Other Therapists:

5.1 Collaboration Interface:

- Therapists shall have access to a collaborative interface for sharing insights and best practices. The "Collaborate" button will provide a section to facilitate communication and information exchange among therapists.

Users: Admins:

Admins can login and logout but can not register. Only other previous admins can add new admins for the app.

1. User Management:

1.1 **Phobia Sufferer Management:**

- Admins shall have the capability to view and manage the profiles of phobia sufferers.
- Actions may include account activation, deactivation, or suspension based on user behavior or compliance with platform guidelines.
- Admins shall be able to view and manage phobia-related information submitted during registration.

1.2 **Therapist Management:**

- Admins shall be able to view and manage therapist profiles.
- Actions may include verifying professional documents, updating information, or deactivating accounts if necessary.

1.3 **User Support and Issue Resolution:**

- Admins shall have a dedicated interface to handle user support queries, concerns, or issues. A support ticketing system for addressing user problems and providing timely resolutions shall be available.

2. Platform Maintenance and Updates:

2.1 **Feature Maintenance:**

- Admins shall oversee the maintenance of existing features on the platform. They should have the authority to disable or enable specific features based on platform performance or user feedback.

2.2 **New Feature Integration:**

- Admins shall be responsible for integrating new features into the platform.

2.3 **VR Environment Updates:**

- Admins shall have access to tools for updating or adding new VR therapy environments.
- This includes adding scenarios, modifying existing ones, or collaborating with content creators for diverse and effective therapy environments.

3. User Feedback and Improvement:

3.1 **Feedback Collection:**

- Feedback forms, surveys, or other channels shall be available to gather user opinions and suggestions.

3.2 **Analysis of Feedback:**

- Admins shall analyze collected feedback to identify areas of improvement or features that may require modification.

Non-Functional Requirements:

1. Usability:

1.1 The VR therapy platform shall have an intuitive and user-friendly interface.

1.2 Phobia sufferers and therapists shall be able to navigate and use the platform efficiently without extensive training.

1.3 The average time for a phobia sufferer to initiate and complete a therapy session should not exceed 10 minutes.

2. Performance:

2.1 The platform shall load VR environments within 5 seconds to ensure a seamless and immersive experience.

2.2 During therapy sessions, the platform shall maintain a frame rate of at least 60 frames per second to prevent motion sickness.

2.3 The system shall support a minimum of 100 simultaneous users without significant degradation in performance.

3. Compatibility:

3.1 The VR therapy platform shall be compatible with a wide range of VR headsets, including Oculus, Meta Quest, and others.

3.2 Mobile device compatibility shall be ensured for users who do not have access to dedicated VR headsets.

4. Response Time:

4.1 The system shall provide real-time feedback during therapy sessions, with a response time not exceeding 1 second for user interactions.

4.2 Therapist oversight features, including remote guidance, shall have response times within 2 seconds.

5. Security:

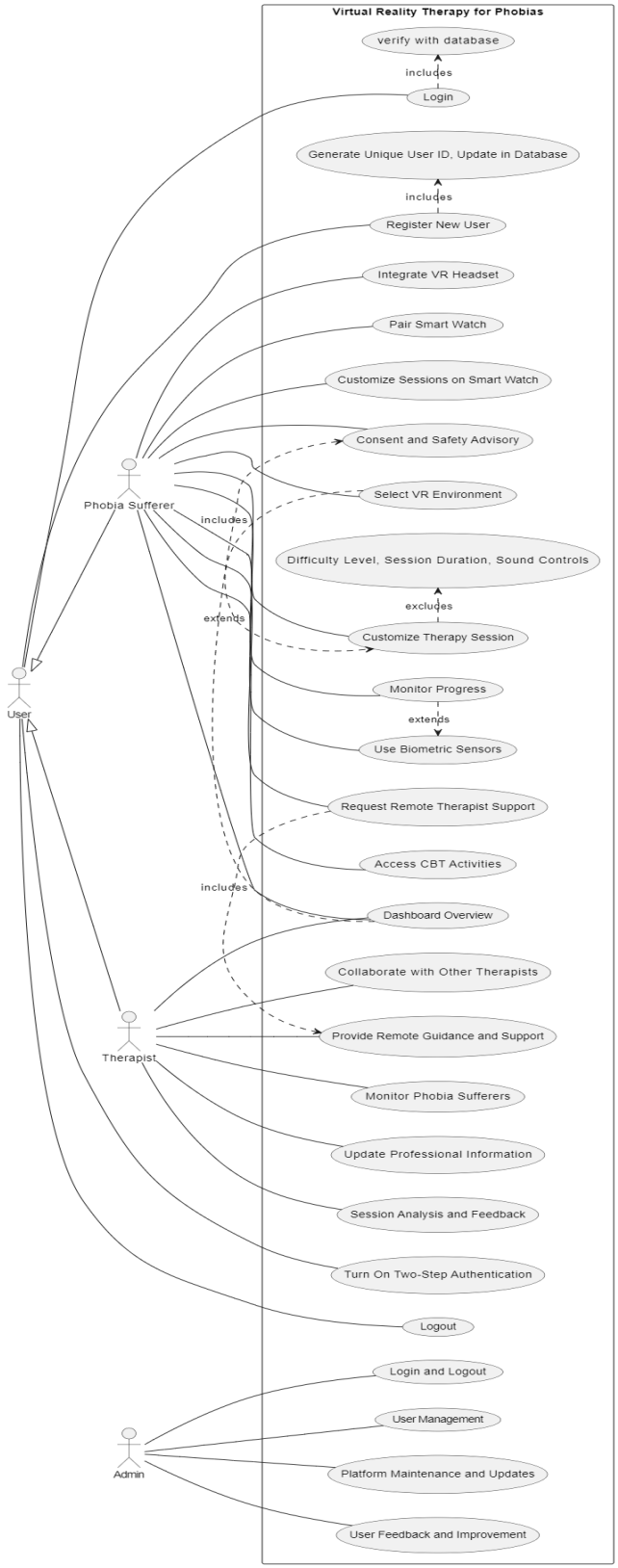
5.1 User data, including personal and biometric information, shall be encrypted during transmission and storage.

5.2 The platform shall implement user authentication and authorization mechanisms to ensure access control.

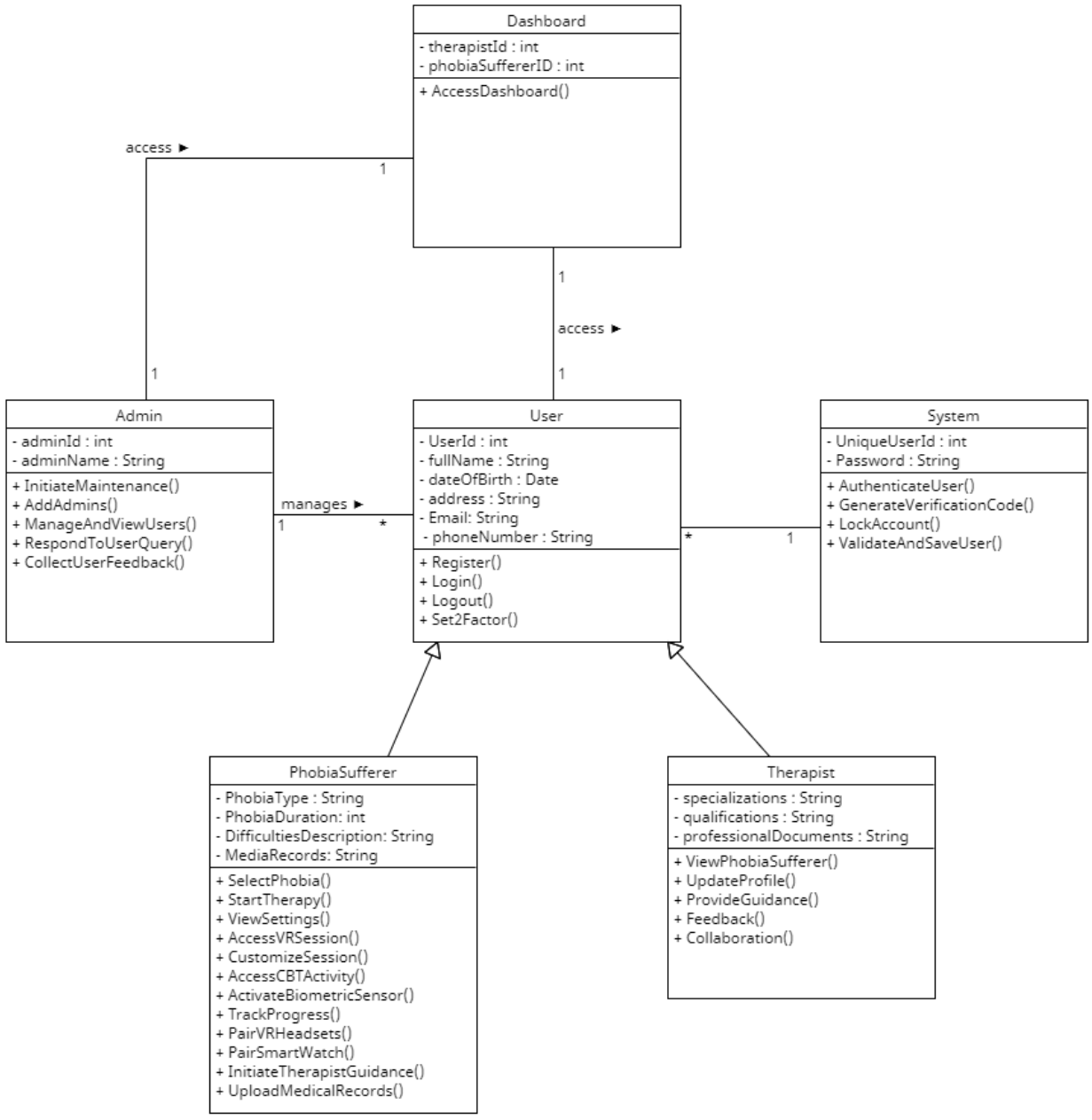
5.3 Compliance with data protection regulations and standards shall be maintained, with a focus on user privacy.

4. DIAGRAMS

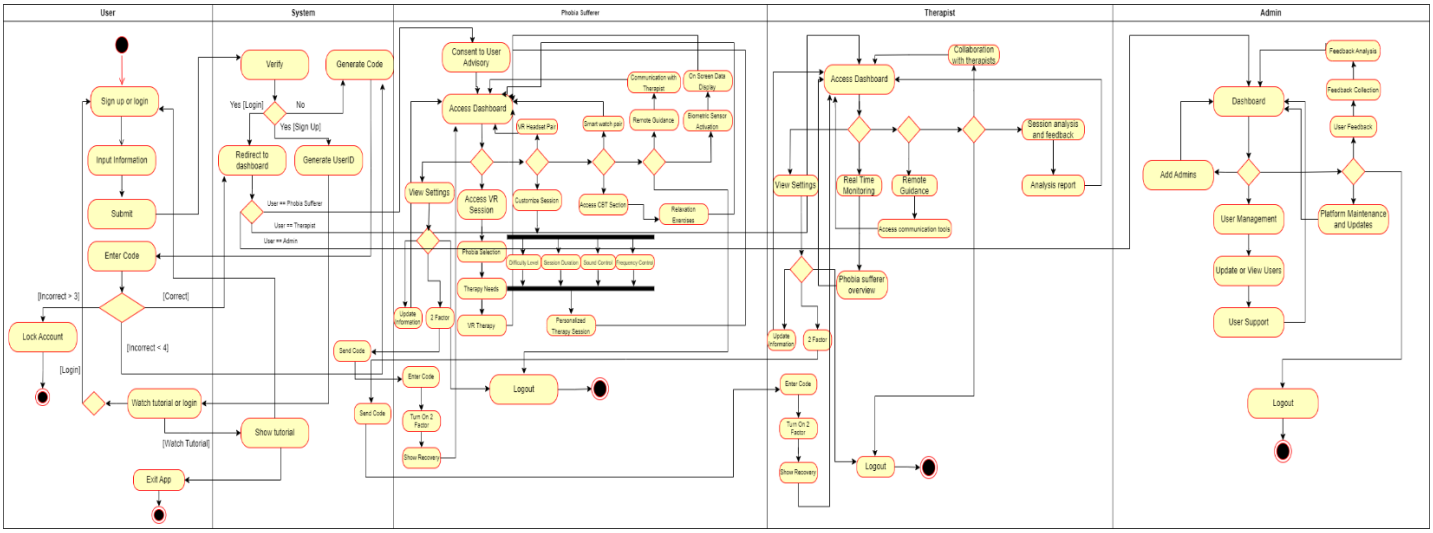
A. Use Case Diagram:



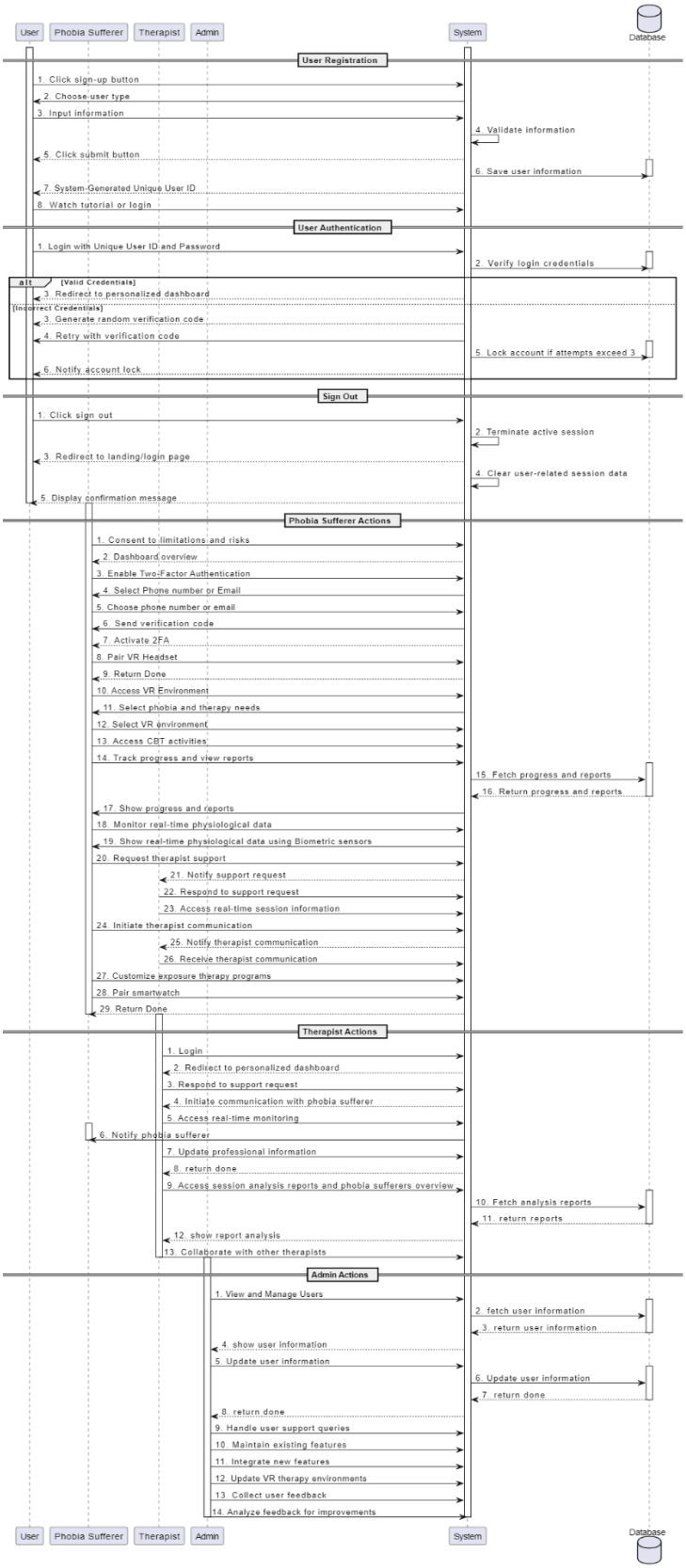
B. Class Diagram:



C. Activity Diagram:

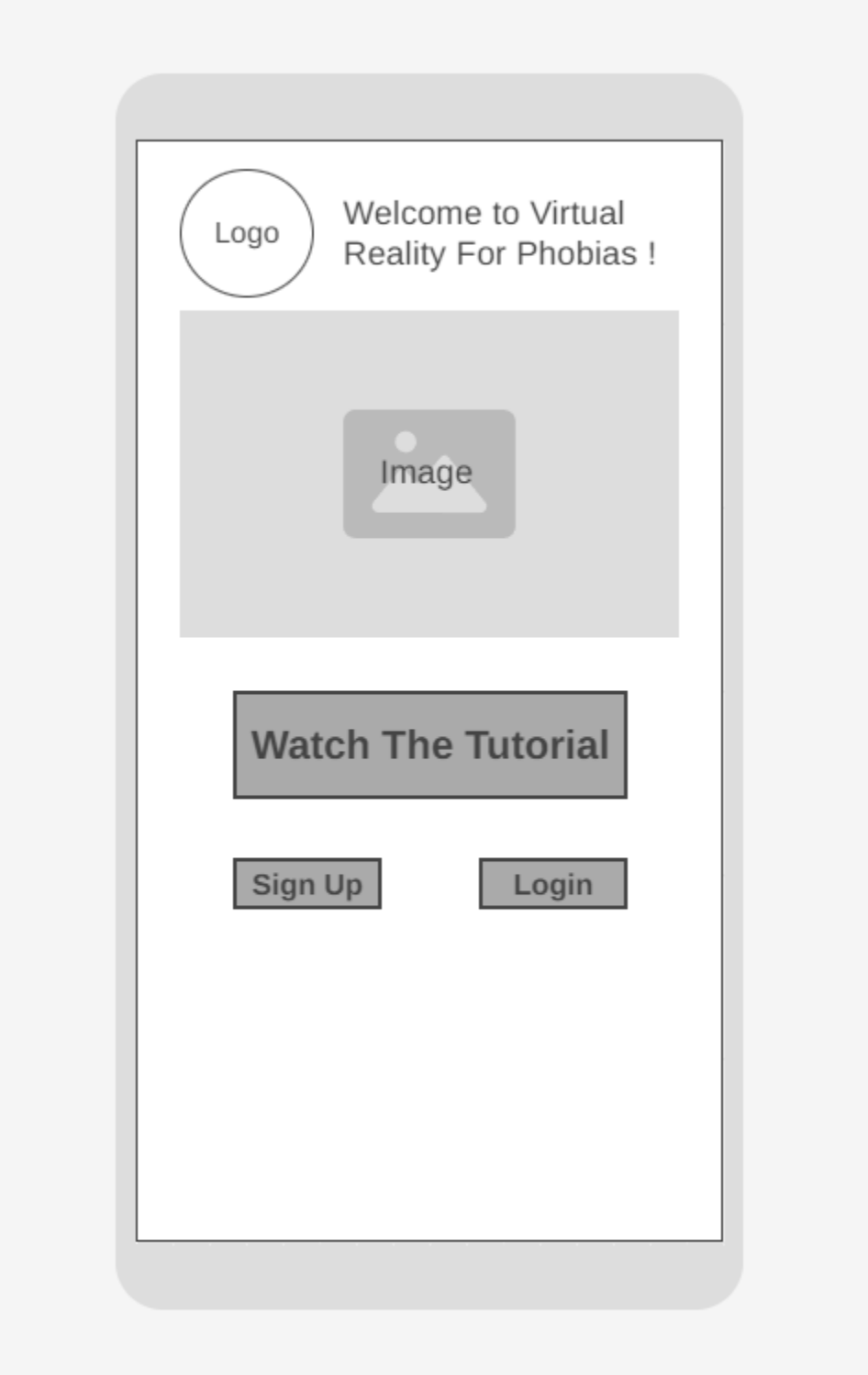


D. Sequence Diagram:

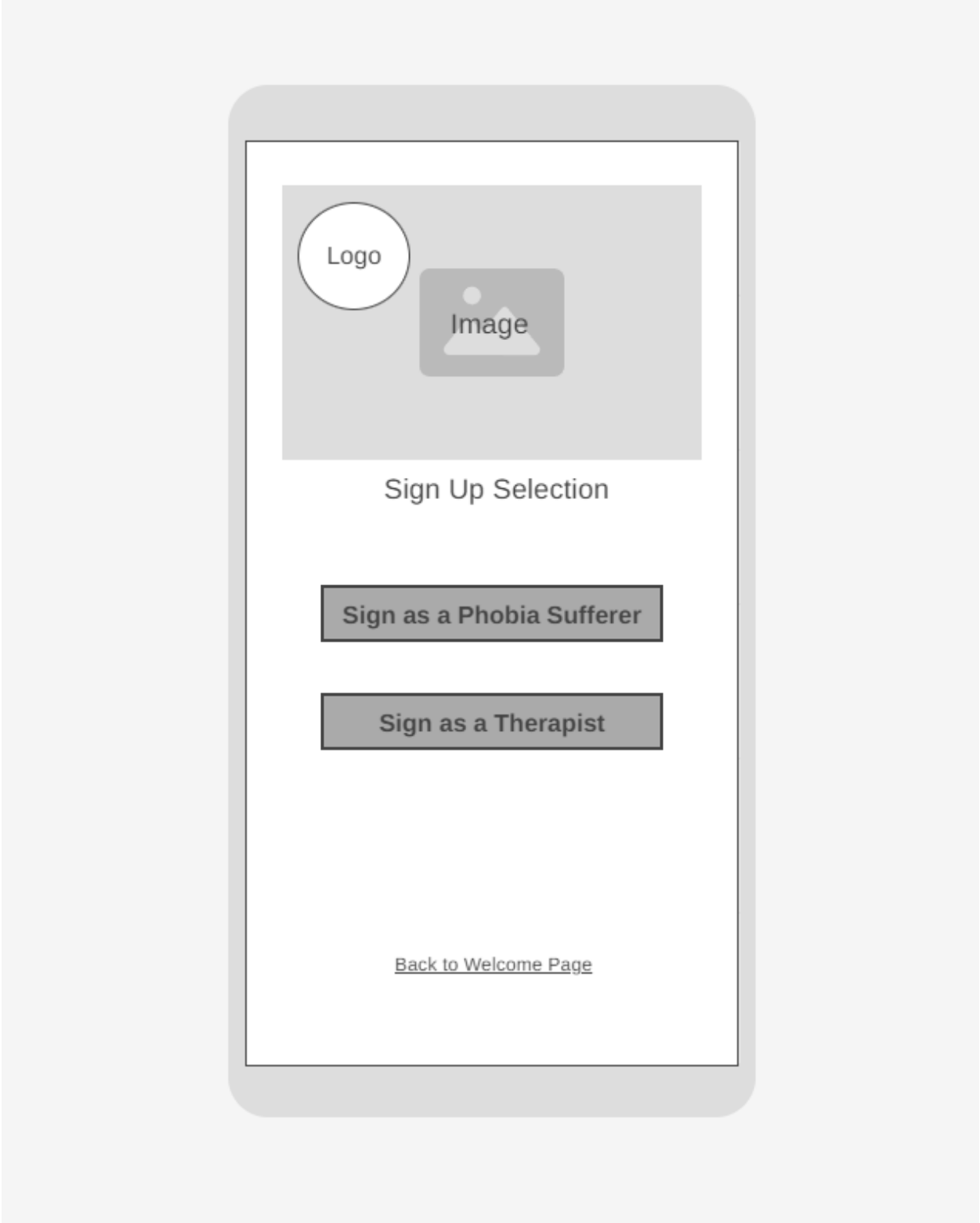


6. WIREFRAMING

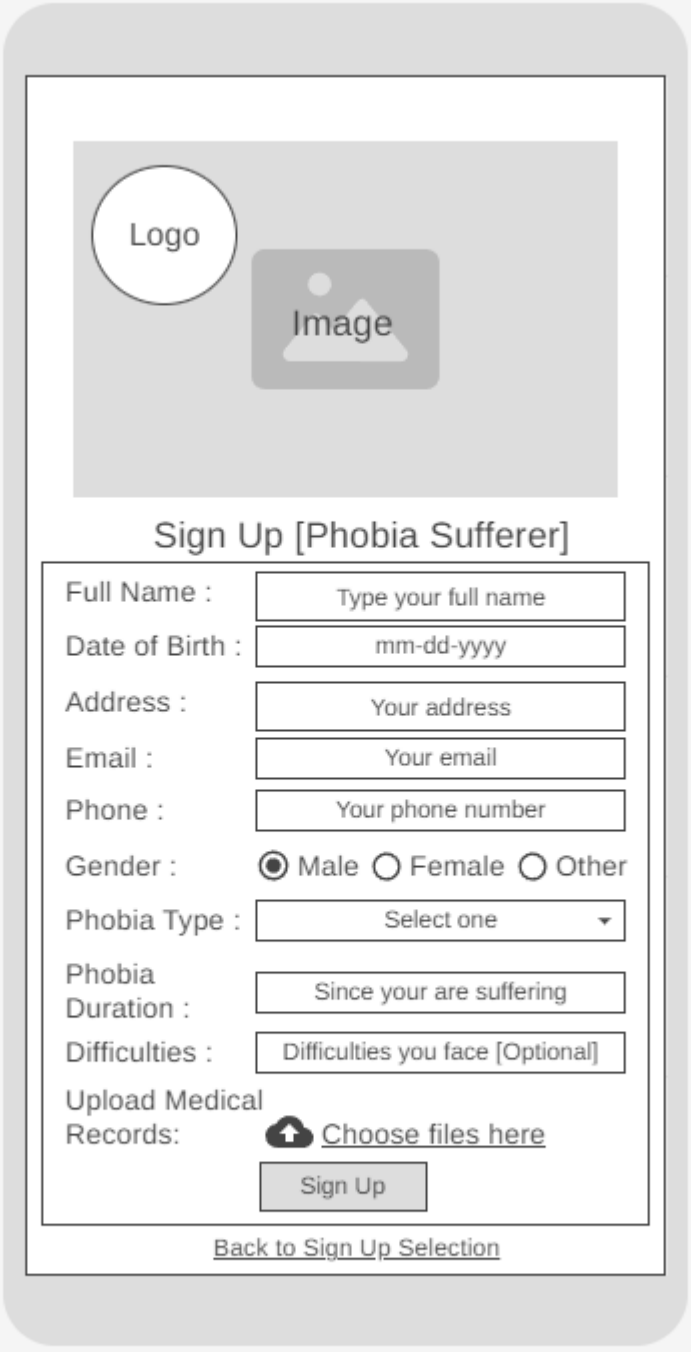
Welcome page –



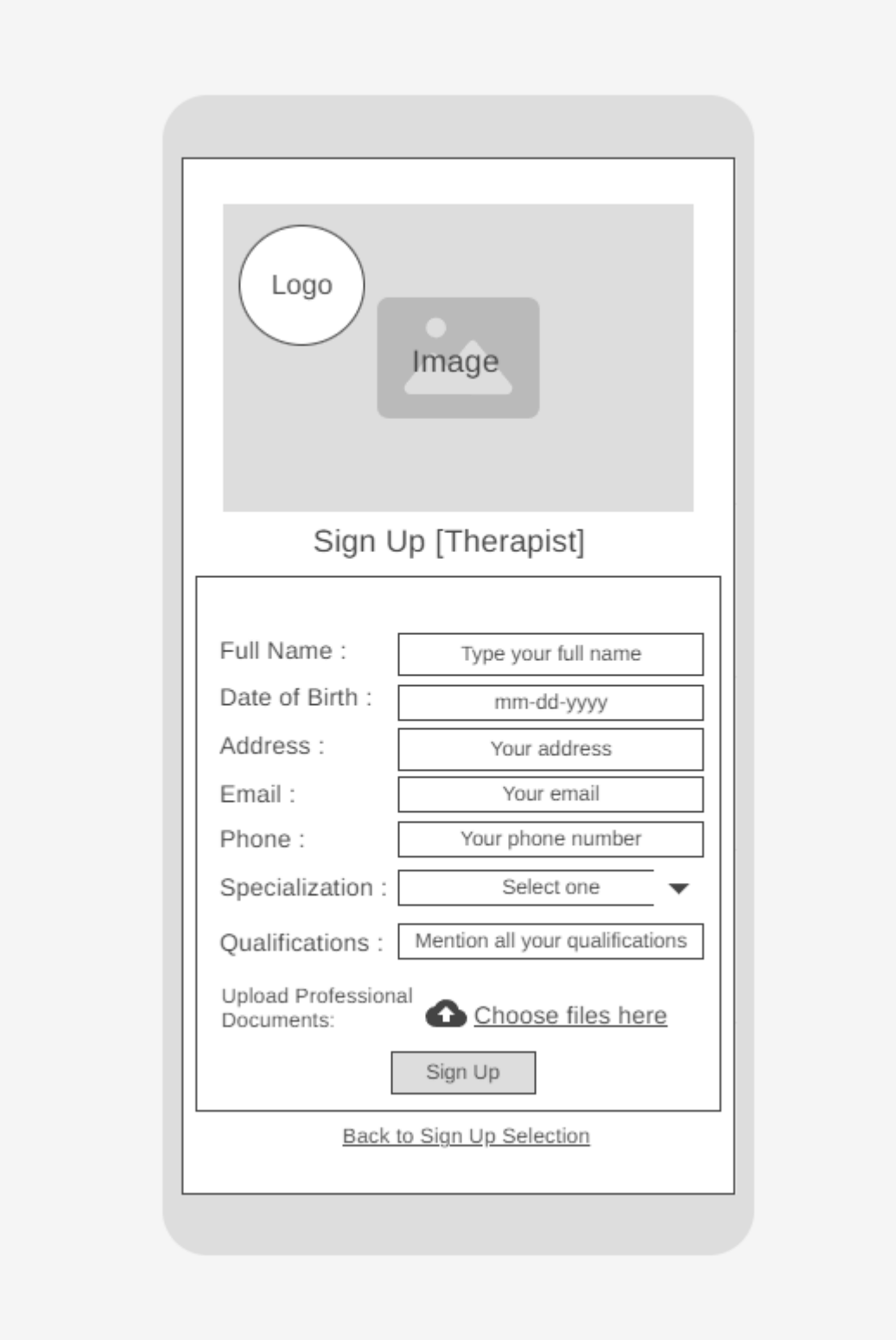
Sign Up Selection–



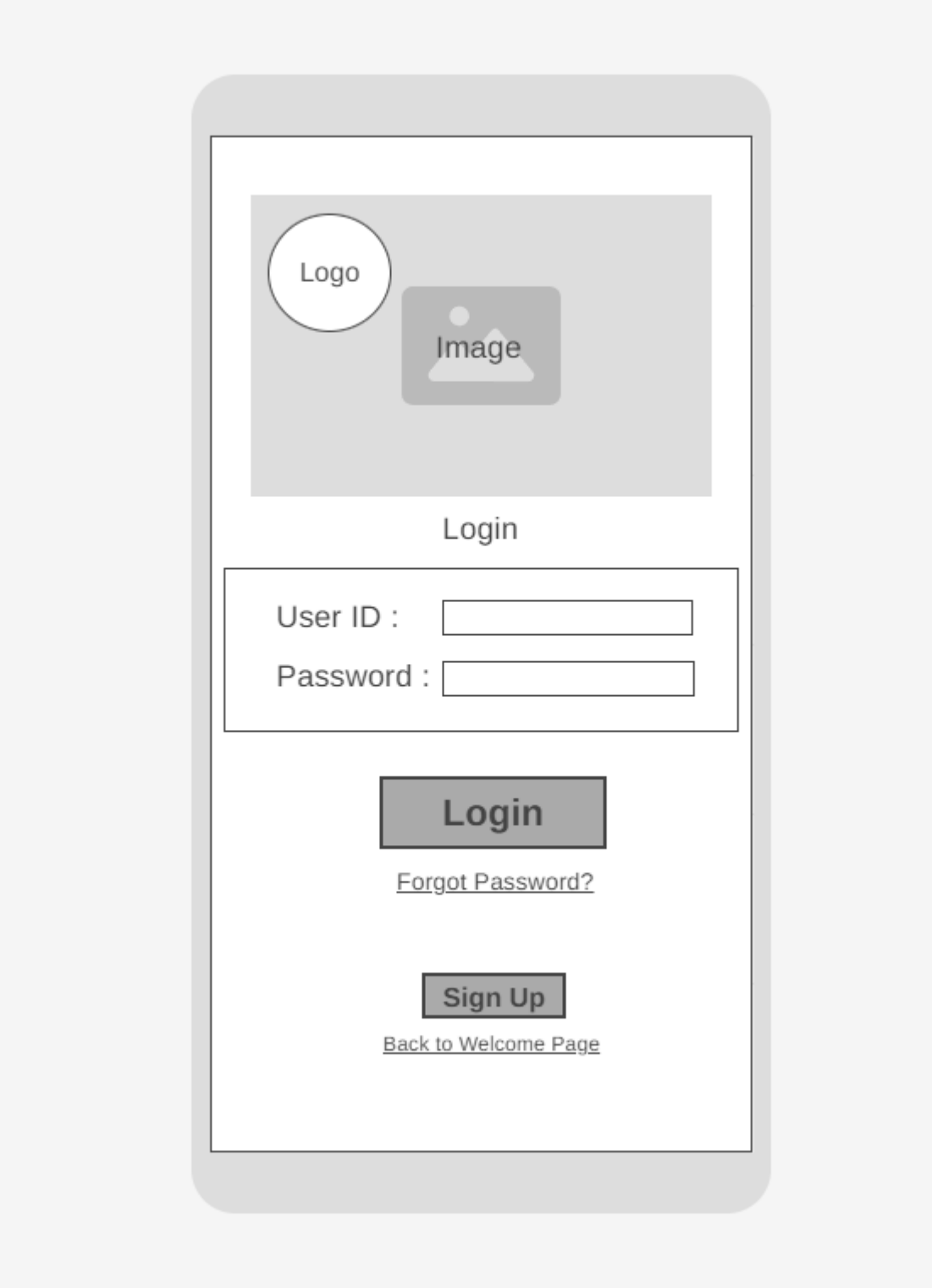
Sign up[Phobia Sufferer]:



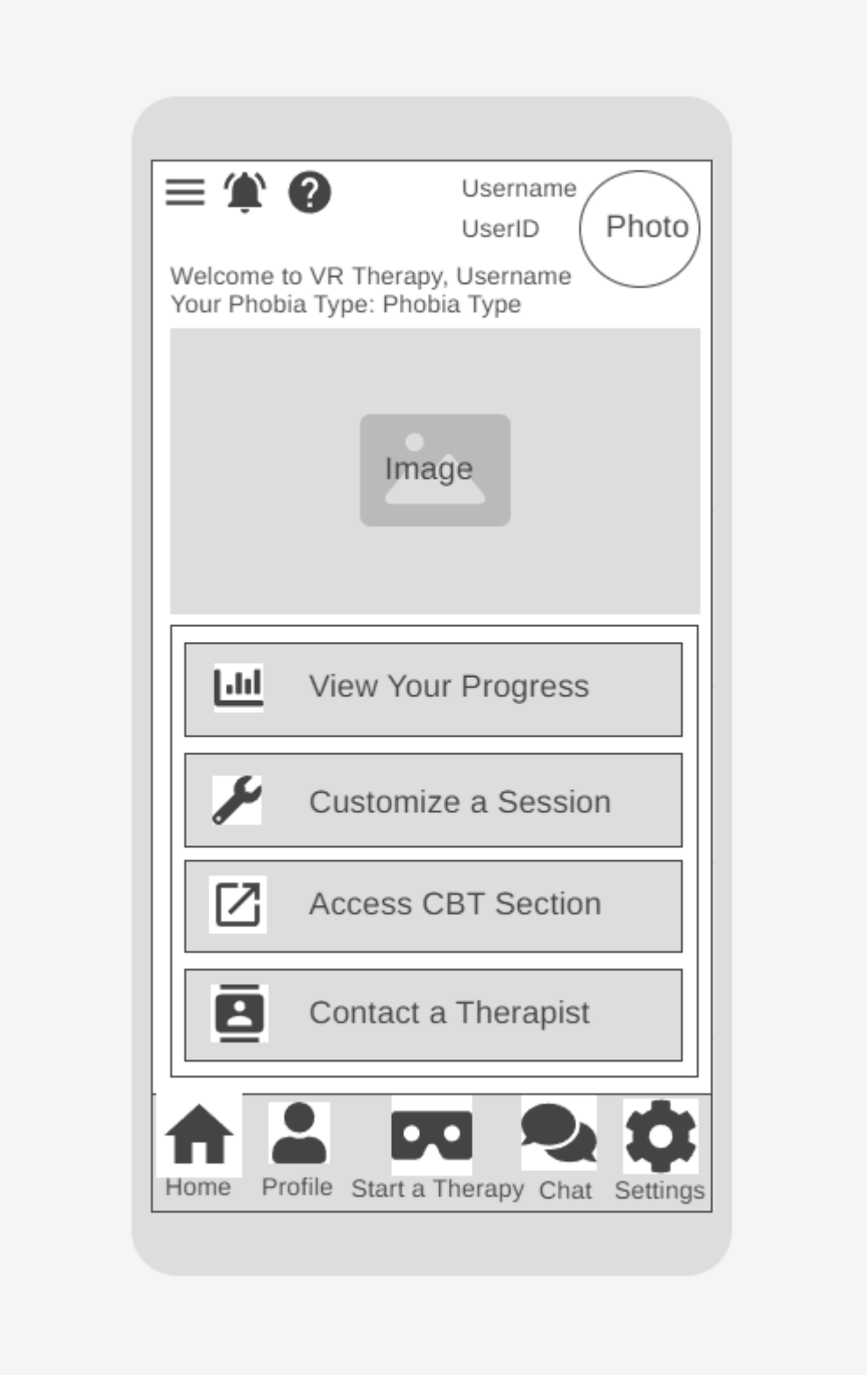
Sign up[Therapist]:



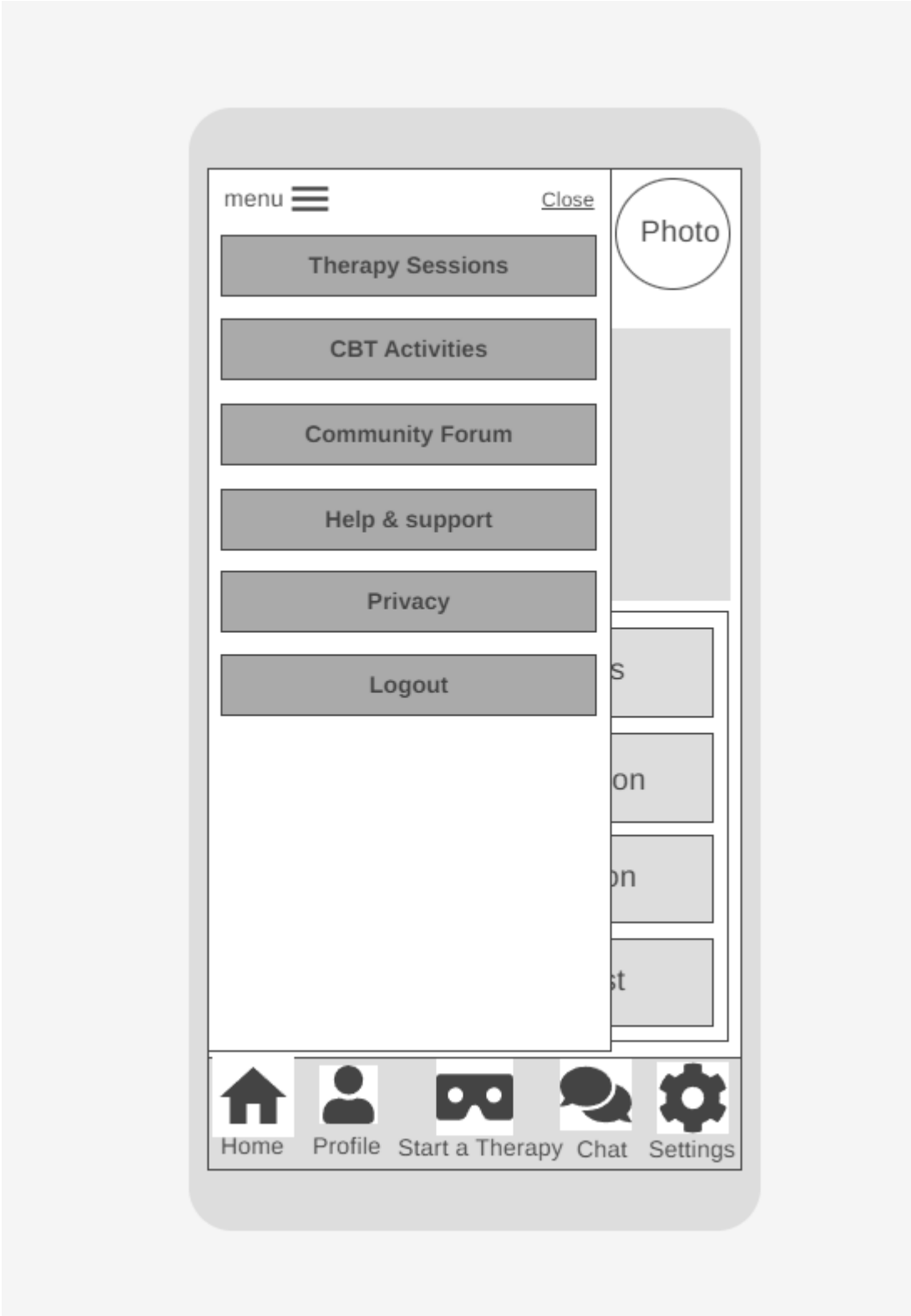
Login page –


Logo
Image
Login
User ID :
Password :
Login
Forgot Password?
Sign Up
Back to Welcome Page

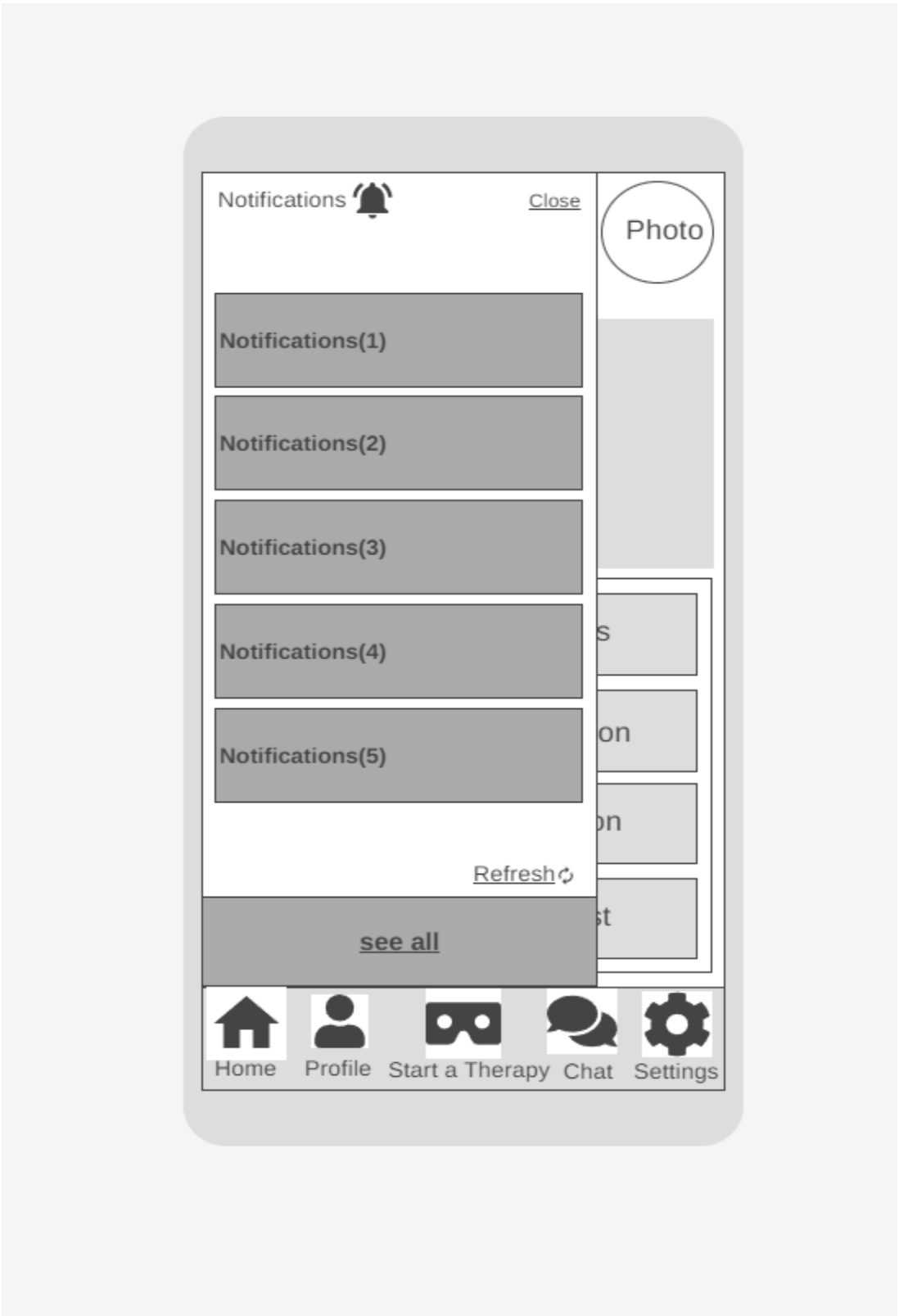
Phobia Sufferer Dashboard:



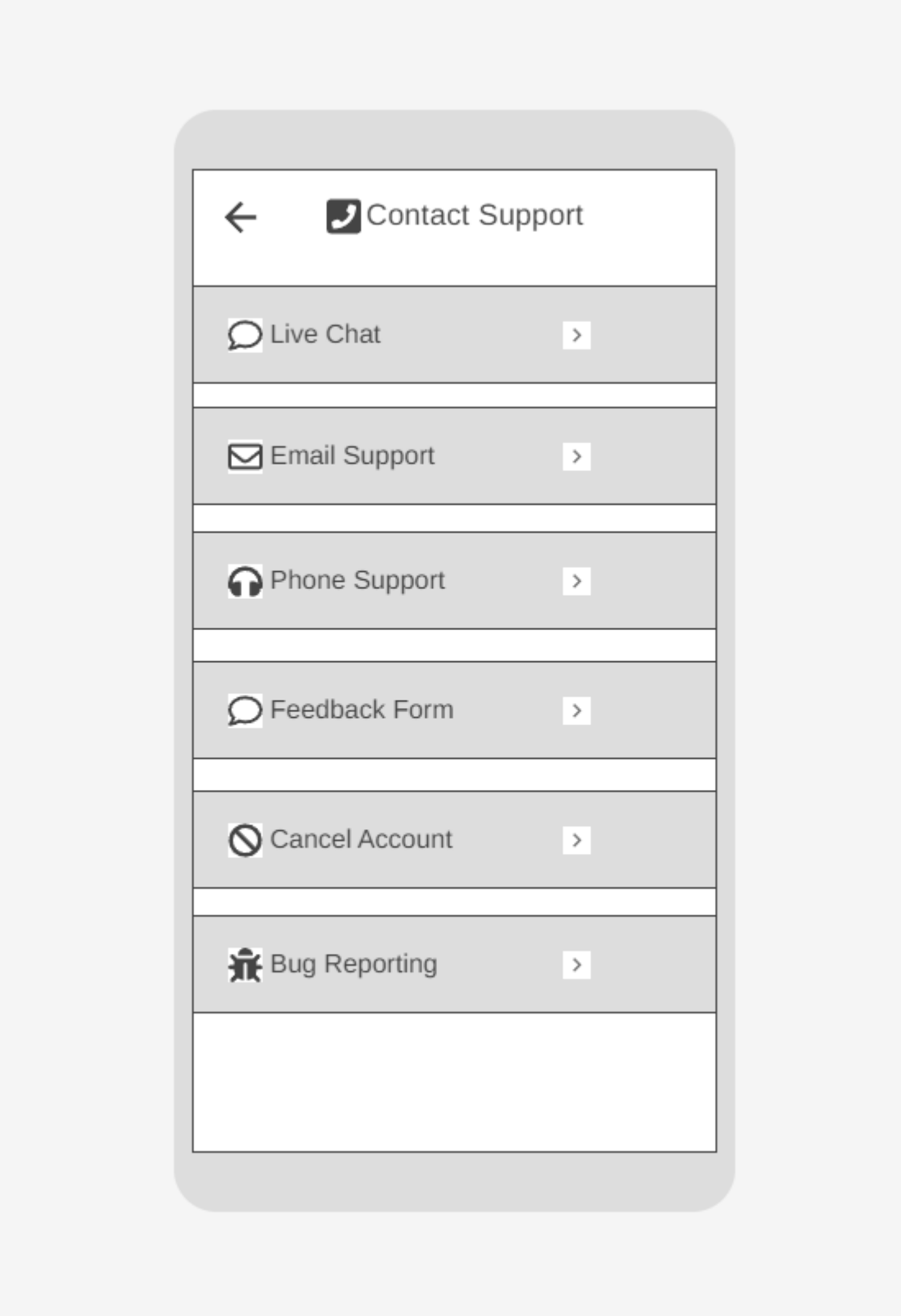
Menu Expanded -



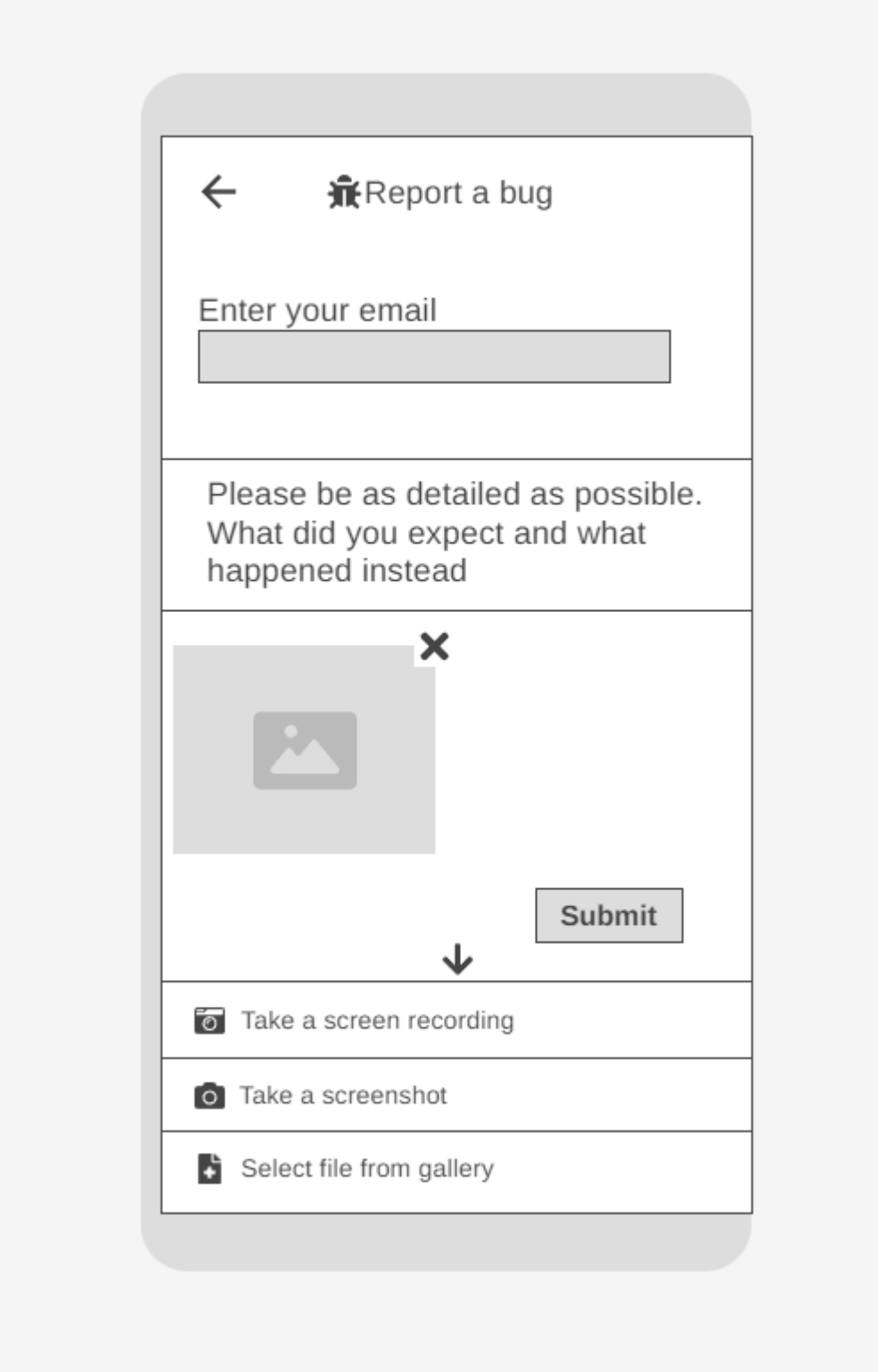
Notifications:



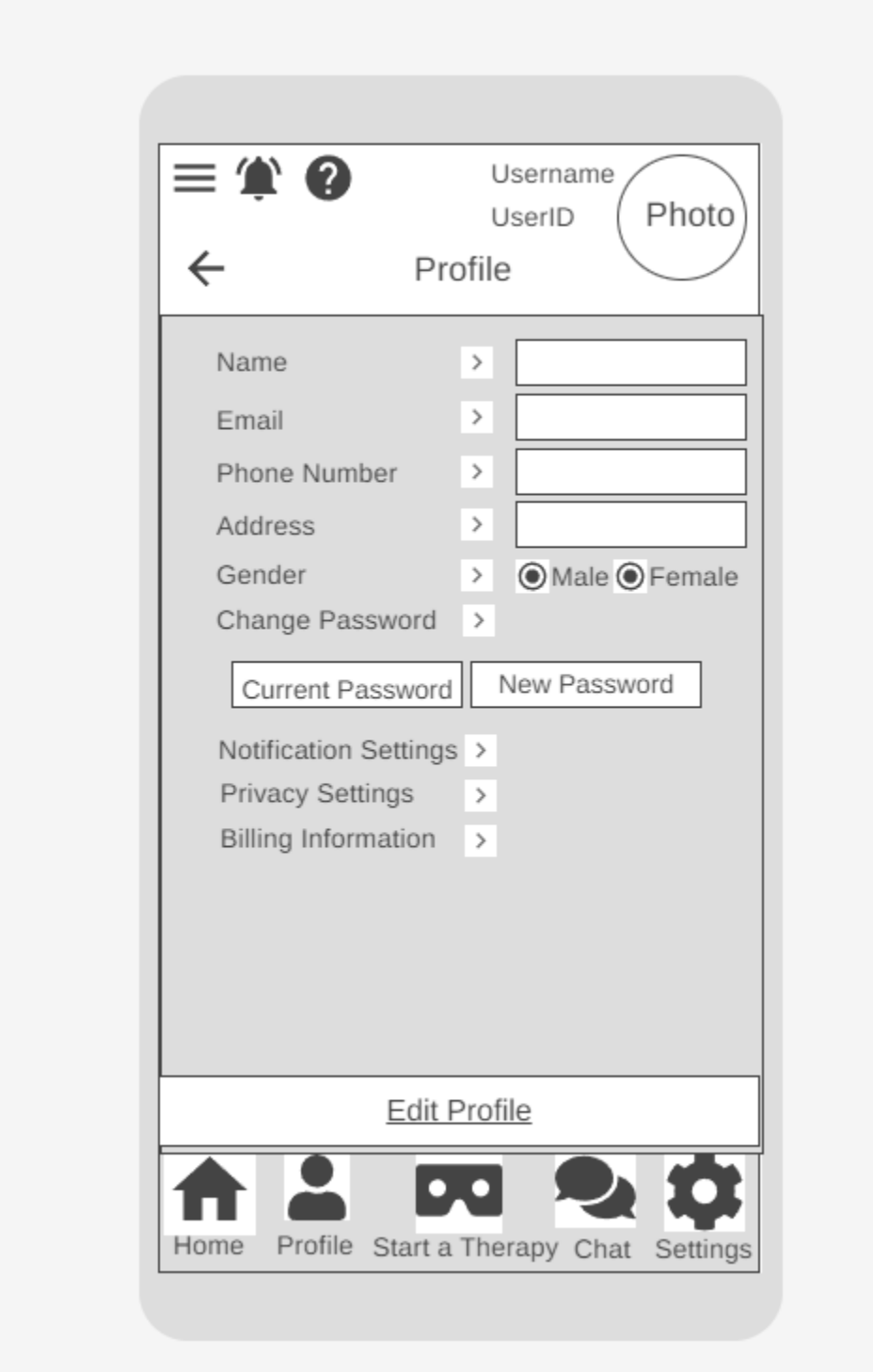
Contact Support:



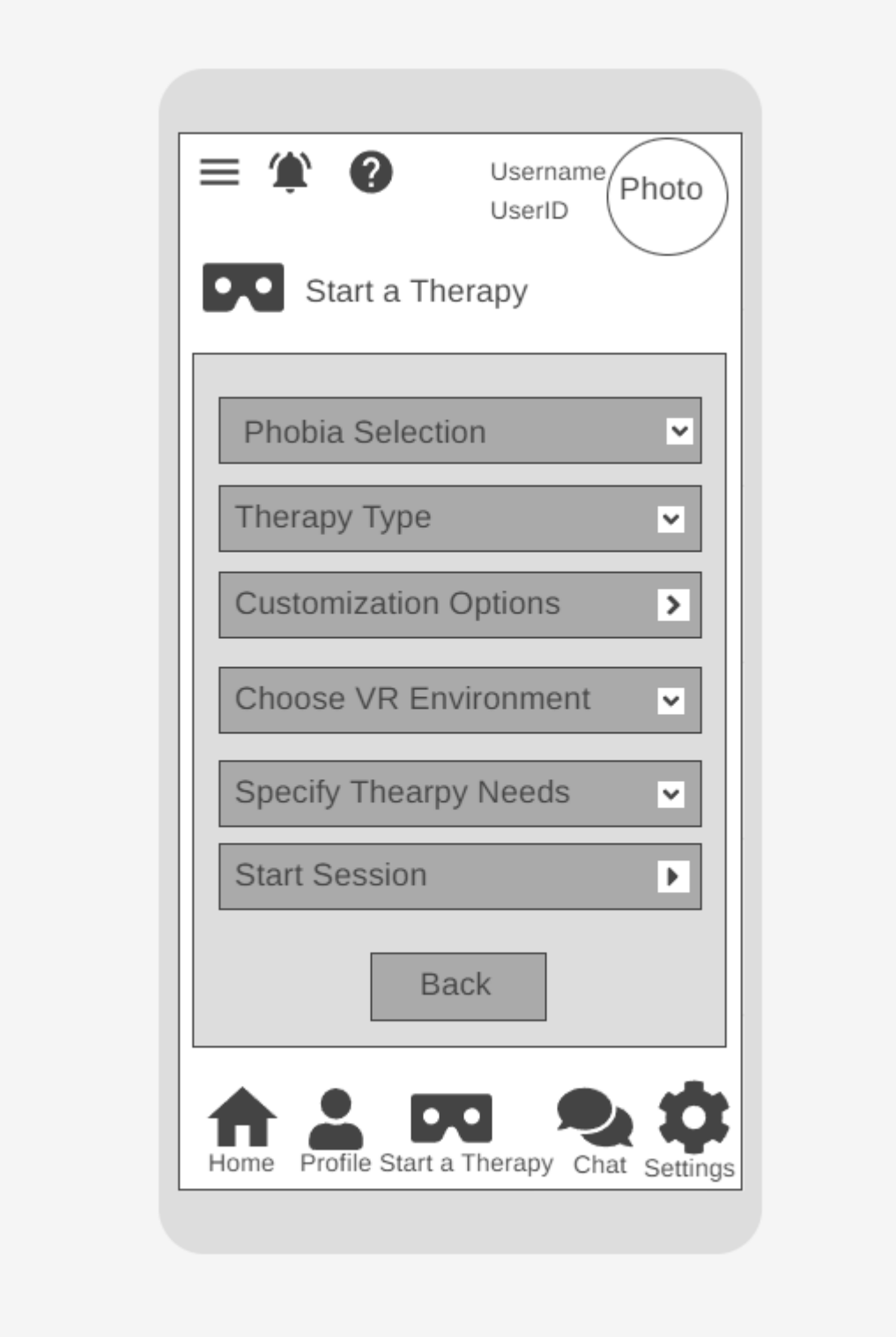
Report a Bug:


Report a bug
Enter your email
Please be as detailed as possible. What did you expect and what happened instead
Submit
Take a screen recording
Take a screenshot
Select file from gallery

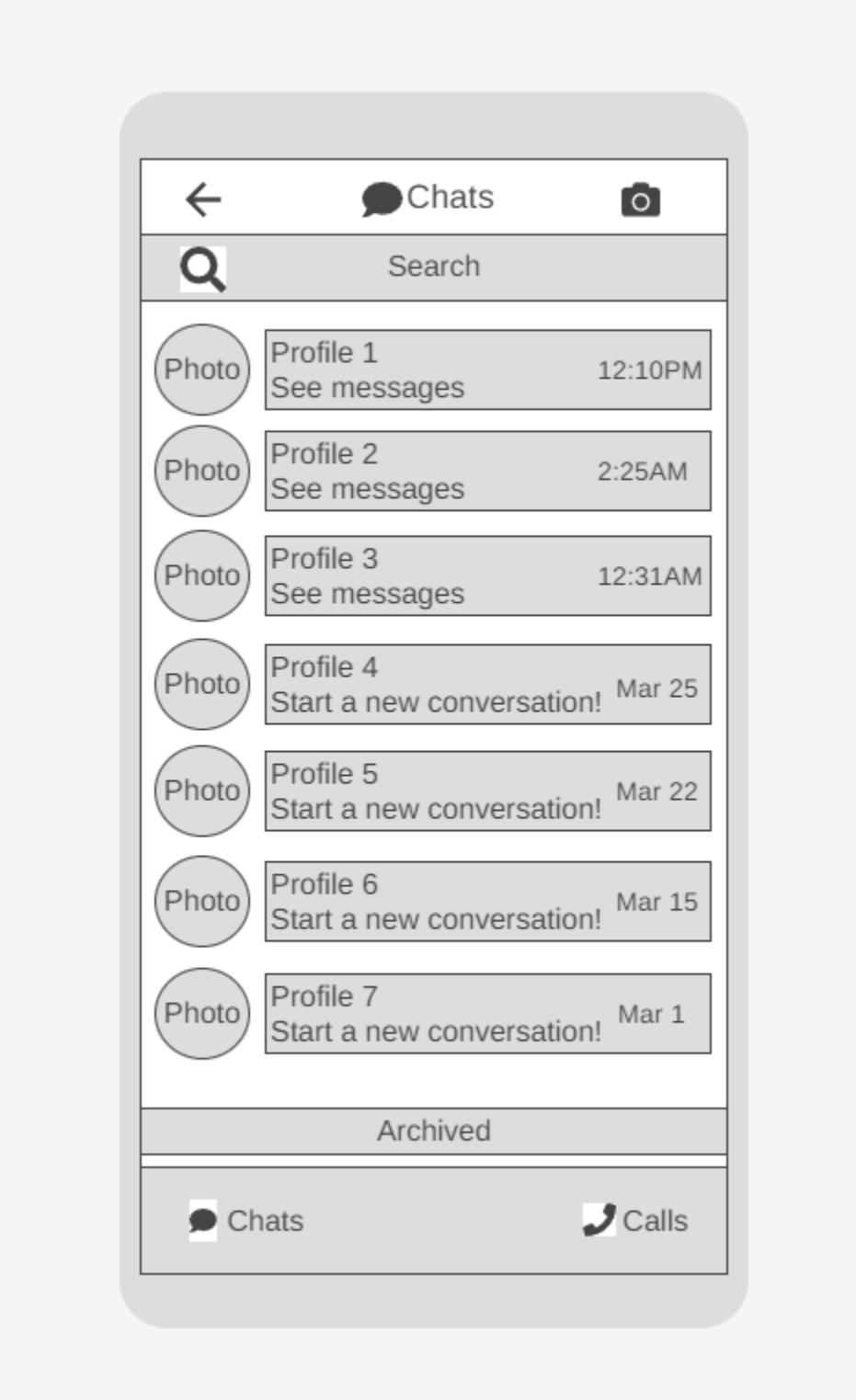
Profile/Edit Profile:



Start a therapy:



Chat: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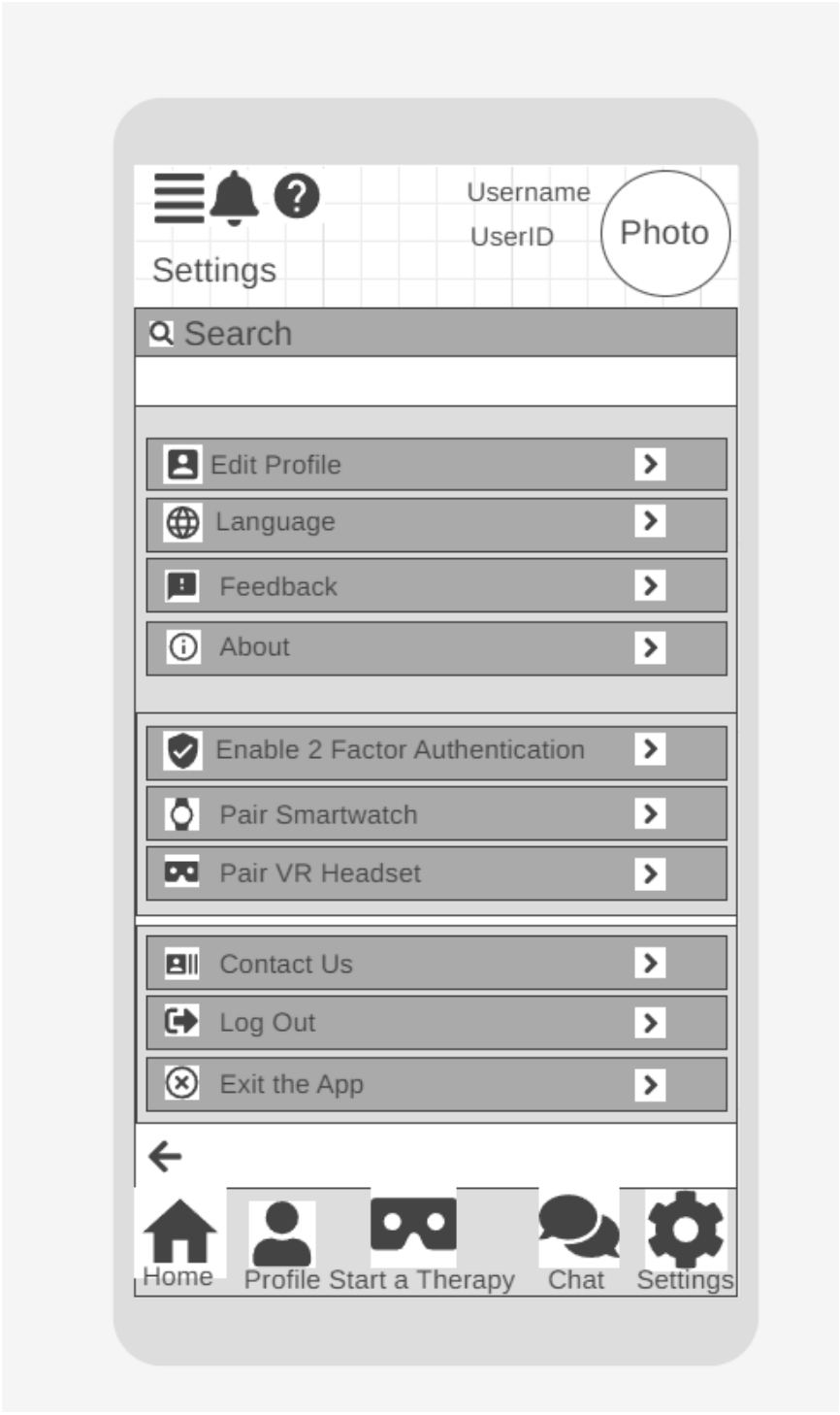
Search
Photo
Profile 1
See messages
12:10PM
Photo
Profile 2
See messages
2:25AM
Photo
Profile 3
See messages
12:31AM
Photo
Profile 4
Start a new conversation!
Mar 25
Photo
Profile 5
Start a new conversation!
Mar 22
Photo
Profile 6
Start a new conversation!
Mar 15
Photo
Profile 7
Start a new conversation!
Mar 1
Archived
Chats
Calls

‘

Settings: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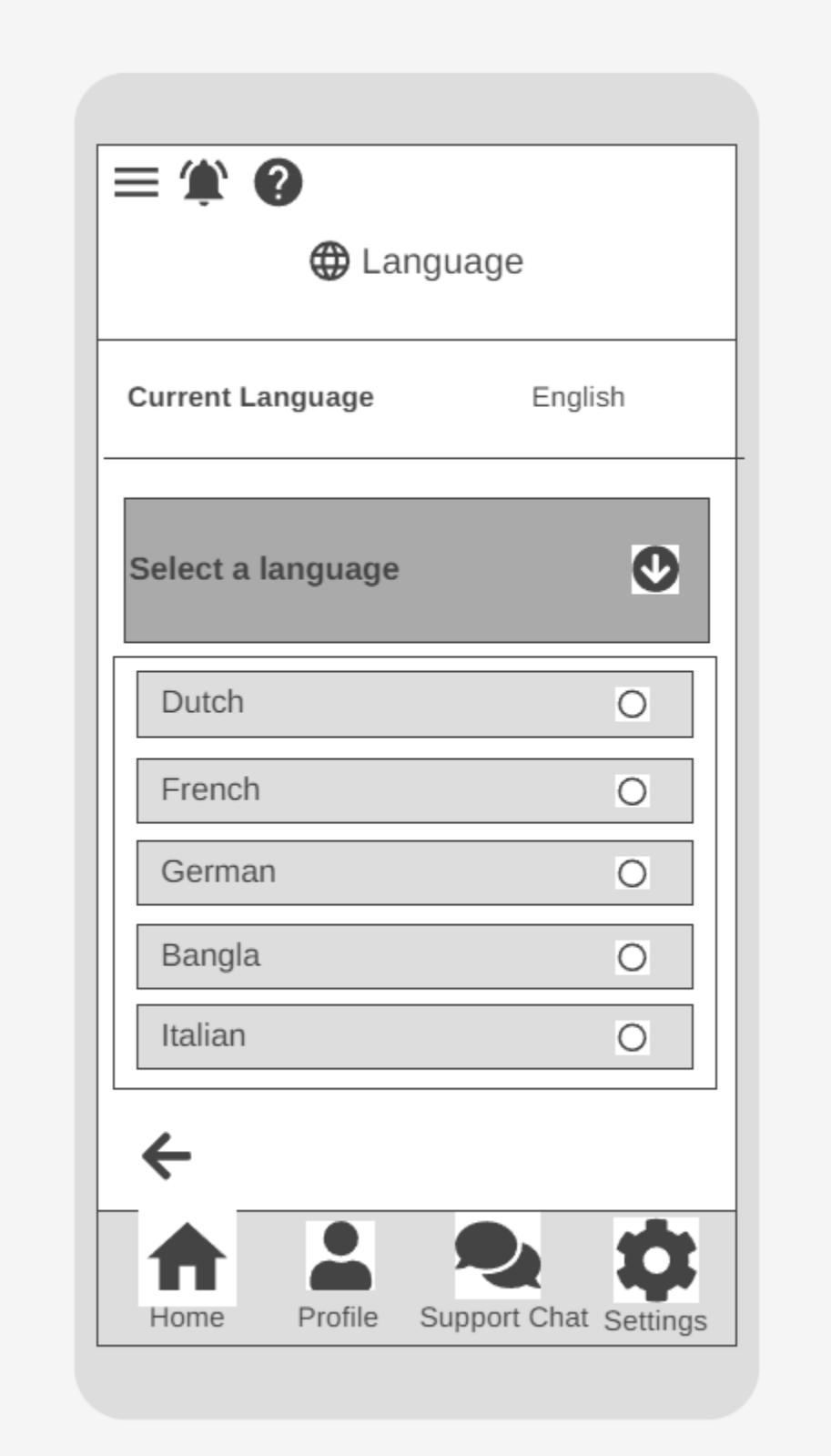
Username
UserID
Photo
Search
Edit Profile
Language
Feedback
About
Enable 2 Factor Authentication
Pair Smartwatch
Pair VR Headset
Contact Us
Log Out
Exit the App
Home
Profile
Start a Therapy
Chat
Settings

Language: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French
German
Bangla
Italian
Home
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Support Chat
Settings

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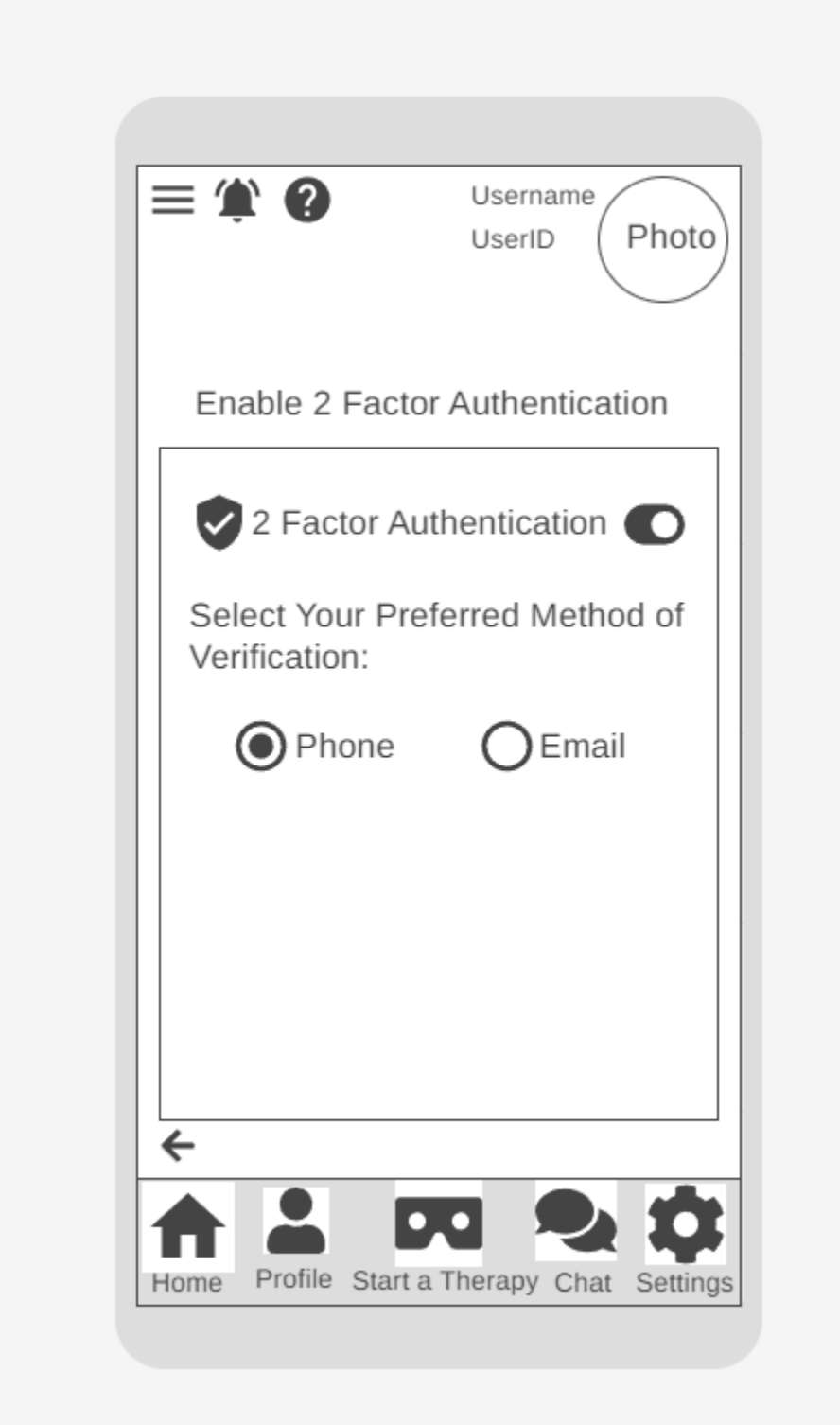
Username
UserID
Photo
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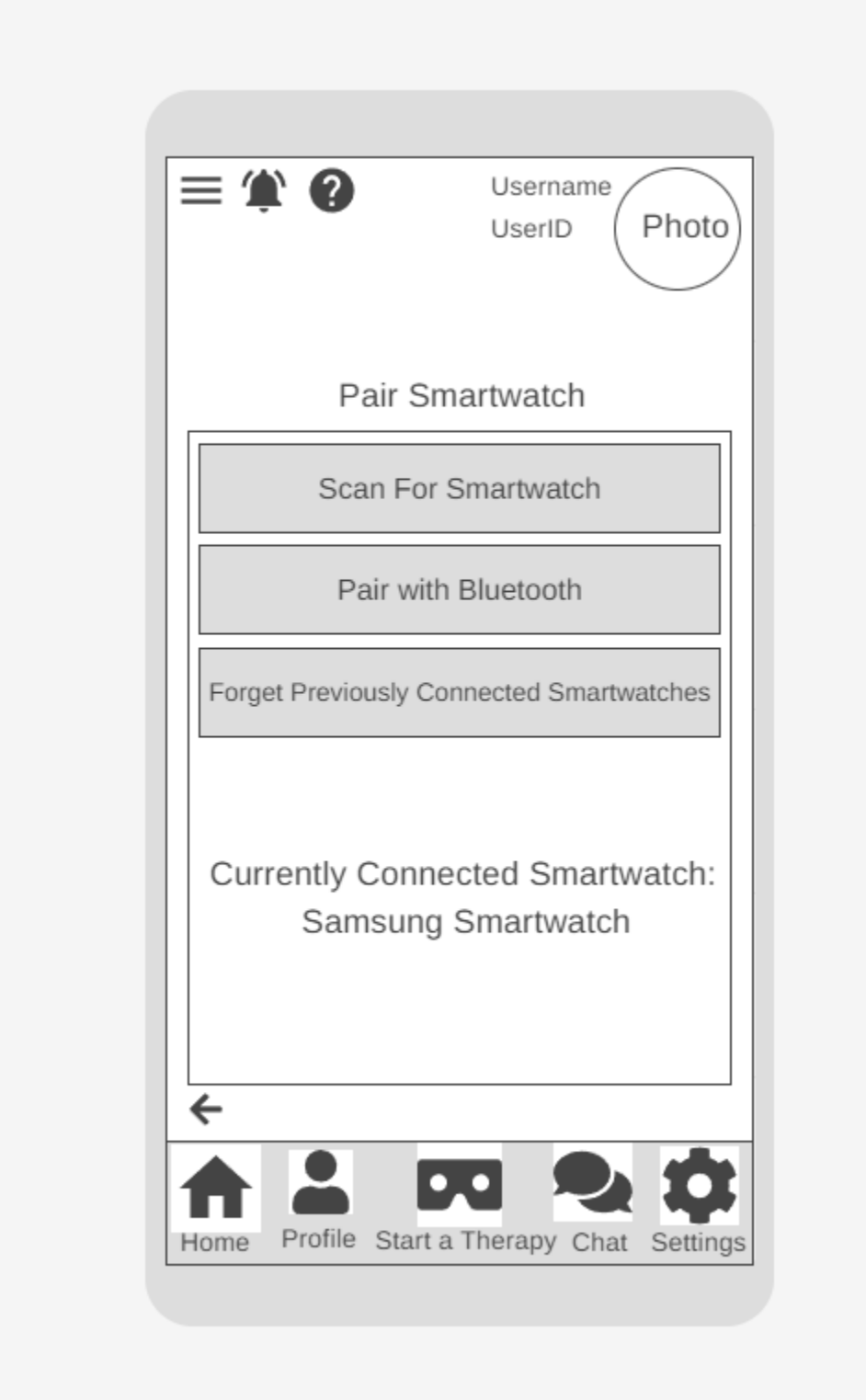
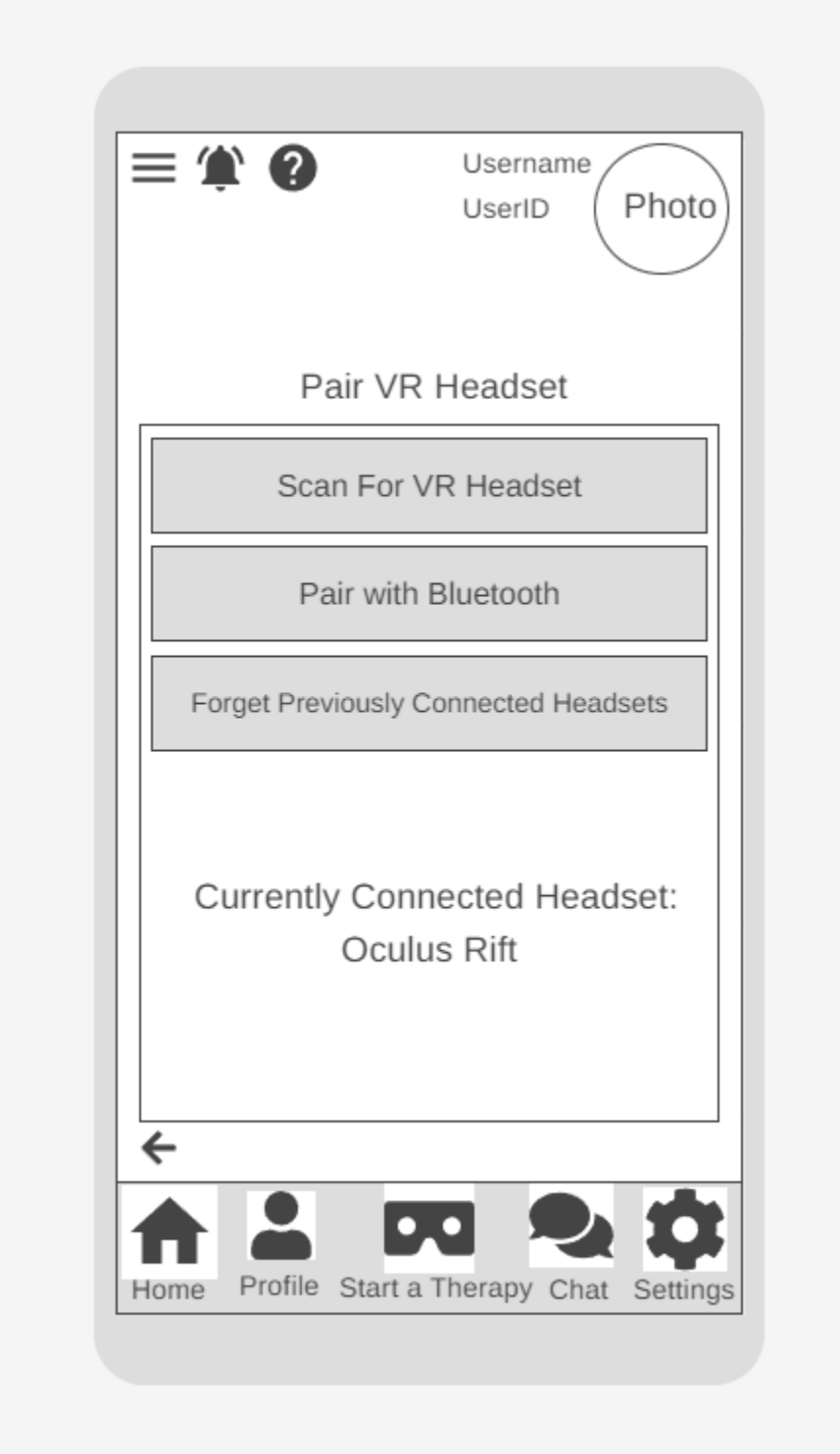
2 Factor Authentication
Select Your Preferred Method of Verification:
Phone
Email
Home
Profile
Start a Therapy
Chat
Settings

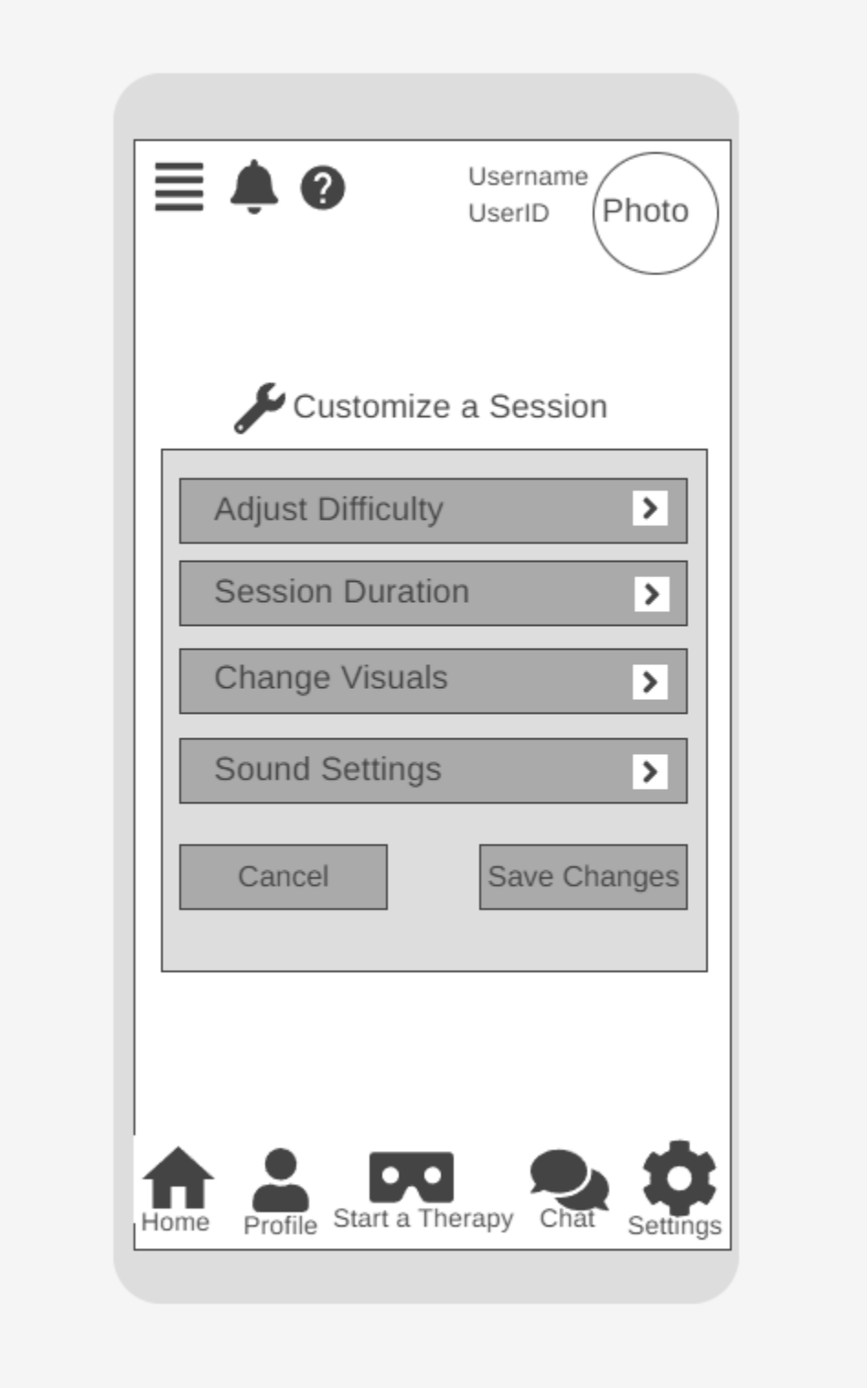
Pair Smartwatch:



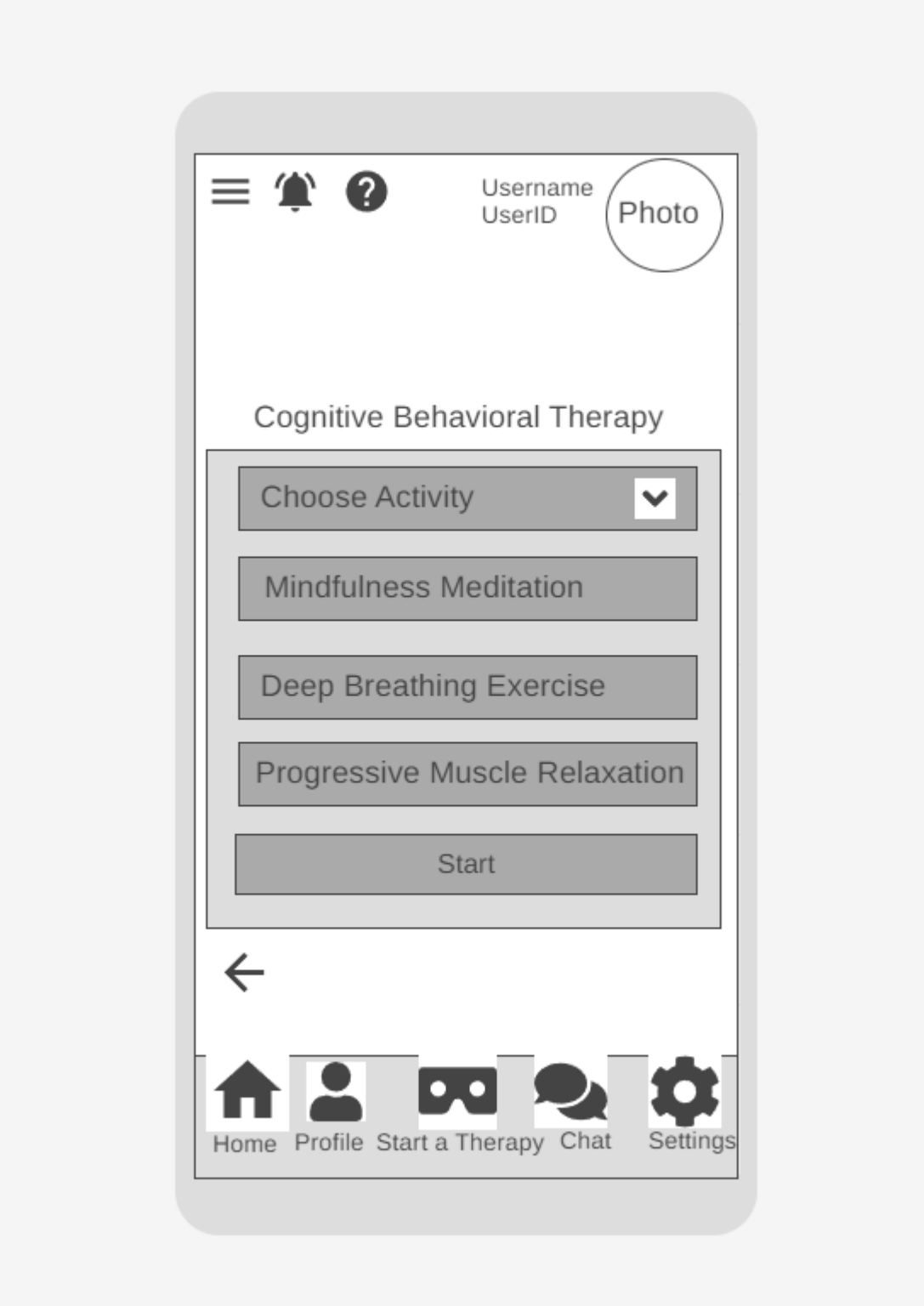
Pair VR Headset:



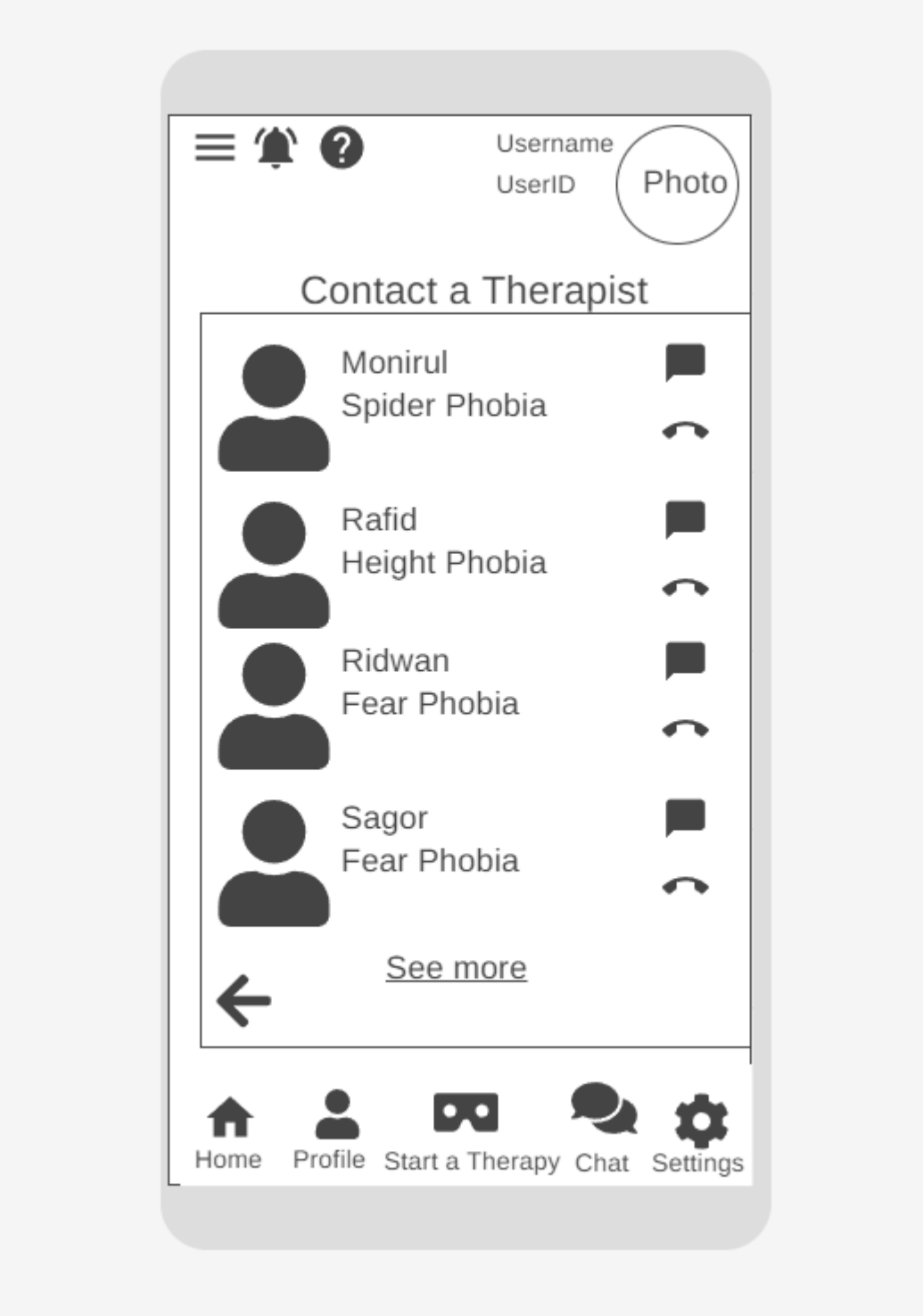
Customize a session:



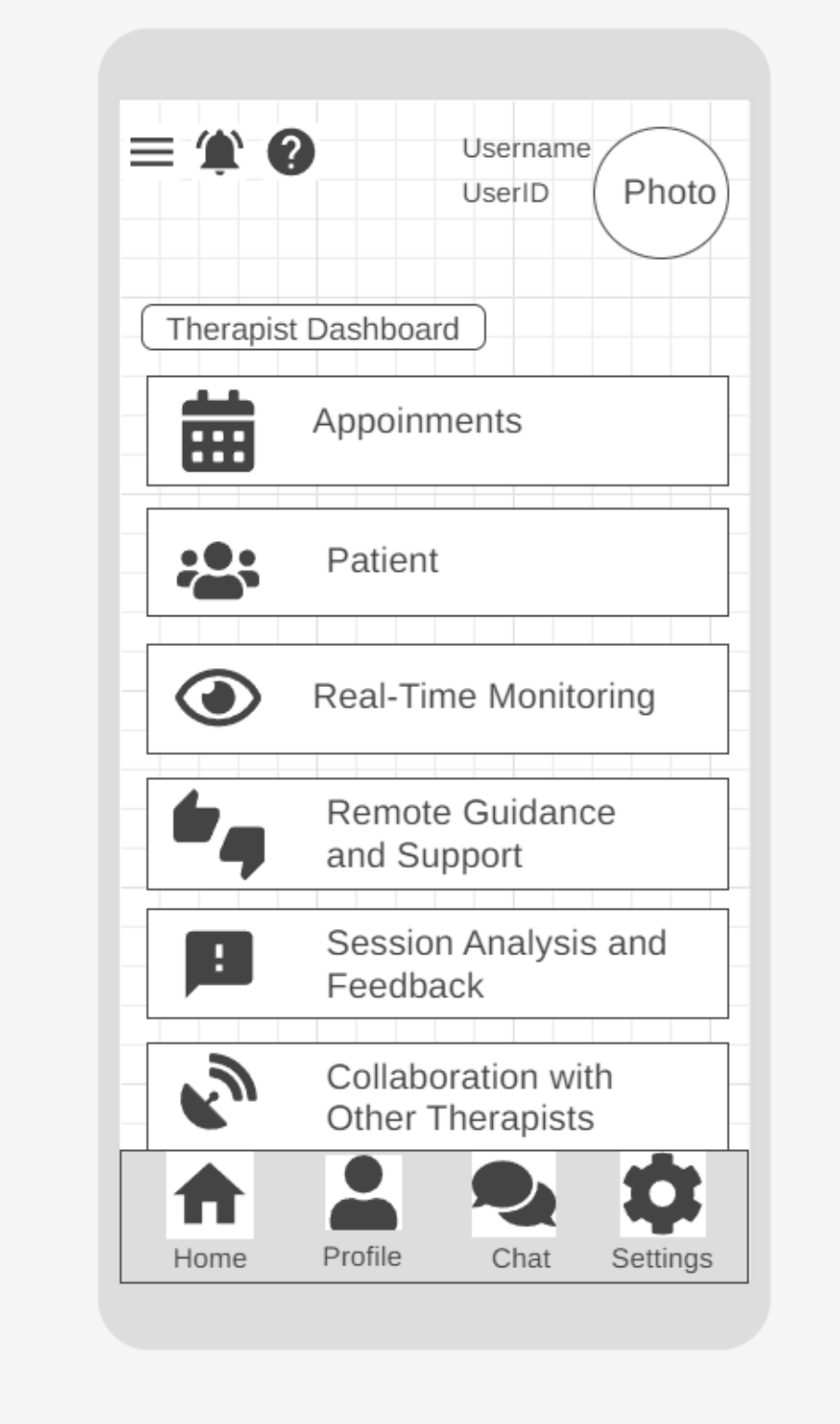
Access CBT Section:



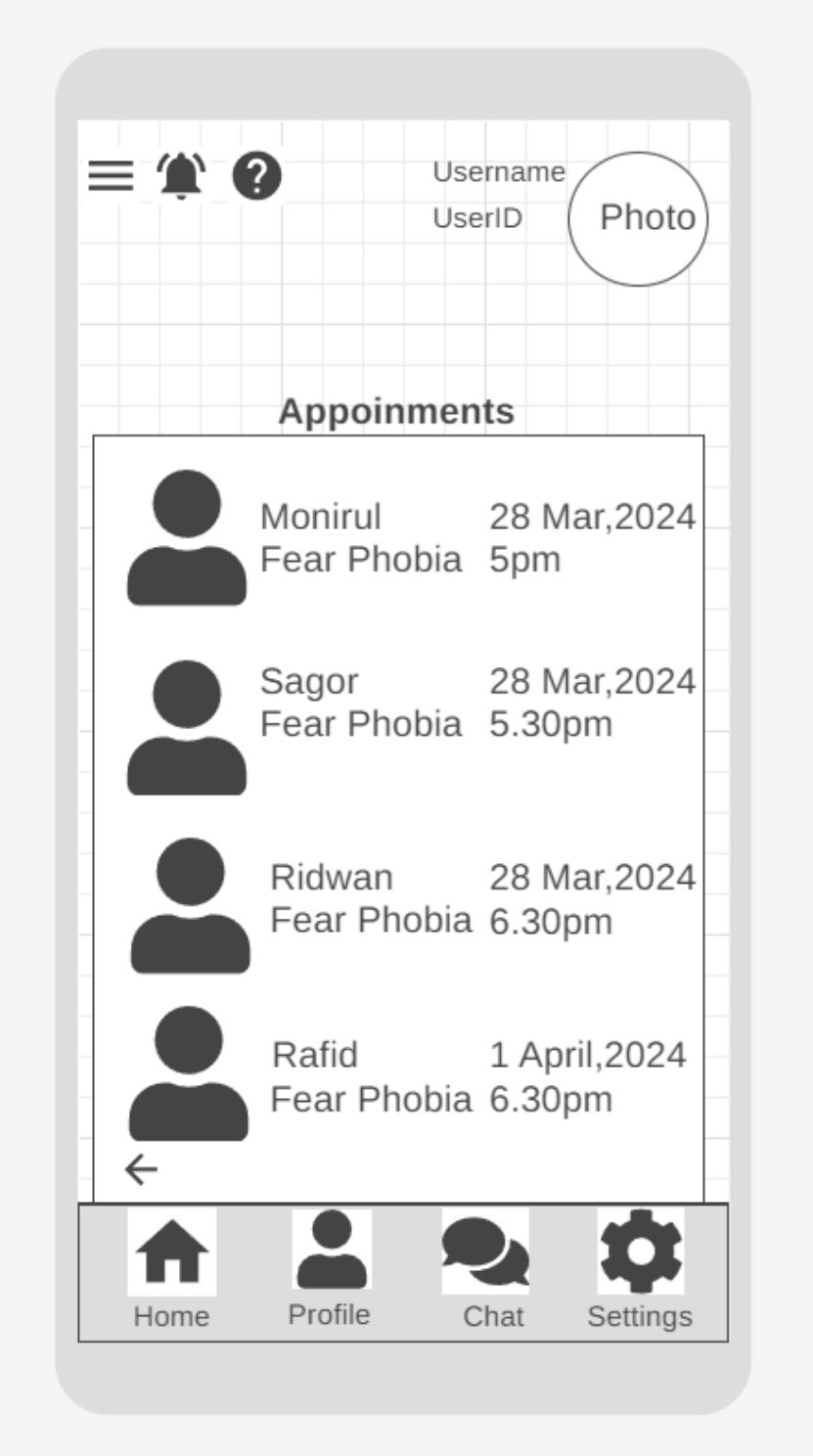
Contact a therapist:



Therapist Dashboard:



Appointments:



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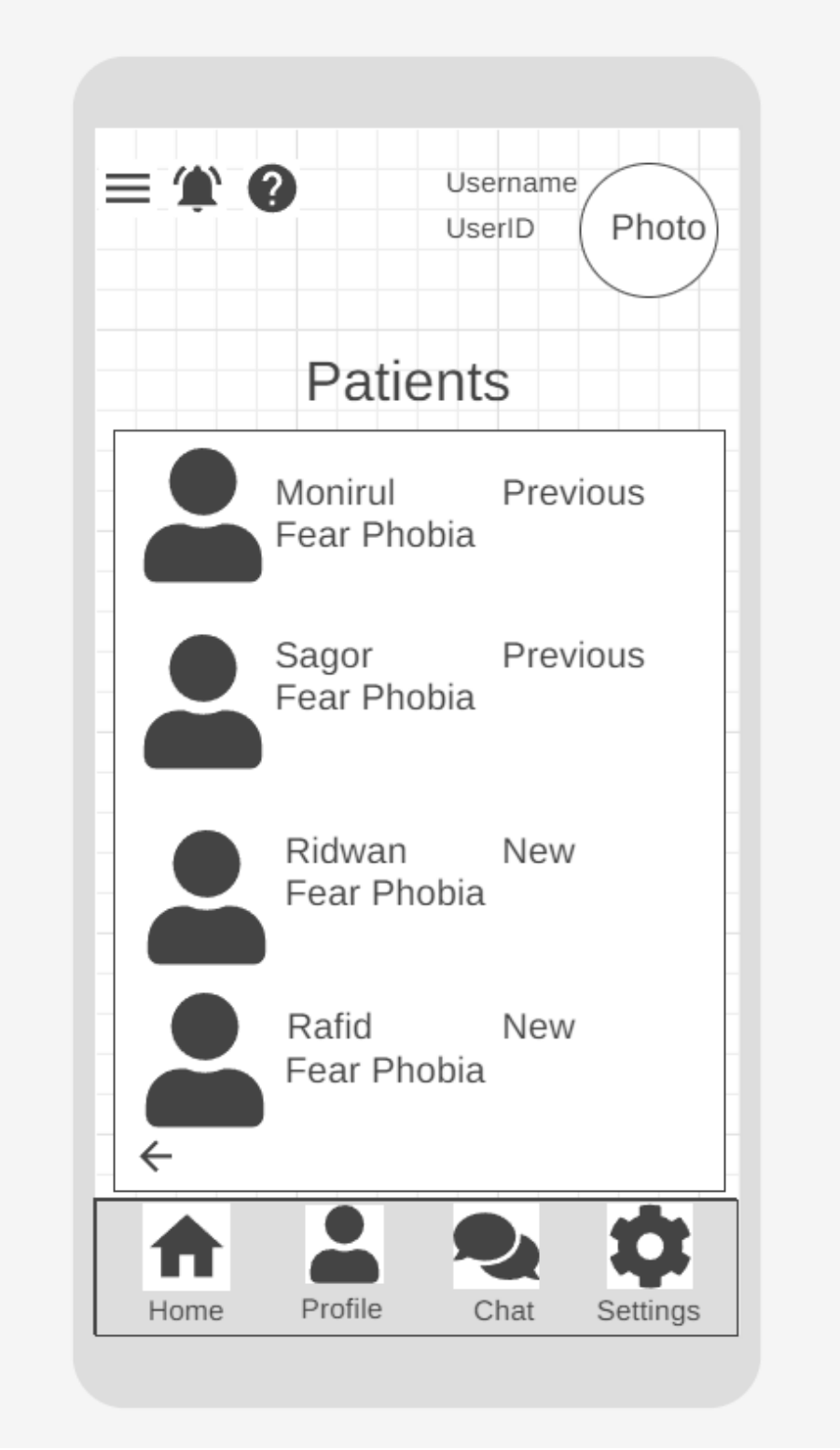
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UserID
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Fear Phobia
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Rafid
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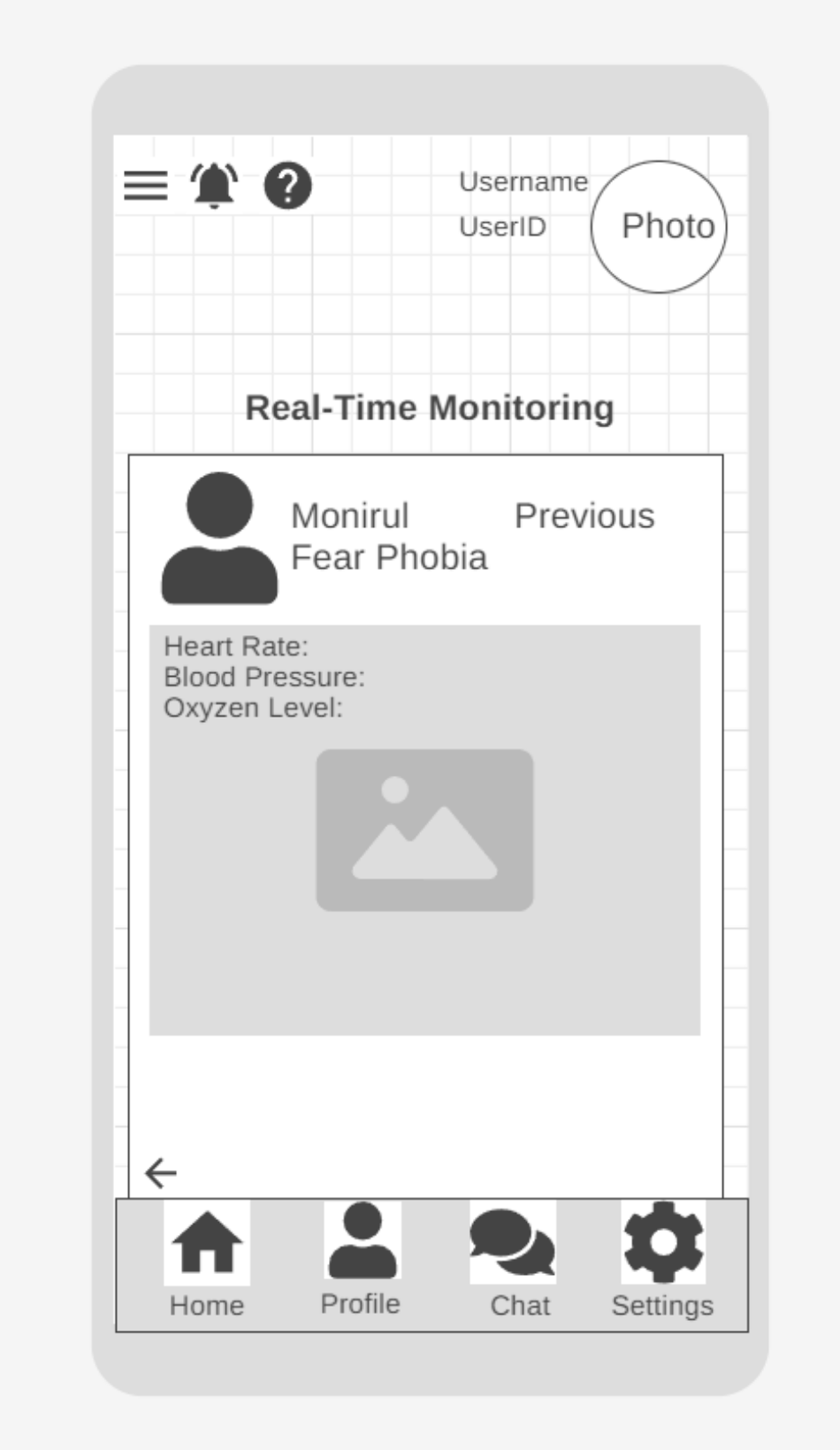
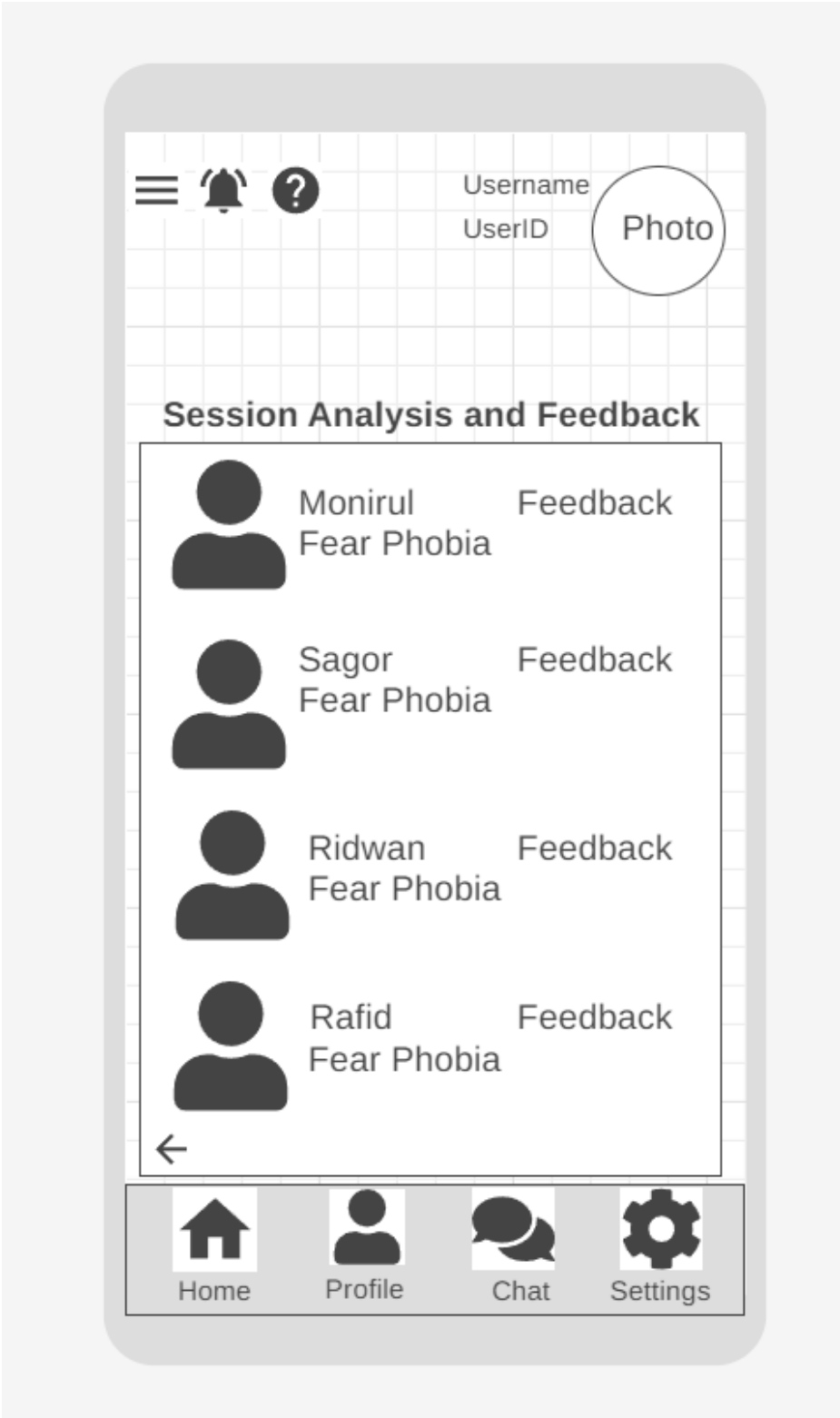
Chat
Settings

Real time monitoring:



Session analysis and feedback:



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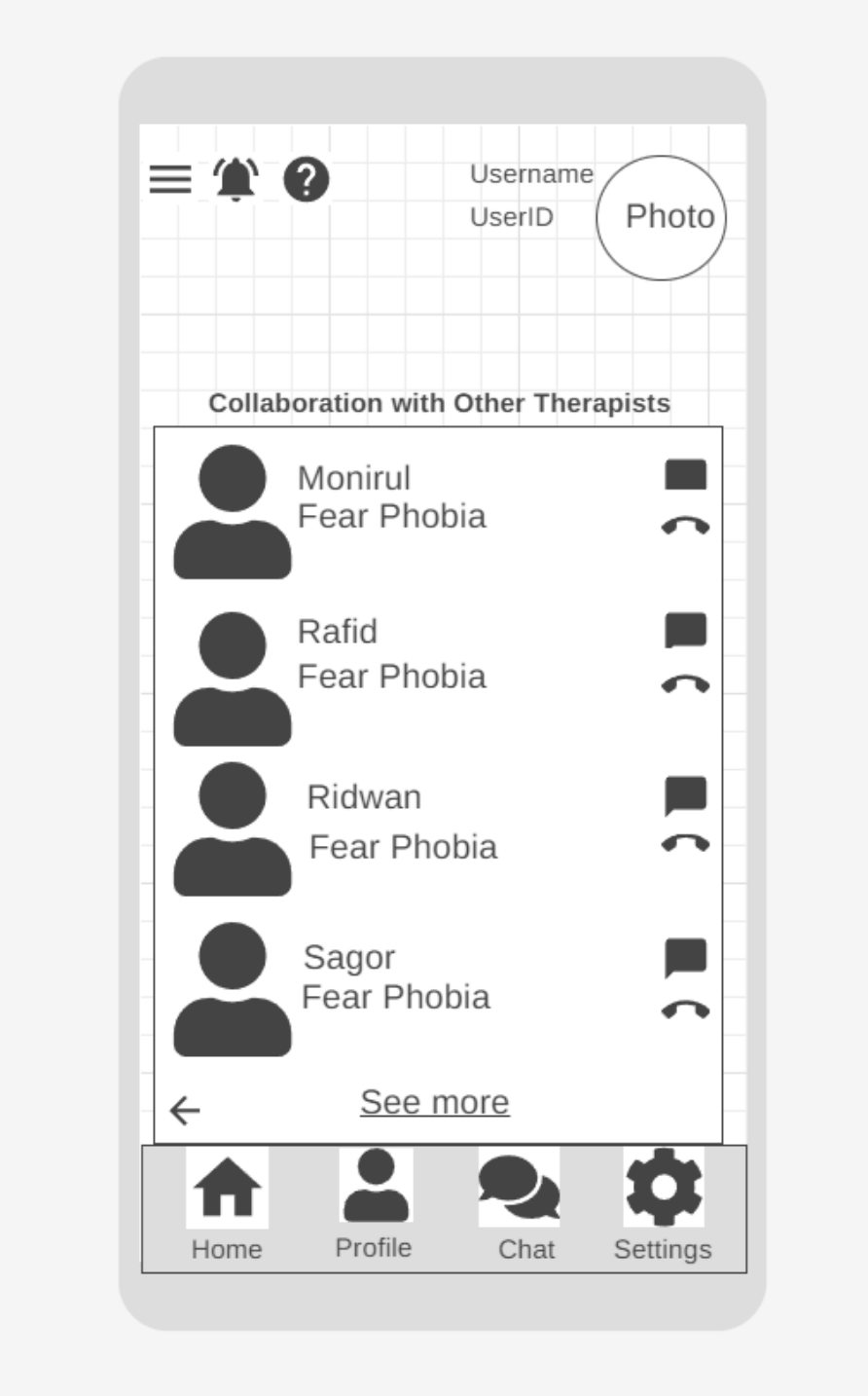
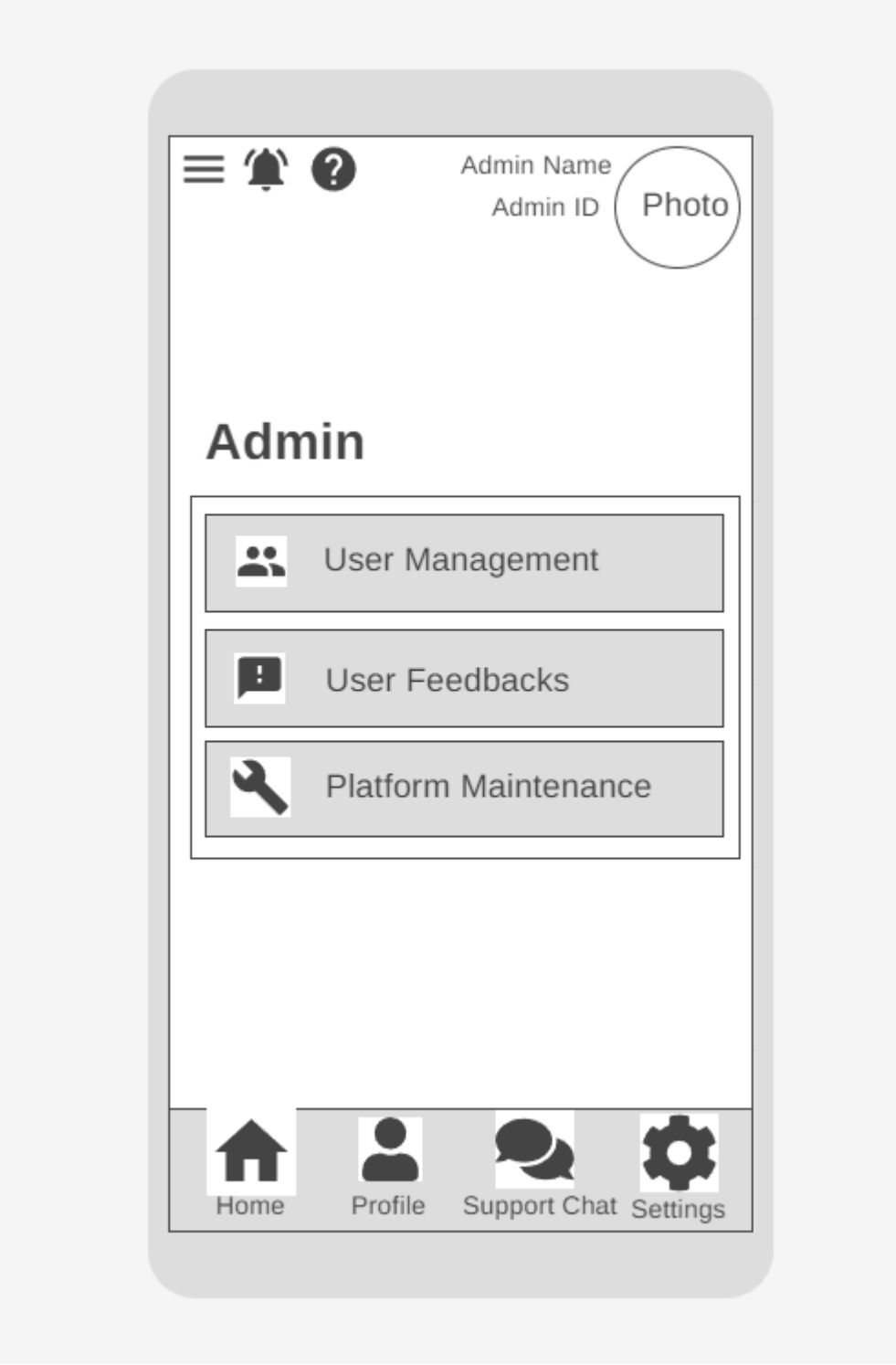
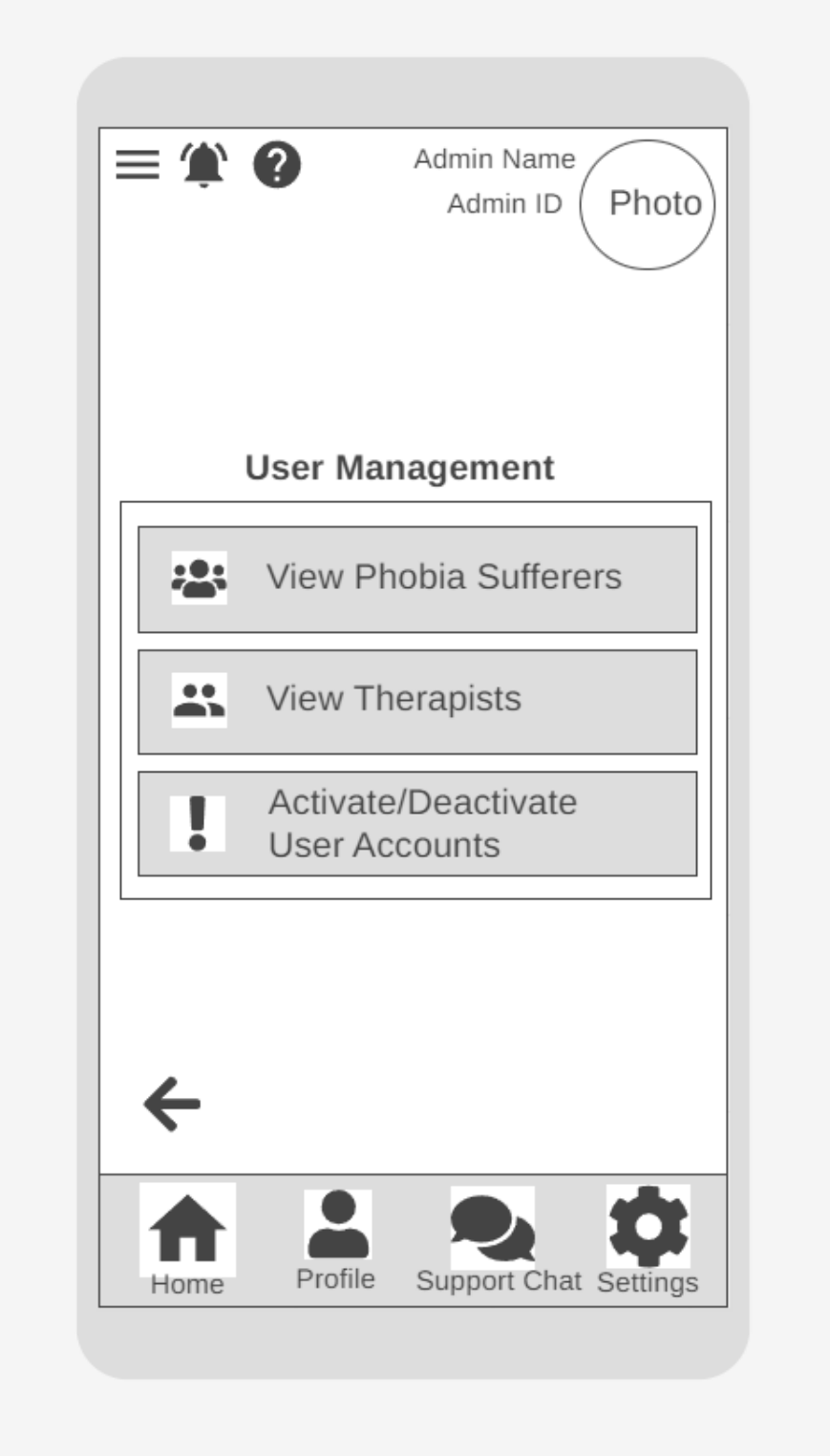


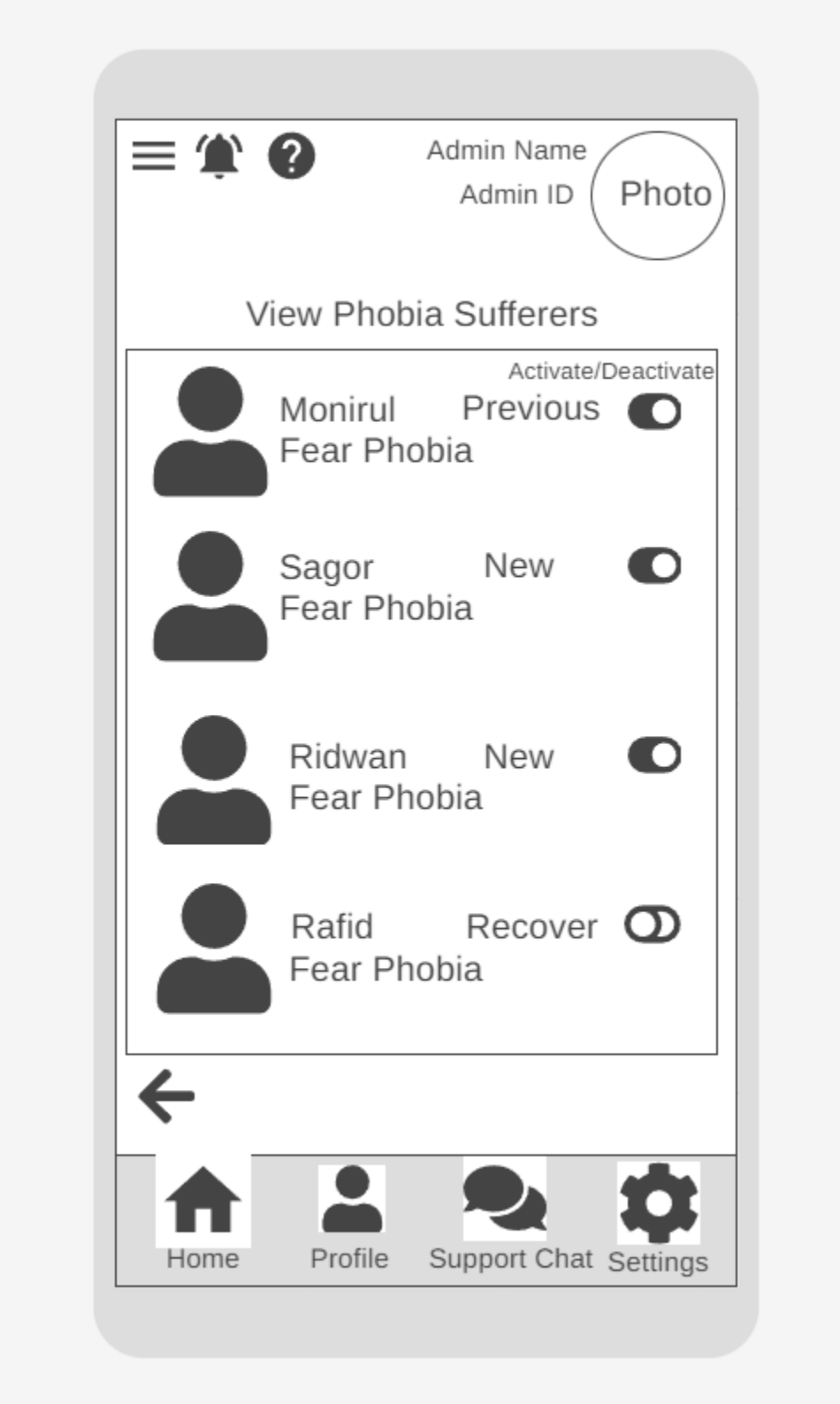
Admin Dashboard:



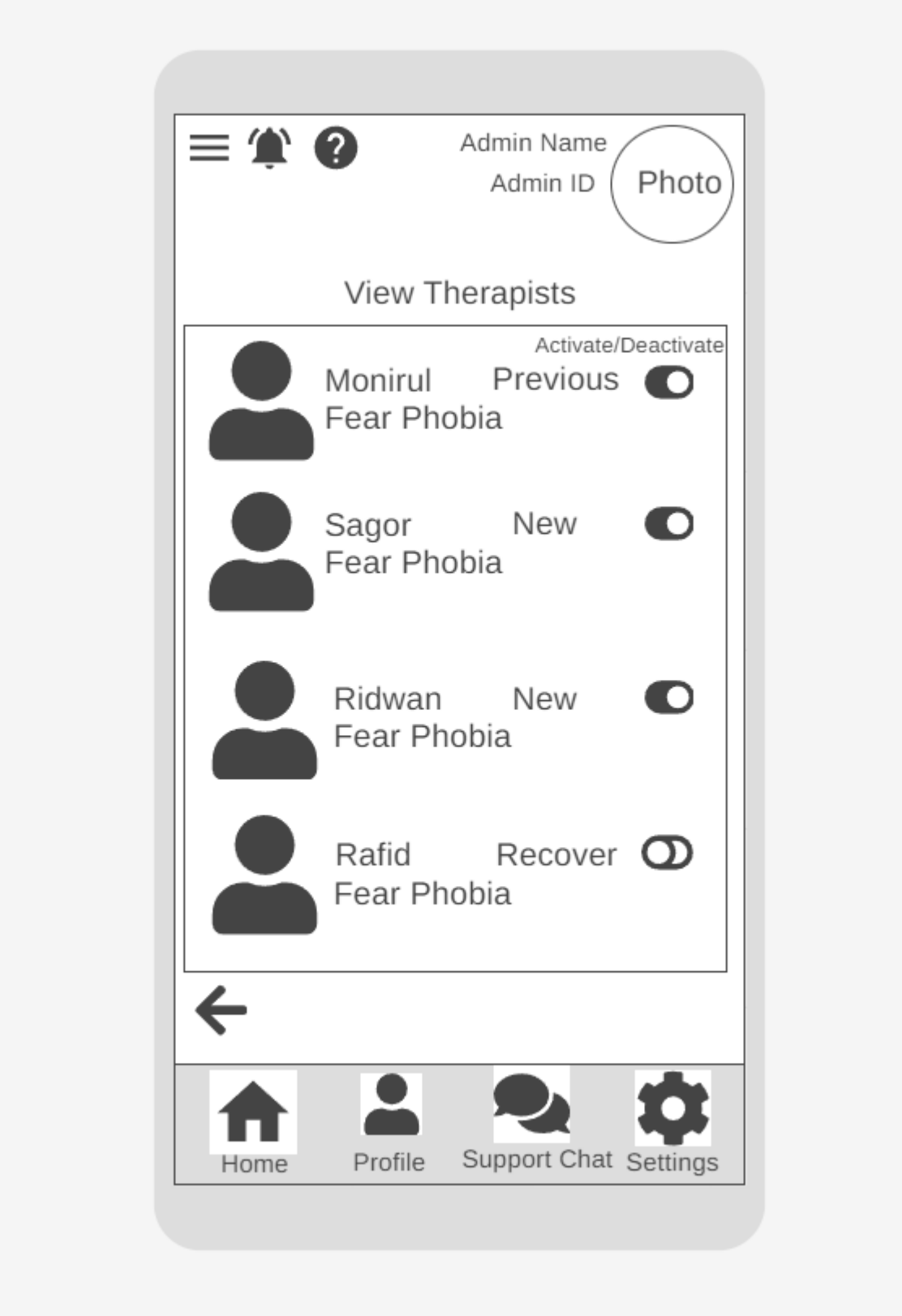
User management:



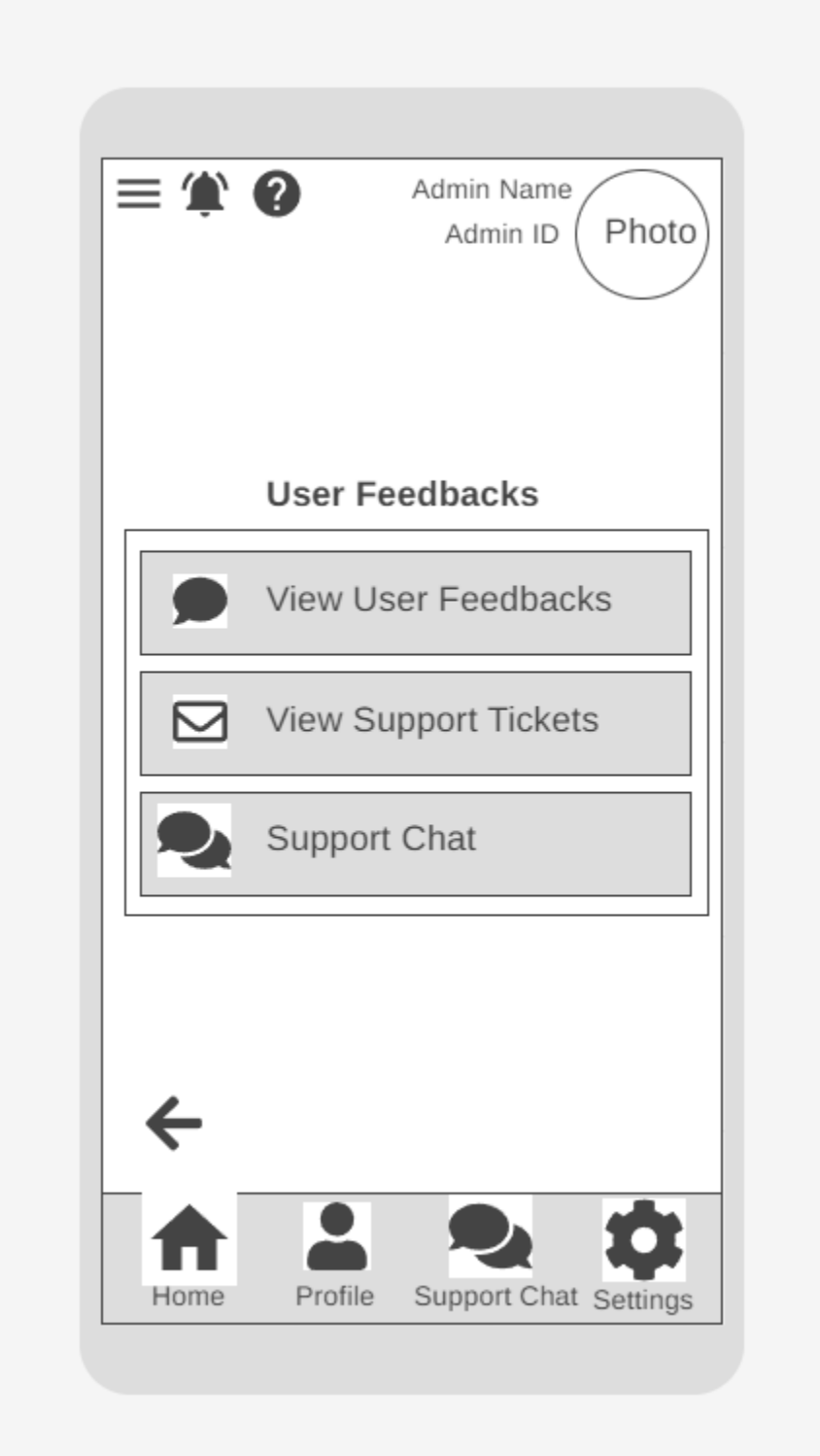
View Phobia Sufferers:



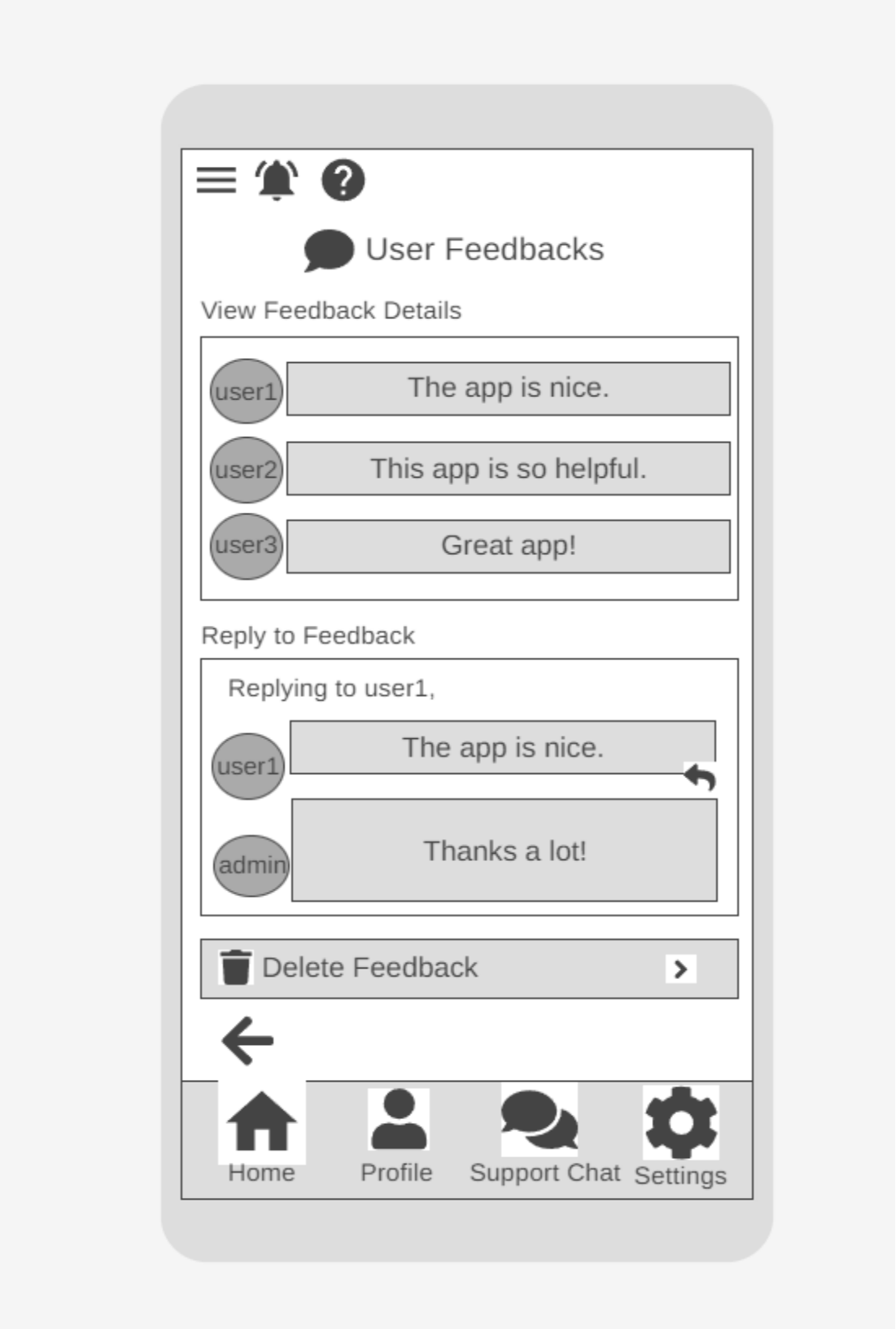
View Therapists:



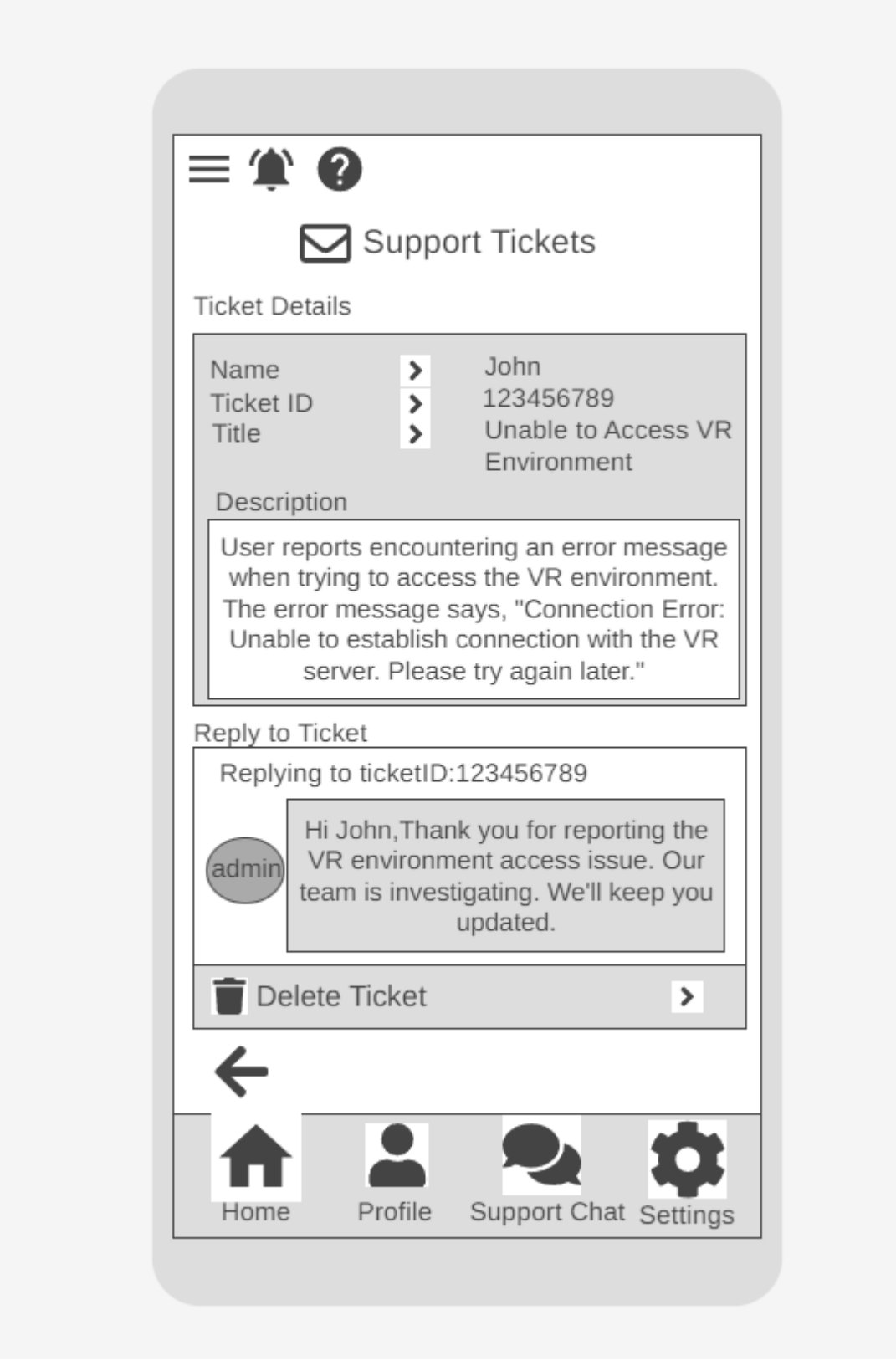
User feedbacks:



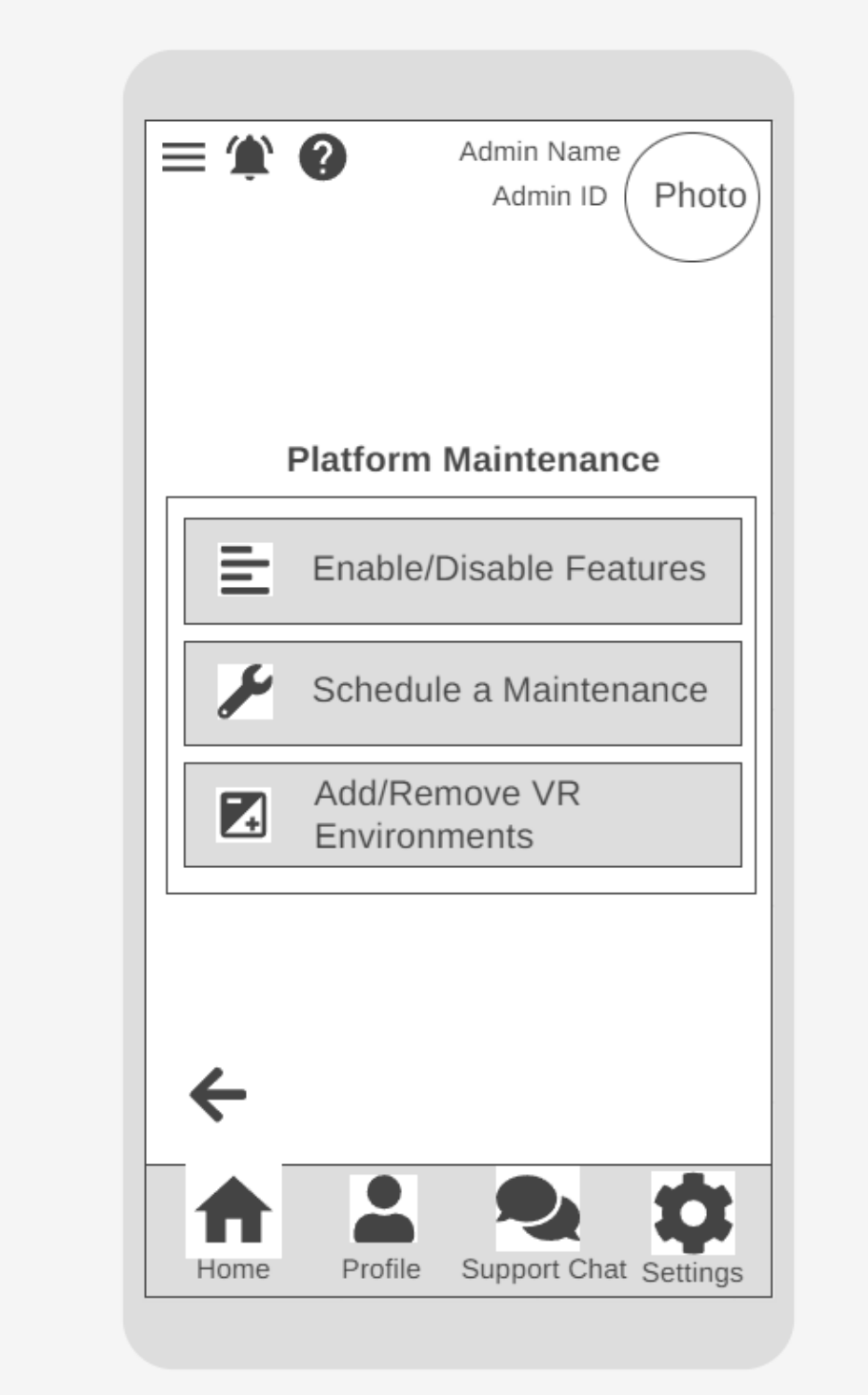
View User feedback:



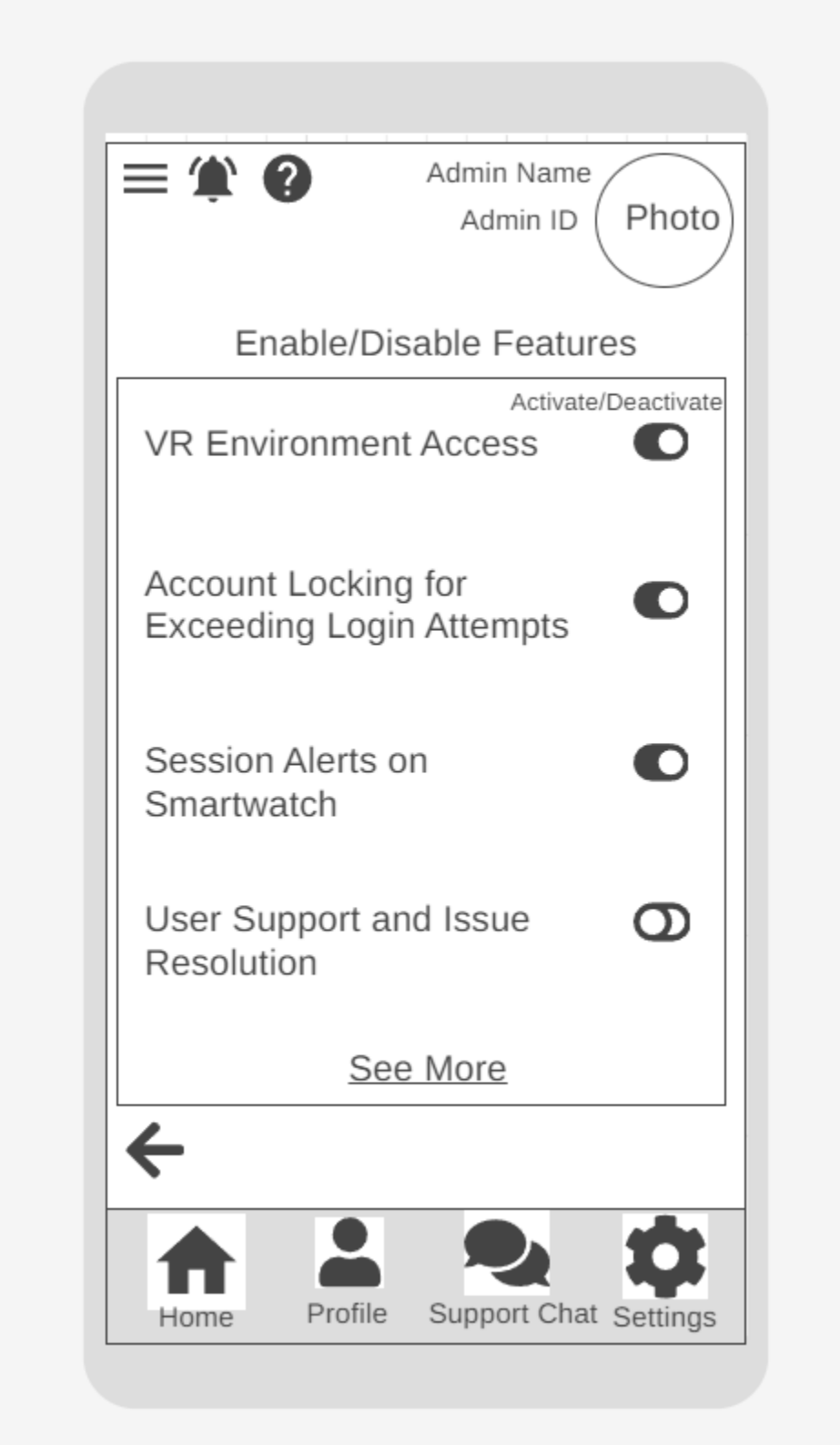
View Support Ticket:



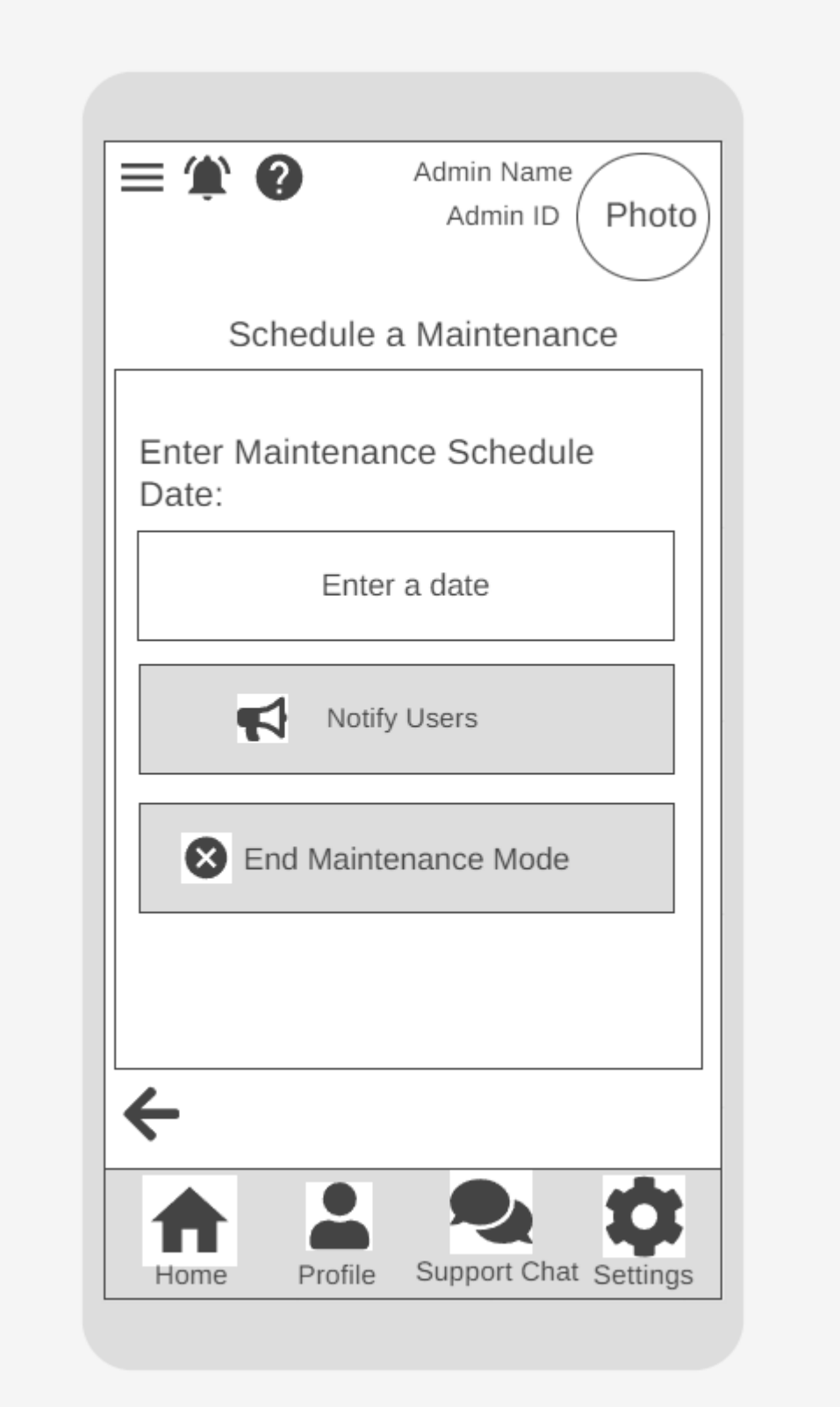
Platform maintenance:



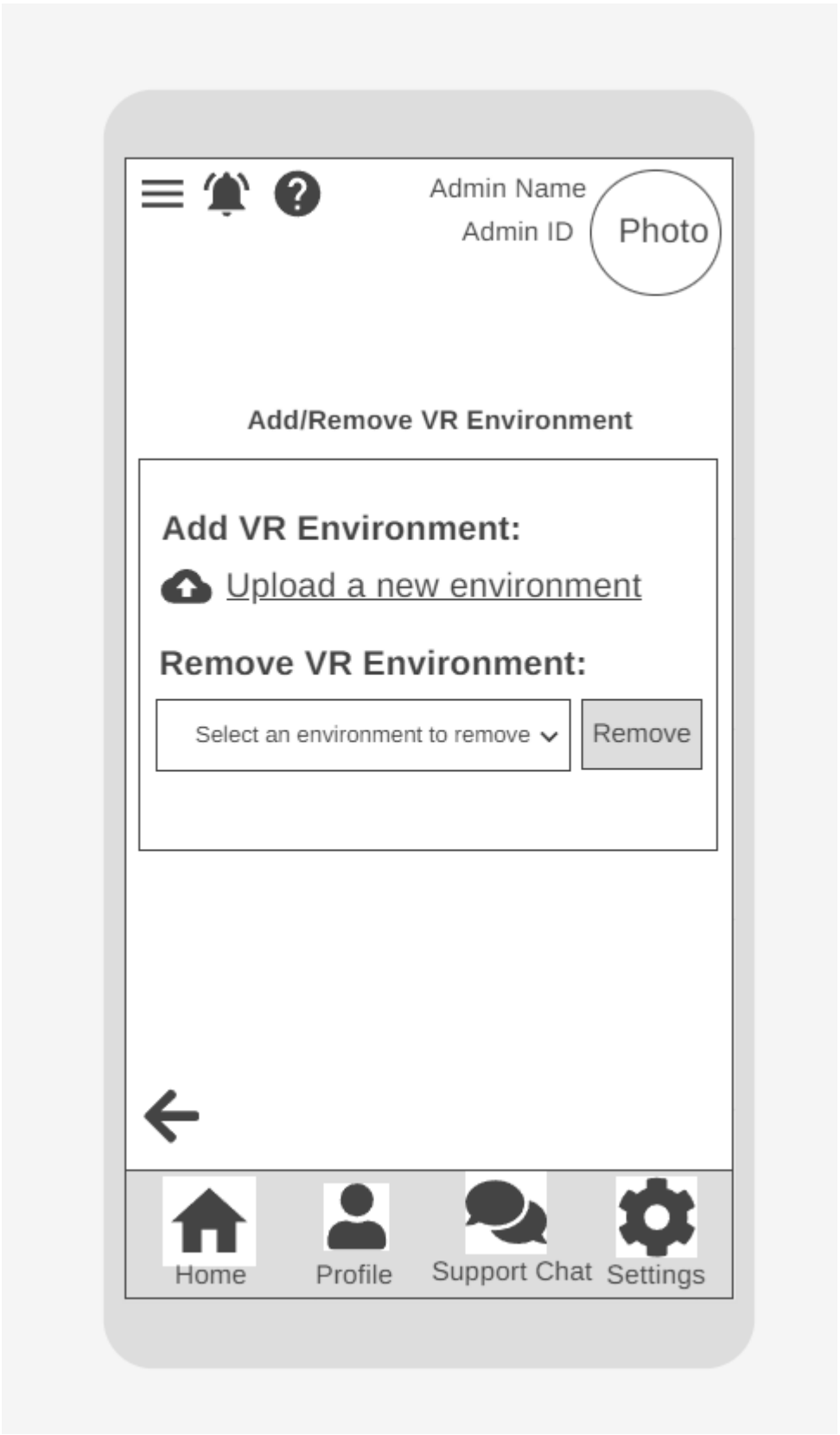
Enable/disable features:



Schedule a Maintenance:



Add/Remove VR Environment:



7. TEST CASES

1.

Project Name: Virtual Reality Therapy for Phobias			Test Designed by: Md. Tamjid Hossain	
Test Case ID: S_1			Test Designed date: 30-03-24	
Test Priority: Medium			Test Executed by:	
Module Name: Phobia Sufferer Sign Up Session			Test Executed date:	
Test Title: Verify Sign Up with valid Full Name, D.O.B, Address, Email, Phone, Gender, Phobia Type, Phobia Duration, Difficulties and Medical Documents (Upload)				
Description: Test app Phobia Sufferer Sign Up page				
Precondition (If any): User must have valid Full Name, D.O.B, Address, email, Phone, Gender, Phobia Type, Phobia Duration, difficulties.				
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)
1. Open the app. 2. Enter Name 3. Enter D.O.B 4. Enter Address 5. Enter Email 6. Enter Phone 7. Select Gender 8. Select Phobia Type 9. Phobia Duration 10. Difficulties	Name: Tamjid D.O.B: 19-07-2002 Address: Rajshani Email : tamjid@gmail.com Phone: 01795035855 Gender: Male Phobia Type: Height Phobia Phobia Duration: 7 years Difficulties: Panic attack, anxiety	Phobia sufferer should be able to sign up to the app	As expected	Pass
Post Condition: User is validated with database and successfully Signs Up. The account session details of Phobia Sufferers sign up information are stored in the database.				

2.

Project Name: Virtual Reality Therapy for Phobias			Test Designed by: Sagor Saha	
Test Case ID: S_2			Test Designed date: 30-03-2024	
Test Priority: Medium			Test Executed by:	
Module Name: Therapists sign up session			Test Executed date:	
Test Title: verify Sign Up with valid Name, D.O.B, Address, Email, Phone, Specialization, Qualifications, Upload Professional Documents.				
Description: Test app Therapist Sign Up page				
Precondition (If any): User must have valid Name, D.O.B, Address, Phone, Email, Specialization, Qualifications.				
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)
1. Enter the app 2. Enter Name 3. Enter D.O.B 4. Enter Address 5. Enter Phone 6. Enter E-mail 7. Enter Specialization 8. Enter Qualifications 9. Upload Professional Documents	Name: Sagor D.O.B: 21-01-2001 Address: Bogura Phone: 01763459998 E-mail: sagorsaha9998@gmail.com	User should Sing Up into the application	As expected	Pass
Post Condition: User is validated with database and successfully Sign Up to account. The account session details of Therapist sign up information are stored in the database.				

3.

Project Name: Virtual Reality Therapy for Phobias			Test Designed by: Mohammed Ridwan Hasnain	
Test Case ID: L_1			Test Designed date: 30-03-24	
Test Priority: Medium			Test Executed by:	
Module Name: User login Session			Test Executed date:	
Test Title: Verify login with valid username and password				
Description: Test the login process to ensure users can securely login to their accounts.				
Precondition (If any): User must have valid username and password				
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)
1. Open the app 2. Enter User_ID 3. Enter Password 4. Click submit	User_ID: 5555555 Password: 1212	Users should be able to log into the application	As expected	Pass
Post Condition: User is validated with database and successfully login to account. The account session details of users are logged in and stored in the database.				

4.

Project Name: Virtual Reality Therapy for Phobias.			Test Designed by: S. M. Monirul Hassan	
Test Case ID: FR_1			Test Designed date:30/3/2024	
Test Priority: Medium			Test Executed by:	
Module Name: User Profile update			Test Execution date:	
Test Title: Update Email, Address, Phone and Password.				
Description: Profile update page				
Precondition (If any): To reset from the update profile page, the user must need to enter the old password.				
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)
1. Go to the app 2. Enter new Email or 3. Enter Phone Number or 4. Enter new Address or 5. Enter new Password 6. Click update	Email:sm151@gmail.com Phone:01745678932 Address: Kuril, Dhaka Old Password: 123456 New Password: 654321	The profile information should be updated correctly.		
Post Condition: The user's updated profile information is also updated with the database.				

5.

Project Name: Virtual Reality Therapy for Phobias			Test Designed by: Afia Sultana	
Test Case ID: SO_1			Test Designed date: 30-03-24	
Test Priority: Medium			Test Executed by:	
Module Name: User Sign Out			Test Executed date:	
Test Title: Verify User Sign out Functionality				
Description: Test the logout process to ensure users can securely sign out of their accounts.				
Precondition (If any): User must be logged in.				
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)
1. Locate the sign out option. 2. Click on the sign out option. 3. Confirm the sign out action.		Users should be successfully logged out of their accounts.	As expected	Pass
Post Condition: User session is terminated, and the user is redirected to a designated landing page or the login page.				

6.

Project Name: Virtual Reality Therapy for Phobias			Test Designed by: Md. Tamjid Hossain	
Test Case ID: PS_1			Test Designed date: 30-03-24	
Test Priority: High			Test Executed by:	
Module Name: Phobia Sufferers Informed Consent and User Safety			Test Executed date:	
Test Title: Verify Informed Consent and User Safety Advisory				
Description: Test if phobia sufferers are presented with a comprehensive advisory statement regarding user safety and informed consent before accessing therapy sessions.				
Precondition (If any): Phobia sufferer must be logged in.				
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)
1. Access the therapy session initiation page. 2. Verify if the advisory statement is displayed. 3. Click confirm or cancel button		Phobia sufferers should be presented with the advisory statement and required to consent before accessing therapy sessions.		
Post Condition: Users who decline to provide explicit consent should not be allowed to proceed with therapy sessions.				

7.

Project Name: Virtual Reality Therapy for Phobias			Test Designed by: Md. Tamjid Hossain	
Test Case ID: FR_2			Test Designed date: 30-03-24	
Test Priority: Medium			Test Executed by:	
Module Name: Two-Factor Authentication Activation			Test Executed date:	
Test Title: Verify Two-Factor Authentication Activation				
Description: Test if users can activate two-factor authentication (2FA) for enhanced account security.				
Precondition (If any): Users must be logged in.				
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)
1. Access the user profile or settings section. 2. Look for the option to enable 2FA. 3. Select the option to enable 2FA and proceed. 4. Enter a valid phone number or email address for verification. 5. Enter the verification code received via phone or email.	Valid phone number or email address.	Users should be able to activate 2FA successfully, enhancing the security of their accounts.		
Post condition: Users should be able to activate 2FA successfully, enhancing the security of their accounts.				

8.

Project Name: Virtual Reality Therapy for Phobias			Test Designed by: Md. Tamjid Hossain	
Test Case ID: PS_2			Test Designed date: 30-03-24	
Test Priority: Medium			Test Executed by:	
Module Name: Starting a VR Therapy Session			Test Executed date:	
Test Title: Verify Starting a VR Therapy Session Process				
Description: Test if phobia sufferers can select and initiate therapy sessions in VR environments tailored to their specific phobias.				
Precondition (If any): Phobia sufferer must be logged in and have accessed the therapy session initiation page.				
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)
1. Select the option to start a VR therapy session 2. Choose a specific phobia for therapy. 3. Customize therapy session if needed 4. Choose the VR Environment 5. Specify the therapy needs 6. Start the session	Specific phobia for therapy, therapy needs, preferences.	Phobia sufferers should be able to select and initiate therapy sessions in VR environments tailored to their specific phobias and preferences.		
Post condition: Therapy sessions are initiated in the selected VR environment, providing immersive exposure therapy.				

9.

Project Name: Virtual Reality Therapy for Phobias			Test Designed by: Sagor Saha	
Test Case ID: PS_3			Test Designed date: 30-03-24	
Test Priority: Medium			Test Executed by:	
Module Name: VR Headset Integration			Test Executed date:	
Test Title: Verify VR Headset Integration				
Description: Test if phobia sufferers can connect and integrate VR headsets for an enhanced therapy experience.				
Precondition (If any): Phobia sufferer must be logged in and have accessed settings page.				
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)
1. Access the option for VR headset integration. 2. Follow the instructions to connect the VR headset. 3. Verify if the VR headset is successfully connected and integrated.		Phobia sufferers should be able to connect and integrate VR headsets seamlessly, enhancing their therapy experience with immersive visuals and audio.		
Post condition: VR headset is successfully integrated				

10.

Project Name: Virtual Reality Therapy for Phobias			Test Designed by: Sagor Saha	
Test Case ID: PS_4			Test Designed date: 30-03-24	
Test Priority: Medium			Test Executed by:	
Module Name: Progress Tracking and Reporting			Test Executed date:	
Test Title: Verify Progress Tracking and Reporting				
Description: Test if the system tracks and provides feedback on the user's engagement and progress in exposure therapy sessions.				
Precondition (If any): Phobia sufferer must be logged in and have accessed the View your progress page.				
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)
1. Access the progress tracking section. 2. Review the overview of completed exercises, session durations, and frequency of participation.		Phobia sufferers should be able to view comprehensive feedback on their engagement and progress in exposure therapy sessions.		
Post condition: Phobia sufferers have insights into their therapy progress, aiding in adjusting therapy programs for better outcomes.				

11.

Project Name: Virtual Reality Therapy for Phobias			Test Designed by: Sagor Saha	
Test Case ID: PS_5			Test Designed date: 30-03-24	
Test Priority: High			Test Executed by:	
Module Name: Real-Time Monitoring and Feedback			Test Executed date:	
Test Title: Verify Integration of Biometric Sensors				
Description: Test if the system integrates and activates biometric sensors during exposure therapy sessions for real-time monitoring.				
Precondition (If any): Phobia sufferer must be logged in and have initiated exposure therapy sessions.				
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)
1. Access the exposure therapy session. 2. Verify if biometric sensors, including heart rate monitors, skin conductance sensors, and oxygen level sensors, are activated.		Biometric sensors should be integrated and activated for real-time monitoring during exposure therapy sessions.		
Post condition: Real-time physiological data is monitored and available for analysis during exposure therapy sessions.				

12.

Project Name: Virtual Reality Therapy for Phobias			Test Designed by: Mohammed Ridwan Hasnain	
Test Case ID: PS_6			Test Designed date: 30-03-24	
Test Priority: Medium			Test Executed by:	
Module Name: Remote Therapist Guidance and Support			Test Executed date:	
Test Title: Verify Remote Therapist Guidance and Support				
Description: Test if phobia sufferers can initiate and receive remote therapist guidance and support				
Precondition (If any): Phobia sufferer must be logged in and have accessed the therapist guidance or contact a therapist section.				
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)
1. Access the option for remote therapist support. 2. Initiate the request for therapist guidance and support. 3. Verify if a secure communication interface is established with the therapist.		Phobia sufferers should be able to initiate and receive real-time guidance and support from therapists		
Post condition: Phobia sufferers can engage in real-time communication with therapists for assistance and guidance.				

13.

Project Name: Virtual Reality Therapy for Phobias			Test Designed by: Mohammed Ridwan Hasnain	
Test Case ID: T_1			Test Designed date: 30-03-24	
Test Priority: Medium			Test Executed by:	
Module Name: Remote Therapist Guidance and Support			Test Executed date:	
Test Title: Verify Provision of Therapist's Remote Guidance and Support				
Description: Test if therapists can provide remote guidance and support to phobia sufferers during therapy sessions.				
Precondition (If any): Therapist is logged in and phobia sufferer requests support.				
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)
1. Receive a request for support from a phobia sufferer. 2. Initiate remote guidance session.	Support request from phobia sufferer.	Therapist should be able to provide remote guidance and support effectively to phobia sufferers during therapy sessions.		
Post condition: Phobia sufferer receives assistance and guidance from the therapist				

14.

Project Name: Virtual Reality Therapy for Phobias			Test Designed by: S.M. Monirul Hasan	
Test Case ID: T_2			Test Designed date: 30-03-24	
Test Priority: Medium			Test Executed by:	
Module Name: Real-Time Monitoring			Test Executed date:	
Test Title: Verify Real-Time Monitoring of Phobia Sufferers				
Description: Test if therapists can monitor real-time progress of phobia sufferers during therapy sessions.				
Precondition (If any): Therapist is logged in and has assigned phobia sufferers.				
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)
1. Access the real-time monitoring section from the therapist dashboard. 2. Select a phobia sufferer currently undergoing a therapy session.	Assigned phobia sufferers.	Therapist should be able to view real-time data of phobia sufferers' progress during therapy sessions.		
Post condition: Therapist can monitor and analyze phobia sufferers' progress effectively.				

15.

Project Name: Virtual Reality Therapy for Phobias			Test Designed by: S.M. Monirul Hasan	
Test Case ID: Ad_1			Test Designed date: 30-03-24	
Test Priority: Medium			Test Executed by:	
Module Name: User Management			Test Executed date:	
Test Title: Verify Admin's Ability to Activate Phobia Sufferer Account				
Description: Test if admins can activate a phobia sufferer's account.				
Precondition (If any): Admin is logged in and has access to user management functionalities.				
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)
1. Navigate to the user management section from the admin dashboard. 2. Locate the phobia sufferer account that needs activation. 3. Select the option to activate the account.	Phobia sufferer account awaiting activation.	Admin should be able to successfully activate the phobia sufferer's account, granting them access to the platform.		
Post condition: Phobia sufferer can log in and access the platform's features.				

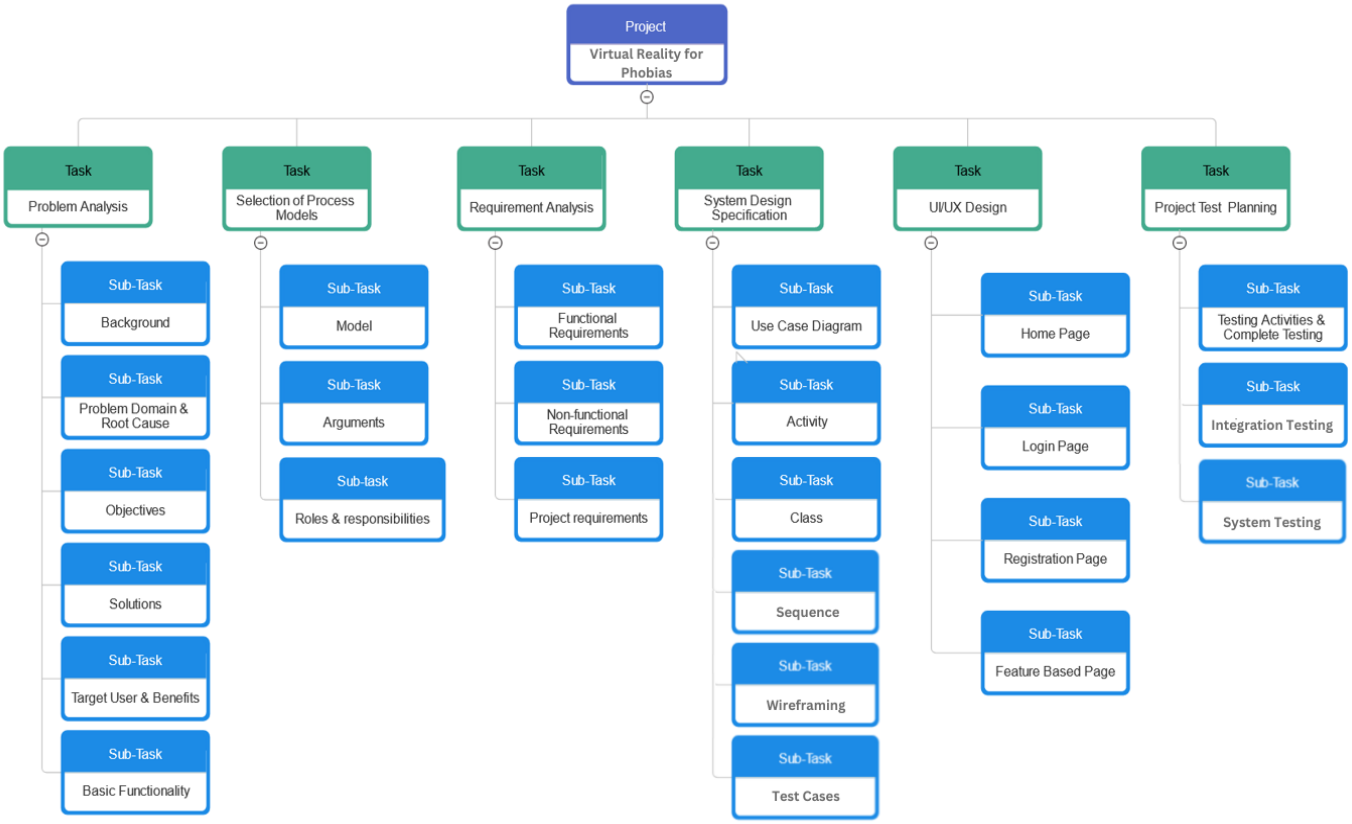
16.

Project Name: Virtual Reality Therapy for Phobias			Test Designed by: Afia Sultana	
Test Case ID: Ad_2			Test Designed date: 30-03-24	
Test Priority: Medium			Test Executed by:	
Module Name: Platform Maintenance and Updates			Test Executed date:	
Test Title: Verify Admin's Ability to enable/disable features				
Description: Test if administrators can enable/disable specific features on the platform as needed for maintenance or updates.				
Precondition (If any): Admin is logged in				
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)
1. Access the platform maintenance section. 2. Identify the features to be disabled. 3. Enable/Disable the selected feature(s).	Feature(s) to be enabled/disabled.	Administrators should be able to enable/disable specific features on the platform temporarily for maintenance or updates, ensuring uninterrupted service delivery.		
Post condition: The disabled features are no longer accessible to users, facilitating maintenance or updates without impacting user experience. The enabled features are accessible to users.				

17.

Project Name: Virtual Reality Therapy for Phobias			Test Designed by: Afia Sultana	
Test Case ID: Ad_3			Test Designed date: 30-03-24	
Test Priority: Medium			Test Executed by:	
Module Name: User Feedback and Improvement			Test Executed date:	
Test Title: Verify Admin's Ability to Analyze User Feedback				
Description: Test if admins can analyze user feedback effectively for platform improvement.				
Precondition (If any): Admin is logged in and has access to user feedback data.				
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)
1. Navigate to the user feedback section from the admin dashboard. 2. Review the collected user feedback. 3. Analyze the feedback to identify common themes, trends, and areas for improvement.	User feedback collected through feedback form in the app.	Admin should be able to effectively analyze user feedback, identifying actionable insights for platform improvement.		
Post condition: Admin gains valuable insights into user preferences, and suggestions for enhancing platform functionality.				

8. WORK BREAKDOWN STRUCTURE



Constructive Cost Model (COCOMO):

Let's assume Source Line of Code is 4000.

So, effort will be, PM = Coefficient<Effort Factor>*$(SLOC/1000)^{P}$ = 2.4*$(4000/1000)^{1.05}$ = 10.289

Development time, DM = 2.50*$(PM)^{T}$ = 2.50 * $(10.289)^{0.38}$ = 6.0623 = 6

Required number of people, ST = PM/DM = 10.289/6.0623 = 1.697 = 2

That means we need to work for (4*6) =24 weeks. (Total weeks in 6 months as DM is 6)

9. TIMELINE CHART 1

	Pregame Phase						Development												Postgame Phase					
	Planning			Architecture			Sprint 1			Sprint 2			Sprint 3			Sprint 4								
Weeks / Person	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13	Week 14	Week 15	Week 16	Week 17	Week 18	Week 19	Week 20	Week 21	Week 22	Week 23	Week 24
A: T	■	■	■																					
B: S				■	■	■																		
C: T&S							■			■			■			■								
D: T&S								■			■			■			■							
E: T&S									■			■			■			■						
F: S																			■					
G: T&S																				■	■			
H: T																						■		
I: T&S																							■	■

Here, T means Tamjid & S means Sagor (As people required is 2)

A: Project objectives, scoping, requirements gathering and planning

B: Design, user stories creation, product backlog creation and sprint planning

C: Requirements and analysis for each sprint

D: Design and development for each sprint

E: Testing and delivery of each sprint

F: Integration testing

G: System testing

H: Documentation

I: Release preparation and launch

10. TIMELINE CHART 2

Pregame phase:

Work Task	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6
Project scoping and definition						
Requirements gathering						
Project planning						
Project team creation						
User stories collection and creation						
Product backlog creation						
Sprint planning						

Game Phase: Sprint 1 and 2

Work Task	Sprint 1			Sprint 2		
	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Login page, dashboard feature analysis						
Dashboard design						
VR Therapy session development						
Dashboard feature testing						
Session customization analysis						
Session customization feature development						
VR headset pairing implementation						
Pairing and customization feature testing						

Game Phase: Sprint 3 and 4

Work Task	Sprint 3			Sprint 4		
	Week 13	Week 14	Week 15	Week 16	Week 17	Week 18
Cognitive behavior feature analysis						
CBT design and development						
Therapists contact implementation						
CBT and contact feature testing						
Settings and customization feature analysis						
Customization feature development						
User feedback implementation						
Customization and user feedback testing						

Post game phase:

Work Task	Week 19	Week 20	Week 21	Week 22	Week 23	Week24
Sprint review						
Integration testing						
System testing						
Documentation						
Software deployment						
Customer feedback review						
Post release review						

11. EVA ANALYSIS

Task	Planned Effort	Actual Effort
1	2	4
2	6	8
3	14	15
4	5	4
5	5	3
6	3	3.5
7	5	6.5
8	5	
9	5	
10	5	

BAC = PM*22 = 10.289*22 = 226

BCWS = 55

BCWP = 40

ACWP = 44

SPI = BCWP/BCWS = 40/55 = 0.7272

SV = BCWP – BCWS = 40 – 55 = -15 person-day

CPI = BCWP/ACWP = 40/44 = 0.909

CV = BCWP – ACWP = 40 – 44 = – 4 person-day

% schedule for completion = BCWS/ BAC = 55/226 = 24.33% [% of work scheduled to be done at this time]

% complete = BCWP/ BAC = 40/226 = 17.69% [% of work completed at this time]

12. RISK MANAGEMENT

Risks	Category	Probability	Impact	RMMM
Size estimate maybe significantly high	PS	70%	2	Implement regular progress reviews and re-estimation sessions to identify and address size estimation discrepancies.
Larger number of users than planned	PS	20%	3	Design the system with scalability in mind to accommodate potential increases in user volume
Insufficient User Adoption	BU	50%	2	Develop user-centric features and functionalities based on feedback and user testing
Technical Glitches during Therapy Sessions	TE	40%	3	Conduct deep testing, including stress testing and scenario-based testing, to identify and address potential technical glitches
Delivery deadline will be tightened	BU	75%	2	Regularly monitor project progress and adjust resource allocation as needed to meet delivery deadlines
Funding will be lost	CU	30%	1	Diversify funding sources and secure alternative funding options to mitigate the risk of funding loss
Customer will change requirements	PS	25%	2	Communicate effectively with stakeholders to manage expectations and negotiate changes within project constraints
Technology will not meet expectations	TE	20%	2	Conduct thorough

				technology evaluations to validate technology capabilities and suitability for project requirements
Hardware Compatibility Issues	TE	40%	3	Provide users with clear guidelines and recommendations for selecting compatible hardware devices
User Resistance to Technology	ST	40%	3	Provide ongoing support and assistance channels for users encountering difficulties
Staff turnover will be high	ST	40%	2	Implement strategies to improve employee retention, such as offering competitive compensation and benefits packages
Personnel shortfalls	ST	50%	2	Conduct comprehensive workforce planning to identify staffing needs and recruit qualified personnel
Unrealistic time and cost estimates	BU	35%	1	Conduct detailed project planning and estimation
Developing the wrong software functions	PR	10%	1	Prioritize features based on user value and impact to minimize the risk of developing unnecessary functions
Developing the wrong interface	PR	20%	2	Involve stakeholders and users in interface design and usability testing to gather feedback and validate design decisions
Lack of Formalized Development Process	PR	30%	2	Provide training and support for team members to ensure this

				doesn’t happen
Real time performance problems	ST	45%	3	Conduct comprehensive performance testing throughout the development lifecycle to identify potential problems and areas of improvement
Poor software quality that does not meet the user’s needs	PR	20%	2	Conduct thorough requirements validation sessions with stakeholders to ensure a clear understanding of user needs and expectations
Lack of Therapist Engagement	BU	30%	2	Provide comprehensive training and support resources to therapists to familiarize them with the VR therapy platform and its capabilities
Skill Shortages	ST	40%	3	Conduct a thorough skills assessment of the development team to identify areas of expertise and potential skill gaps
Communication Barriers and Language Differences	CU	25%	2	Provide translation services or language support to facilitate effective communication between the development team and customers
Limited Access to Hardware Resources	DE	30%	2	Ensure hardware resources early in the project lifecycle to support development and testing activities

Rubric for Project Assessment (CO3)

Criteria	Marks distribution (Max 4X5= 20)				Acquired Marks
	Missing/ Incorrect (0-1)	Inadequate (2)	Satisfactory (3-4)	Excellent (5)	
Selection of Software Engineering Models	Does not articulate a position or argument of choosing appropriate model. Does not present any evidence to support the arguments for the choice of the model.	Articulates a position or argument for choosing models that is unfocused or ambiguous. Presents incomplete/vague evidence to support argument for model choice.	Articulates a position or argument of choosing models that is limited in scope. Does not present enough evidence to support the argument for the choice of the model	Clearly articulates a position or argument for the choosing software engineering models. Presents sufficient evidence to support argument for the model selection	
Role identification and Responsibility Allocation	The project has poor project management plans for identifying roles and assigning the responsibilities	Identify few roles in the project management where some of the roles are left alone with any project responsibilities	Identify most of the roles in the project management and assign their responsibilities	Well planned project with proper role identification and responsibility allocation in the project management activities	
Impact identification	Student vaguely discuss the impact of societal, health, safety, legal, cultural, or environmental issues in their project	Student provided with partial relevance to the impact of societal, health, safety, legal, cultural, or environmental issues in their project	Student fairly provided the analysis to the impact of societal, health, safety, legal, cultural, or environmental issues in their project	Student comprehensively provided the analysis to the impact of societal, health, safety, legal, cultural, or environmental issues in their project	
Formatting and Submission	Project report is not complete and Several errors in spelling and grammar. Present a Confusing organization of concepts, supporting arguments, and real-life example. Sentences rambling, and details are repeated.	Some errors in spelling and grammar. Some problems of organizing the answer in a logical order of defining, elaborating, and providing real-life examples.	Few errors in spelling and grammar. Presents most of the details in a logical flow of organization in definition, details, and example.	Project report is complete and No errors in spelling and grammar. Consistently presents a logical and effective organization of definition, details, and real-life example of the topic.	

Acquired marks:	
CO Pass / Fail:	

Rubric for Project Assessment (CO4)

Marking Criteria	Marks Distribution (Maximum 3X5=15)				Acquired Marks
	Missing/ Incorrect (0-1)	**Inadequate (2)**	**Satisfactory (3-4)**	**Excellent (5)**	
Project Planning	Missing or incorrect project plan;	Insufficient project plan provided: project team, project tasks, goals etc. stated poorly.	Sufficient information provided : project team members, their tasks, project plan discussed in details.	Thorough and relevant project plan is provided; project plan is clear and easy to follow.	
Effort Estimation and Scheduling	Missing or incorrect effort estimation or schedules based on available project resources	Insufficient or poorly stated effort estimation or schedules based on available project resources	Correct or sufficient technique used for effort estimation or schedules based on available project resources	Project estimation was described using proper effort estimation or schedules based on available project resources	
Risk Management	Risk analysis activities were missing or inappropriate for the specific project: unidentified risks or wrongly categorized risks or not prioritized properly.	Risks are partially identified(insufficient) and not properly categorized or not prioritized properly.	Sufficient and critical risks are identified(insufficient) and properly categorized but not prioritized properly.	Sufficient and appropiate risks are identified, analyzed, and properly categorized or prioritized.	
				Acquired Marks:	
				CO Pass / Fail:	