A Coursework Report On

Human Computer Interaction and Design

Course: **COMP1649**

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Introduction

This report will discuss about smart gym equipment application. Then, we will also discuss, explain and study the theory about important content issues such as Design Process, types of different frameworks for Interaction Design including User-Centered Design and Goal-Directed Design. Based on the theoretical aspect of Interaction Design, understand and then consider and propose suitable solutions to apply in the product development and deployment process. More importantly, we will create the low-fidelity and high-fidelity prototype of the smart gym equipment and conduct product evaluations based on the requirements outlined before.

A. Background

1. What is Smart Gym equipment?

Smart Gym equipment is a complete suite system of exercise functions that are connected to different types of application equipment such as cell phones. Smart Gym equipment will allow people to participate in fitness classes (either pre-recorded or live classes). Moreover, Smart Gym equipment is further developed with modern technologies such as storing user information when they wear devices that are connected to Smart Gym equipment, exercise process hourly, day by day and week by week. The nutrition regimes are also saved to help users easily track and follow the set goals.

Figure 1: Smart Gym Simulation (Source Image, n.d.)

2. Why need to Smart Gym equipment?

In the current context, the epidemic COVID-19 has impacted and seriously affected people's lives. Therefore, improving health is extremely important for everyone. But the COVID-19 epidemic has caused gyms to close and people also don't have time to go to the gym to practice. Therefore, Smart Gym equipment was conceived and born with the aim of bringing users the convenience and fastness. Smart Gym equipment is the most effective and optimal solution for those who want to work out without go to the gym.

3. What are connected devices?

Connecting a device between Smart Gym equipment and mobile application is indispensable. But to optimize the process of collecting user health data, should choose an optimal and more efficient connection device such as a bracelet. With the bracelet, it helps us to easily track and monitor the user's exercise progress. Bracelet can connect to Smart Gym equipment via the Internet (wirelessly) such as Wifi.

The picture below demonstrate a bracelet based on the Apple Watch:

Figure 2: Bracelet

- **Bracelet**

The bracelet is meticulously designed, compact and meets almost all the necessary functions to suit the user's purpose including energy burned, heart rate monitoring, performance and the number of repeats during training,… More importantly, almost the Bracelet on the market now uses and is compatible with two popular operating systems including Android and iOS. That ensures the user can use it on whatever type of operating systems they want.

B. Literature Review

1. Processes and Frameworks For Interaction Design

1.1. User-Centered Design

1.1.1. Definition

An iterative design process in which designers focus on the users and their needs during each stage of the design process is called User-Centered Design (UCD). In order to create products that are highly usable and accessible to users, design teams relate to them during the design process through a variety of research and design techniques in UCD. (Definition of User-Centered Design, n.d.)

1.1.2. Process

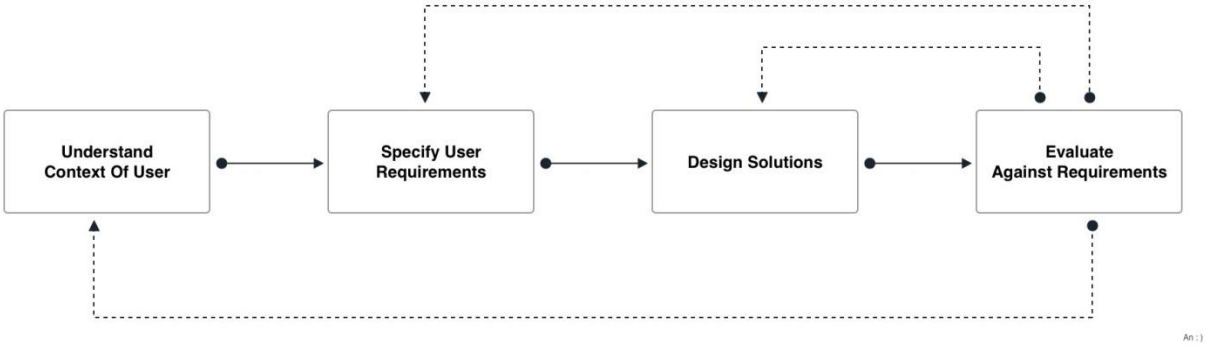

Figure 3: Process of UCD

As you can see Figure 3, here is an overview of UCD process including 4 main points as follows (Process of UCD, n.d.):

- **Understand Context of User:** Understand the focus of user interaction with the product in general and features in particular. Understand and predict the potential of the market your product is targeting.
- **Specify User Requirements:** Based on the context in which find needs, what is the primary goal of the user?
- **Design Solutions:** Design up solution flows to address these needs. Must ensure that the user's want to match the goals of the business, not deviate from the core focus of the product.

- **Evaluate Against Requirements:** Evaluate the solution overall based on the user's needs for the product. To get user feedback about the product at every stage of User-Centered Design, product designer must perform usability testing.

1.2. Goal-Directed Design

1.2.1. Definition

Goal-Directed Design includes the behavioral design, visual appearance and physical form of the product ... Its basic premise is that the best way to design successfully is to focus on achieving the goal. The basis of goal-directed design is to analyze data and conduct comprehensive research to evaluate users' behavior, habits, and goals. (Definition of Goal-Directed Design, n.d.)

1.2.2. Process

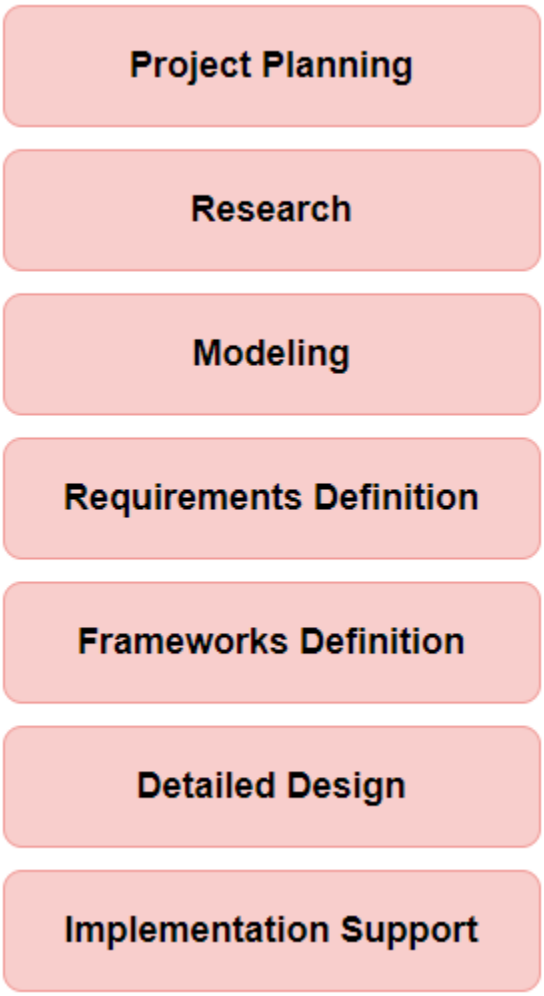

Figure 4: Process of Goal-Directed Design

As you can see Figure 4, the process of Goal-Directed Design consists of 7 steps as follows (Goodwin, 2009):

- **Project Planning:** Coming to the first phase is very important, affecting the overall framework for the entire basic design and setup process, which is the Planning phase. The question posed during this phase what is (the purpose towards?). Planning also includes the identification of the main project objectives and parameters.
- **Research:** To provide qualitative data about a product's actual and / or potential users, the Research Phase uses ethnographic field research techniques (contextual observations and interviews). It also includes competitive product reviews, market research reviews, as well as face-to-face interviews with stakeholders, developers, subject matter experts (SME), and experts technology suitable for specific fields (Define process in Goal-Directed Design, n.d.).
- **Modeling:** The aim of modeling phase is understand data collected, analyze, synthesize and transform it into visual models that can be clearly communicated and used to guide design decisions. Once understood, the next thing to do is pass the implied data required about the functionality and design of the service.
- **Requirements Definition:** This phase uses scenario-based design approaches (Carroll, 1995), with the key innovation focusing the scenarios not on user tasks in summary, but first on meeting the goals and needs of specific users. A requirement definition that balances the user, business, and engineering requirements of the design to adhere to is the output of this process.
- **Frameworks Definition:** A framework shows how those functional elements are related. They must be organized based on a character's contextual scenarios - which elements need to be accessed sequentially or on the same screen. An interactive framework definition, a steady design concept that provides a total and logical form structure for the detail is the output of this process. (Define Frameworks Definition, n.d.)
- **Detailed Design:** To turn ideas into reality, focusing on the big picture but looking at the details, with the use of even more detailed scenarios, design patterns and principles, is the aim of this phase.

- **Implementation Support:** Things can and will change during rollout and development, budget and time concerns can affect which features are removed or what new features are added, and what's important as the designer must be willing to advise and implement to ensure that the overall design quality is not affected. (Define Implementation Support, n.d.)

1.3. Choose framework for cousework

Identifying and choosing the correct and appropriate framework for the product design and implementation process is not easy. We all know and understand that the 2 design frameworks including User-Centered Design and Goal-Directed Design are all based on one method, it is user-centered methodology. Although, User-Centered Design and Goal-Directed Design are both developed and based on the same methodology. But these two frameworks still differ between them. These two frameworks can be understood simply like this. User-Centered Design will focus and consider the user as the center (that is the goal of this framework), the user is the core of the product development and design process. Goal-Directed Design will aim at the ultimate goal that has been set for the product. Or to put it more fully, the goal of this framework is to understand the nature of user needs and their behavior. Based on those foundations to meet and create products for them.

Finally, the framework that I will choose to apply is Goal-Directed Design, because the requirement has been specifically set out to successfully design and implement Smart Gym equipment with specific functions such as provisioning and viewing exercises. The only thing to do is that the functions should function in a smooth and stable way. Instead of must be to satisfy the user preference for which we create the functionality.

2. Cognitive Psychology

2.1. Definition

According to Wikipedia, "Mental action or process of acquiring knowledge and understanding through thoughts, experiences and senses" is referred to as Cognition. (Definition Cognition, n.d.)

Figure 5: Cognitive Psychology (Source Image, n.d.)

2.2. Core cognitive processes

Cognition has also been described as specific types of processes. These includes:

- **Attention**
- **Memory**
- **Learning**
- **Perception and recognition**
- **Reading, speaking and listening**
- **Problem-solving, planning, reasoning and decision-making**

Among the ingredients listed above, components most relevant to Human Computer Interaction design are attention, perception and recognition, and memory. So, I decided to just define and explain these 3 components. The remaining 3 components I just give the basic concept of them. (What is Cognition?, 2019)

- **Attention**

A cognitive process allows people to focus on a specific stimulus in an environment is called Attention. I will give a practical example to be able to explain clearly about Attention. For example, when I read a book, and I see a bold text, the bold text stands out, making me focus and focus on it. So, in order to apply Attention to Smart Gym, I have to understand trend, focus and psychology of user. From that, implement Smart Gym based on what is collected to create a highlight and attracts and attracts attention to users.

- **Perception and Recognition**

A cognitive process that allows people to take in information through their senses (feelings) and then use this information for interaction and feedback is called Perception. The senses include 5 organs that are sight, hearing, touch, taste and smell. So, in order to apply Perception to Smart Gym, practical examples such as the resulting heart rate after exercise must be clear, easy to understand, content text must be consistent, easy to read, video audio during exercise must be easily distinguishable for users.

- **Memory**

An important cognitive process that allows humans to encode, store and retrieve information is known as memory. (Definition Memory, n.d.). I will give a practical example to be able to explain clearly about Memory. For example, in case that a user tries to remember their date of birth, they can easily recall when visual cues affect them. Because people are very good at remembering visual cues about things such as the color of items. So when I decide to deploy Smart Gym apply Memory application, I will make it easier for users to recall the information they have stored in that context. If the user has ever checked and viewed the previous information or it is outstanding information, they will easily recall depending on the memory speed of each person.

- **Learning**

Learning involves the accumulation of skills and knowledge but cannot be achieved without memory. Therefore, memory and learning always go hand in hand or in other words have a close connection with each other.

- **Reading, speaking and listening**

The three forms of language processing have some similar and different properties includes reading, speaking and listening. The meaning of a sentence or phrase that is the same regardless of how it is conveyed is a similarity.

- **Problem-solving, planning, reasoning and decision-making**

Processes related to reflection cognition includes problem-solving, planning, reasoning, and decision-making. These processes involve conscious processes, using different types of artifacts, and discussing with others. Moreover, these processes include thinking about the possible consequences of taking a certain action, what choices are available and what to do.

3. Design Process

3.1. What is Interaction Design?

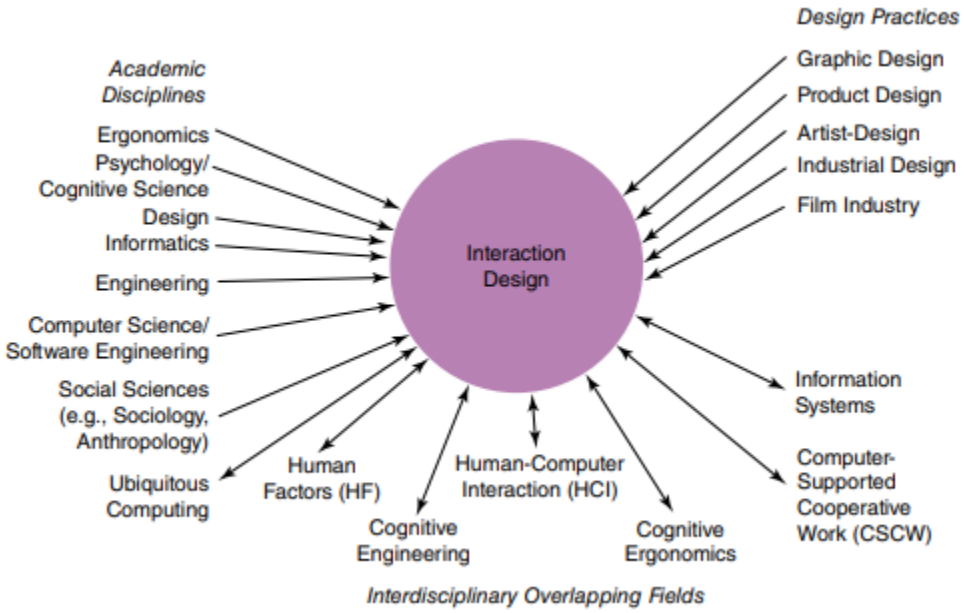

Figure 6: Demonstrate Interaction Design (Rogers, Preece and Sharp, 2015, n.d.)

Based on a research of a book called "Beyond human-computer interaction" 5th edition, Interaction Design means: "Designing interactive products to support the way people communicate and interact in their everyday and working lives". (Helen Sharp, Jennifer Preece, Yvonne Rogers, 2019)

3.2. The process of Interaction Design

The process of Interaction Design consists of 6 main steps as follows (Helen Sharp, Jennifer Preece, Yvonne Rogers, 2015):

- Establish requirements and identify needs
- Develop alternative designs
- Build interactive prototypes that can be communicated and assessed
- Focused on users and their goals
- Evaluate what is being built throughout the process
- Involves trade-offs to balance conflicting requirements

3.3. Interaction Design Principles

I will list the principles of interaction design that are widely used. Although, I know I can't list all the principles of interactive design. So I will only list the most important principles includes (Anon., n.d.):

- **Goal-Driven Design**

Design style that take problem solving as highest priority are known as goal-driven design. The goal of interaction design is to focus on satisfying the specific needs and wants of someone who will use the product.

- **Good Usability**
- **Positive Emontinal Responses**

The creation of a design that affects the positive emotional response in the user is done by the designer. Therefore, they must be interactive aware of the factors that affect a user's emotional response. Such as animations, fonts, and color palettes, for example, because these elements can all trigger an emotional response.

- **Design For People**

It's difficult to design for abstract users when it comes to product design. In the context of a particular group of users, designers should always evaluate their decisions. A persona encapsulates vital data about a group of users in a way that designers can understand and relate to. Emotional aspects influence the purpose designer to create better product behavior.

- **Design Patterns**

In order for designers to solve interaction problems, they use patterns, which are a solution to a particular context. Depending on the variety of situations and circumstances, designers can solve new problems by modifying existing patterns. Creating a solution that suitable well for that usage context is the goal of interaction design.

Interaction designers often apply well-known interface principles such as Material Design by Google and Human Interface Guidelines by Apple. The purpose is to provide patterns that are familiar to the user and show how to use them in specific contexts.

- **Design Iterations**

For a specific interaction problem, the designer can have multiple solutions. The only correct way to reduce the number of design options is to see how it performs for real users (validate it through testing). Not all design of interaction assumptions pass the test. Quite often, designers have to go back to the drawing board to design an alternative. That's why interaction design is rarely linear but an iterative process.

4. Conceptual Model

4.1. Definition

A representation of a system, made up of a component of concepts that is used to help people know, understand, or simulate a subject whose representative model of a system is called the Conceptual Model. (Definition Conceptual Model, n.d.)

4.2. Types of interaction

According to the 5th edition of 2019's book entitled “Beyond Human-Computer Interaction”, on page 81, it mentions Conceptual Model with 5 types of interaction. These includes:

- **Instructing:** Giving instructions to the system and describing how users perform their tasks by asking the system to do something is the purpose of this type of interaction. Requiring the system to do something can be done in a number of different ways, such as

entering commands, actions such as menu options on the touchscreen, pressing buttons, or using a combination of function keys.

Figure 7: Example for Instructing (Source Image, n.d.)

As you can see Figure 7, this is a water vending machine. To be able to buy the type of drink they like, users must follow the instructional procedure inside the system of this vending machine. The process to buy product is quite simple. Firstly, users just need to click to select the product code of the drink they want to buy. Secondly, users perform the operation of putting money in the slot of the water cabinet with the right value. Then, the machine will provide the product to the customer who previously ordered at the receiving slot.

- **Coversing:** Simulating how users interact with a system based on their ideas is the goal of this type of interaction. It is extremely common for the types of applications where users often need to find out information or discuss a particular issue. Examples are robots, chatbots and advisory systems.

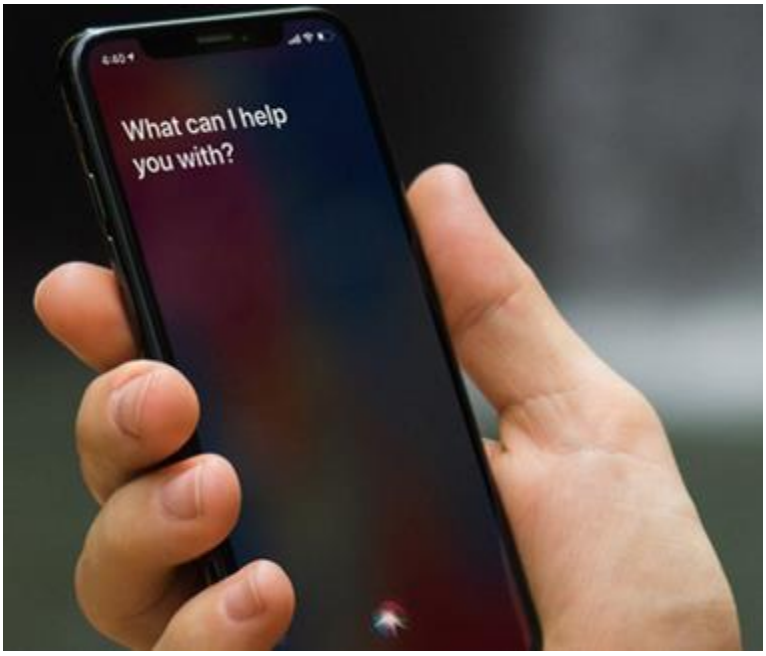

Figure 8: Example for conversing (Source Image2, n.d.)

As you can see Figure 8, This is Siri, the iPhone's virtual assistant. Usage is quite simple, users just need to press the circle button on the iphone. Next, they just need to say what they want, Siri will confirm and execute what you said earlier. It will provide you with information in case it can search for results.

- **Manipulating:** Manipulating objects and leveraging users' knowledge of how they do so in the physical world is the purpose of this type of interaction. Users can interact with objects in physical or virtual space by manipulating them.
- **Exploring:** User migration through physical or virtual environments involves an Exploring method. Sensor technology embedded with the physical environment. Many 3D virtual environments include a digital world designed to be such as where people roam around different areas, places to explore and socialize or video games like GTA 5, PUBG. Cities, parks, schools, bars, and entertainment are all virtual landscapes that have been developed and built and are both real and abstract. From there, the user can experience the most authentic way that the naked eye cannot see. (Explain Exploring, n.d.)
- **Responding:** The system issues warnings, displays or descriptions to the user what it thinks is relevant to the current user's context is the purpose of this type of interaction. A

simple example of responding, such as if you were running and burned 1000 calories in a day, the software tracks your exercise progress like Smart Gym. It will provide notification to you about that milestone that you have reached for the specific activity outlined above. And this tracking will be done automatically without any request from you. You can then respond by looking at the result message on the screen.

4.3. Interface Metaphors

According to wikipedia, The set of visualizations, procedures, and actions in the user interface harnesses specific insights that users already have in other areas called Interface Metaphor. They provide a somewhat similar structure to aspects of a familiar entity (or entities), but they also have their own properties and behaviors. (Definition of Interface Metaphor, n.d.)

Figure 9: Example for Interface Metaphor

As you can see Figure 9, I have given a simple example to explain Interface Metaphor. You can easily see and recognize that this is a trash can but are designed as icons in the computer and they are simulated quite like their physical design. When users want to delete something on the computer, they simply drag and drop into this icon. The process that the user has implemented is as realistic as it is they throw trash in the trash.

4.4. Conceptual Design

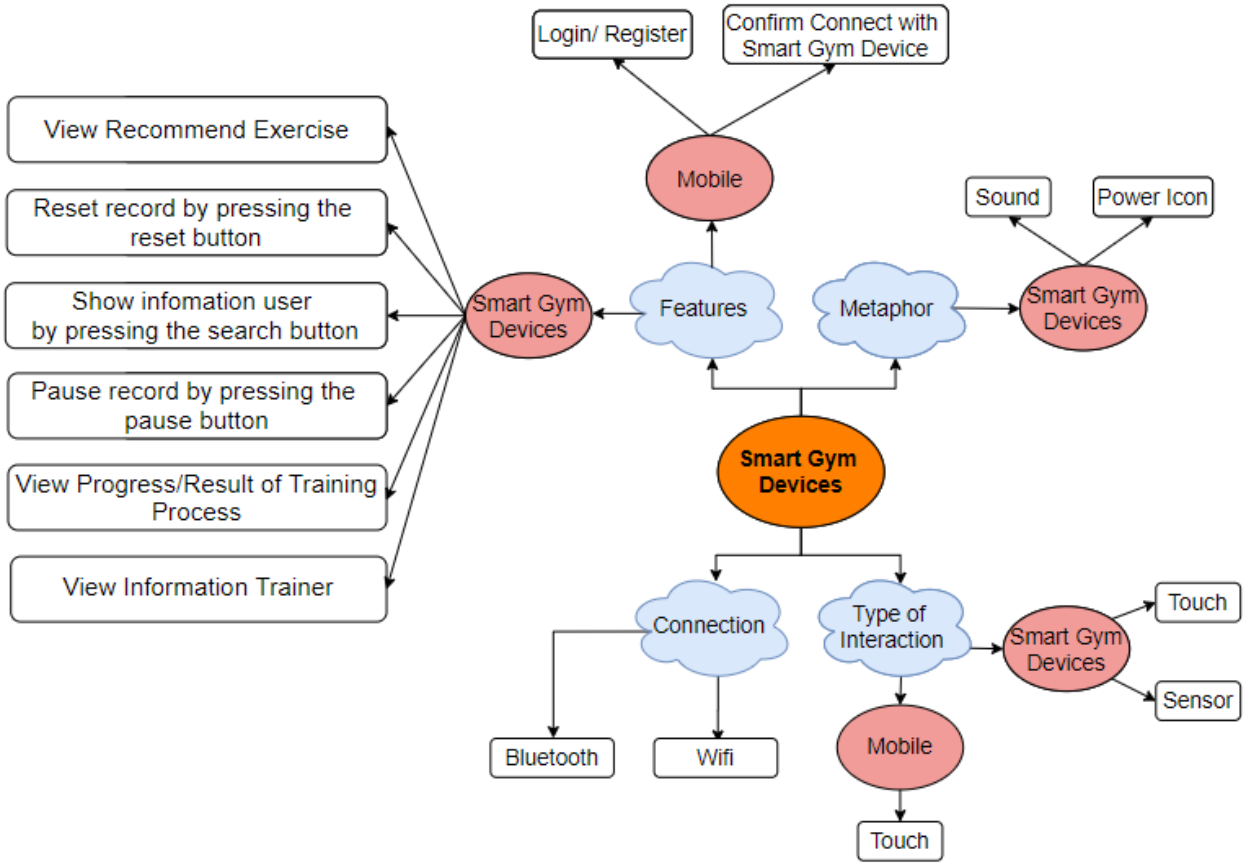

Figure 10: Conceptual Design For Coursework

Applying the above theories of Conceptual Model, based on that I have deployed and designed Conceptual Design for Smart Gym to help users have an overview of Smart Gym. More importantly, relying on Conceptual Design can help users easily understand how Smart Gym works and functions. From there, they know how to use Smart Gym more easily and clearly.

5. Prototypes

5.1. Definition

Prototype can be understood simply like this, is in the middle to high segment of the authenticity of the final product, simulating the impact of the user interface. It will allow users to:

- Experience the content and interact with the interface
- Test for key interaction in the same way as the end product

5.2. Reason need Prototype

Prototype helps people to have an overview and overview of the product. People here include customers, designers, specifically stakeholders. They will be able to hold, view and interact with prototypes more easily than drawings or documents. Without prototypes, developers and team members can build something the client doesn't want, which requires modification and repair, which often leads to higher costs and more errors. Therefore, prototypes are very important in the product design and implementation process, it will help answer questions and assist in choosing between alternatives. More importantly, it will help team members be able to communicate more effectively and clearly.

5.3. Low-Fidelity Prototype

According to the 5th edition of 2019's book entitled “Beyond Human-Computer Interaction”, on page 426, Low-fidelity prototype doesn't look like the final product, nor does it offer the same functionality. The low-fidelity prototype plays an important role in the early stages of product development and design. Because low-fidelity prototypes tend to be simple, manufacturing is fast, and it's cheap. So, they are used with the aim to explore diverse ideas, explore and change.

5.4. Storyboard

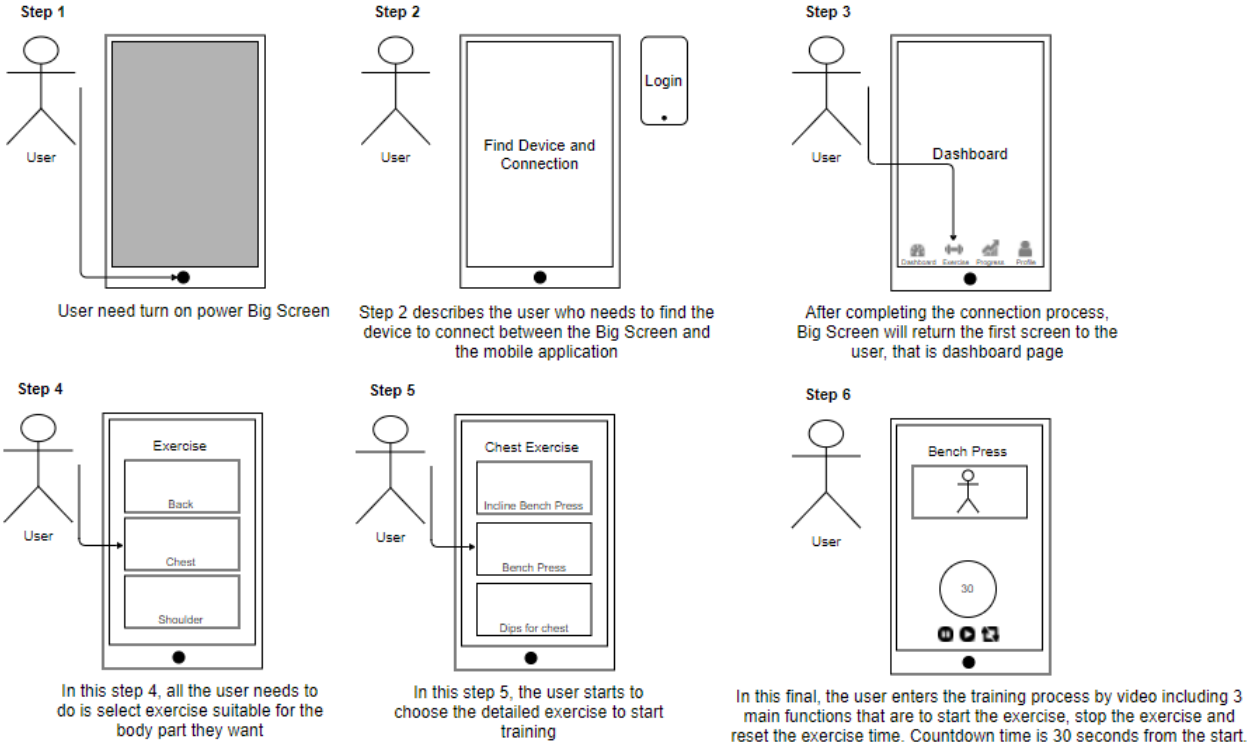

Figure 11: Storyboard

As you can see Figure 11, This is storyboard includes 6 main steps about the user interaction process about the main function of Smart Gym equipment which is large screen training. In each step, I have described a specific and detailed way to help people easily visualize how Smart Gym works (specifically the exercise function).

5.5. Wireframe

It can be understood simply as this, wireframe is considered as the skeleton of the product, is a rudimentary version of the user interface, but it still has enough information to display including mechanical functions product information architecture and version. Rely on information architecture and basic functions that form the basic interface of the product.

The tool that I use to create wireframe is Axure. Below are picture of all the wireframes I have designed:

For mobile screen:

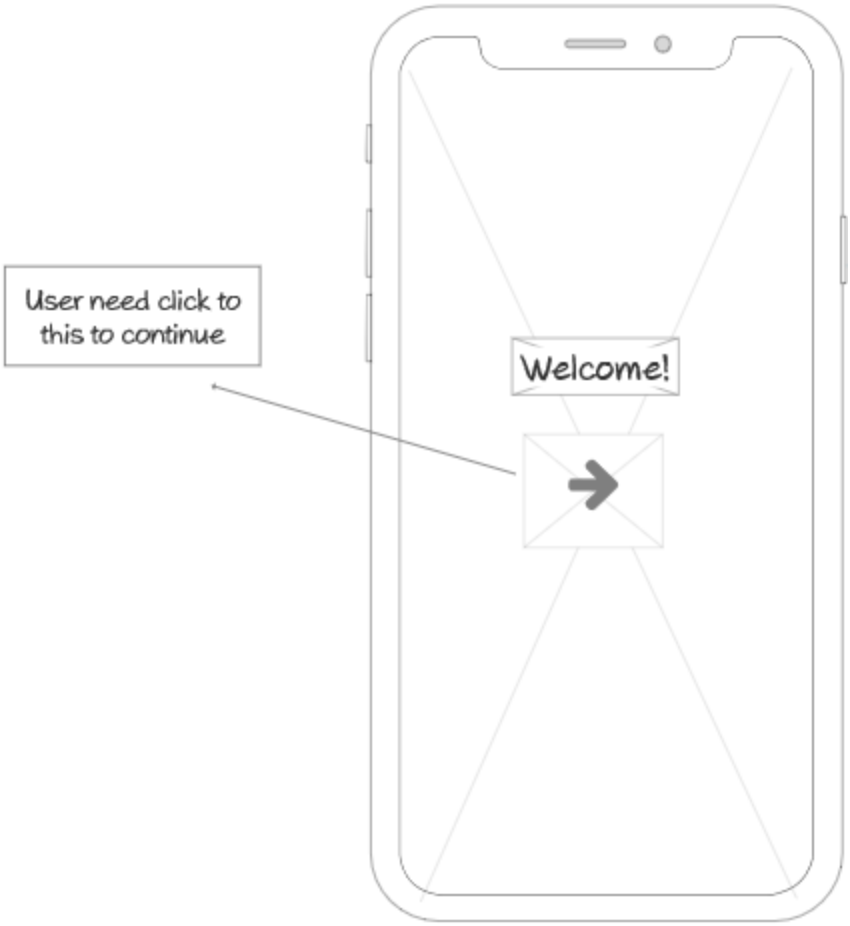

Figure 12: Wireframe: Welcome Page

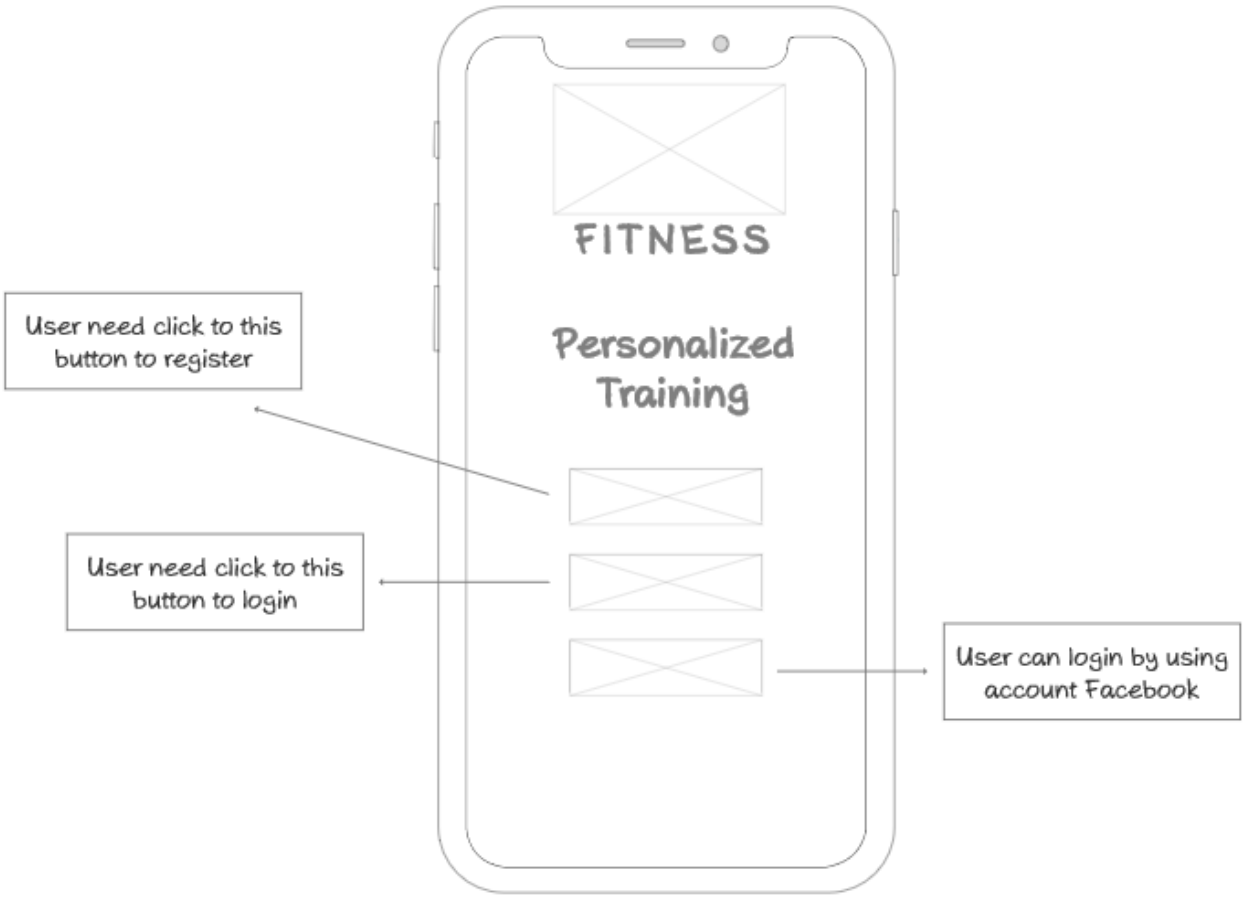

Figure 13: Wireframe: Selection Page

Figure 14: Wireframe: Login Page

For Big Screen:

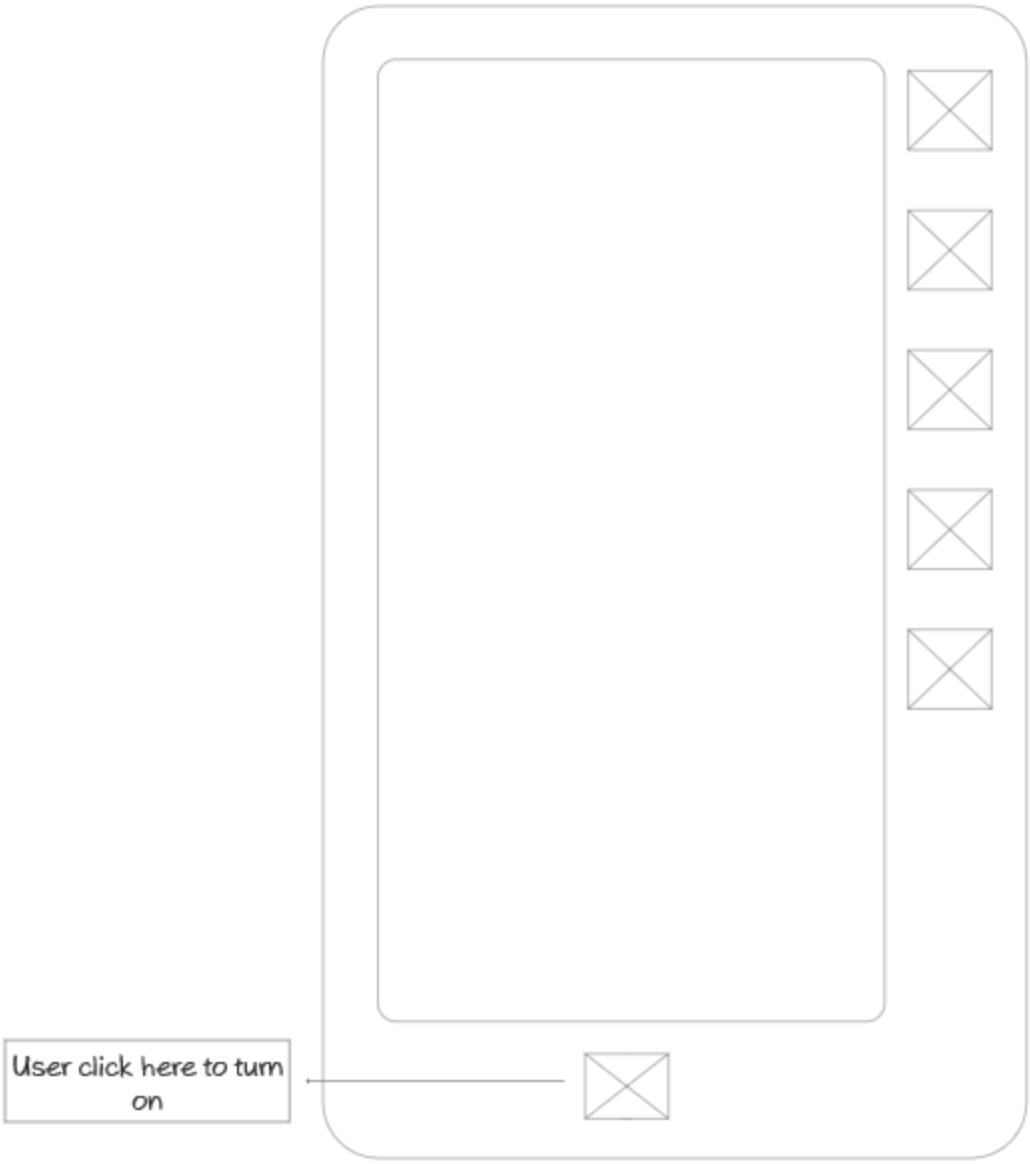

Figure 15: Wireframe: Big Screen

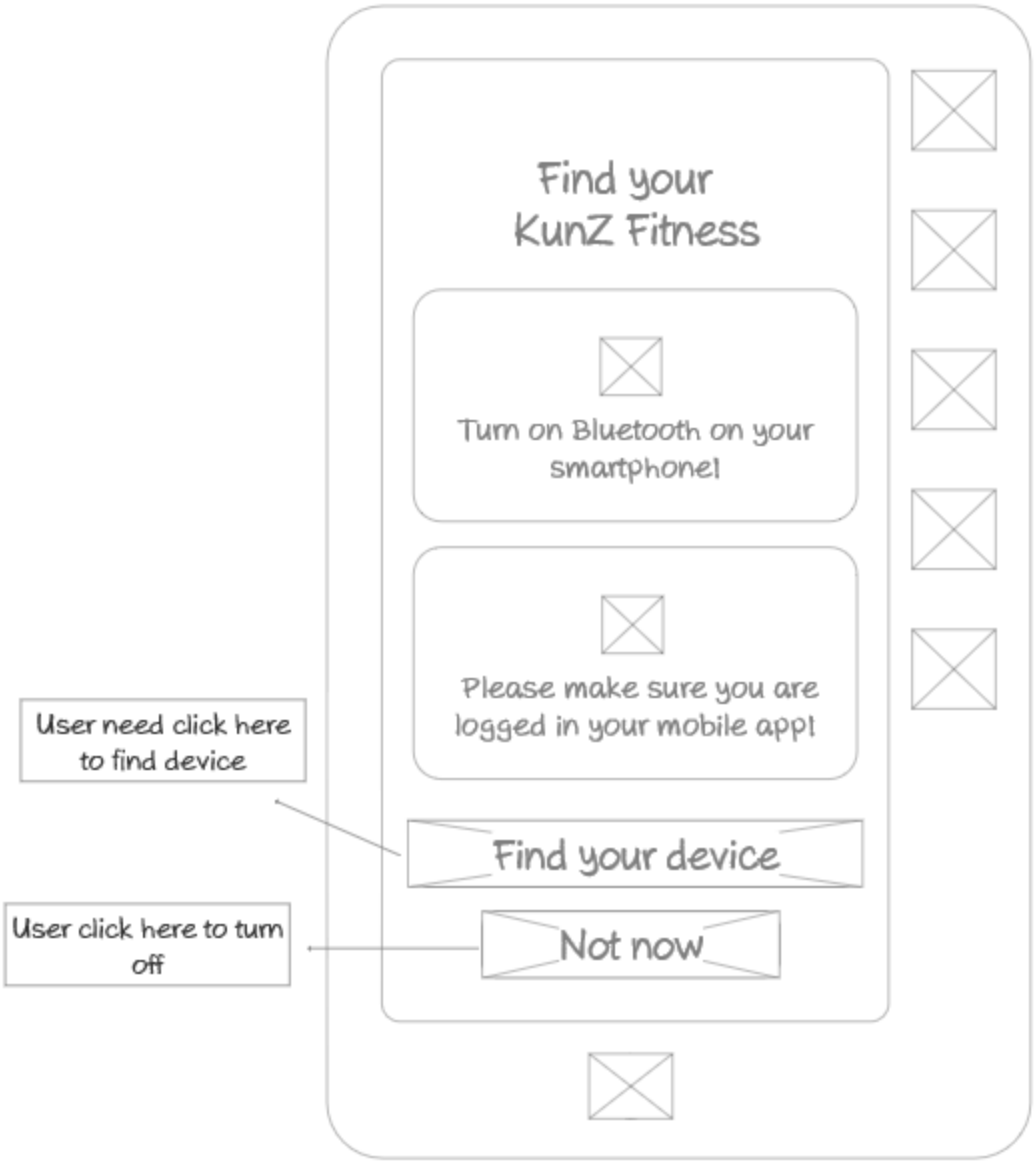

Figure 16: Wireframe: Find Device

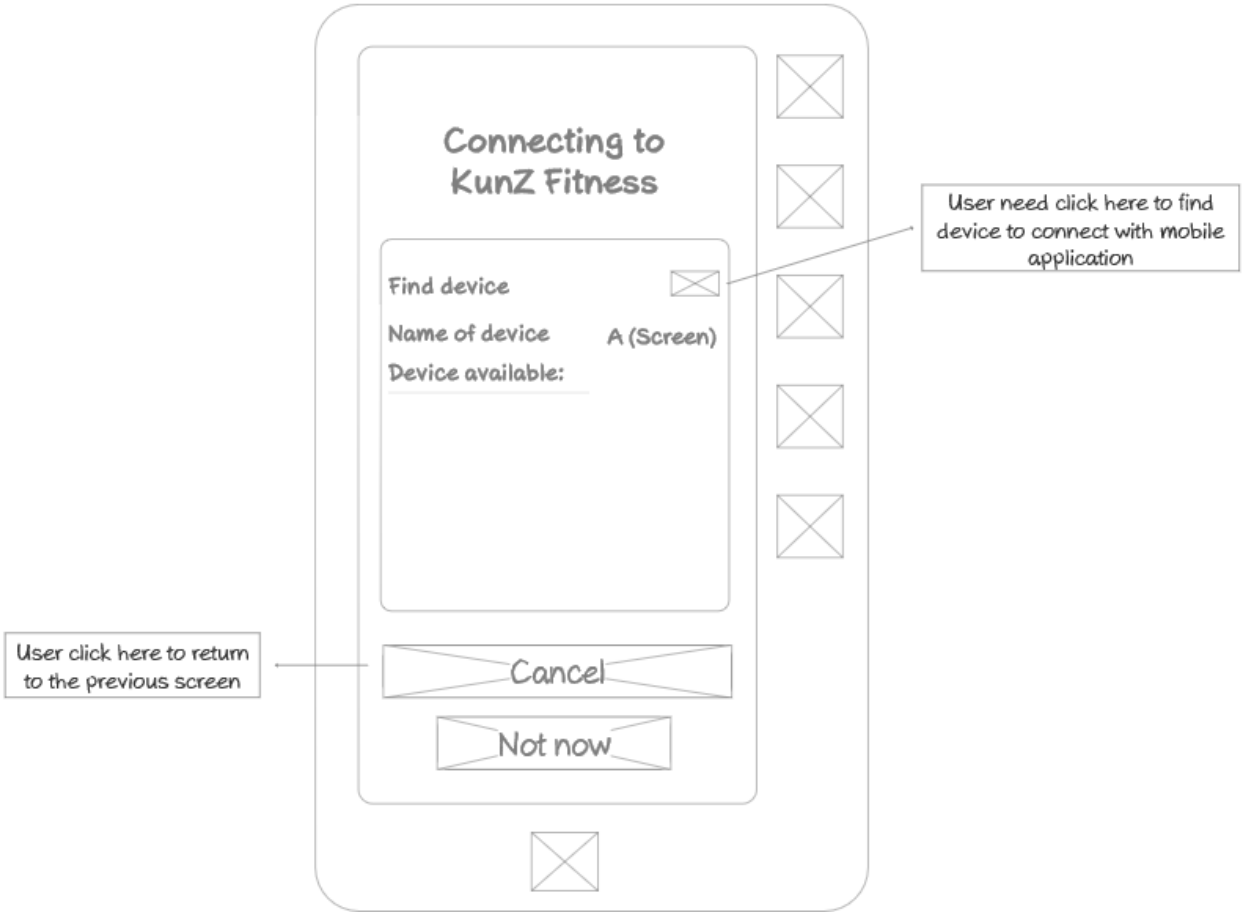

Figure 17: Wireframe: Connection Page

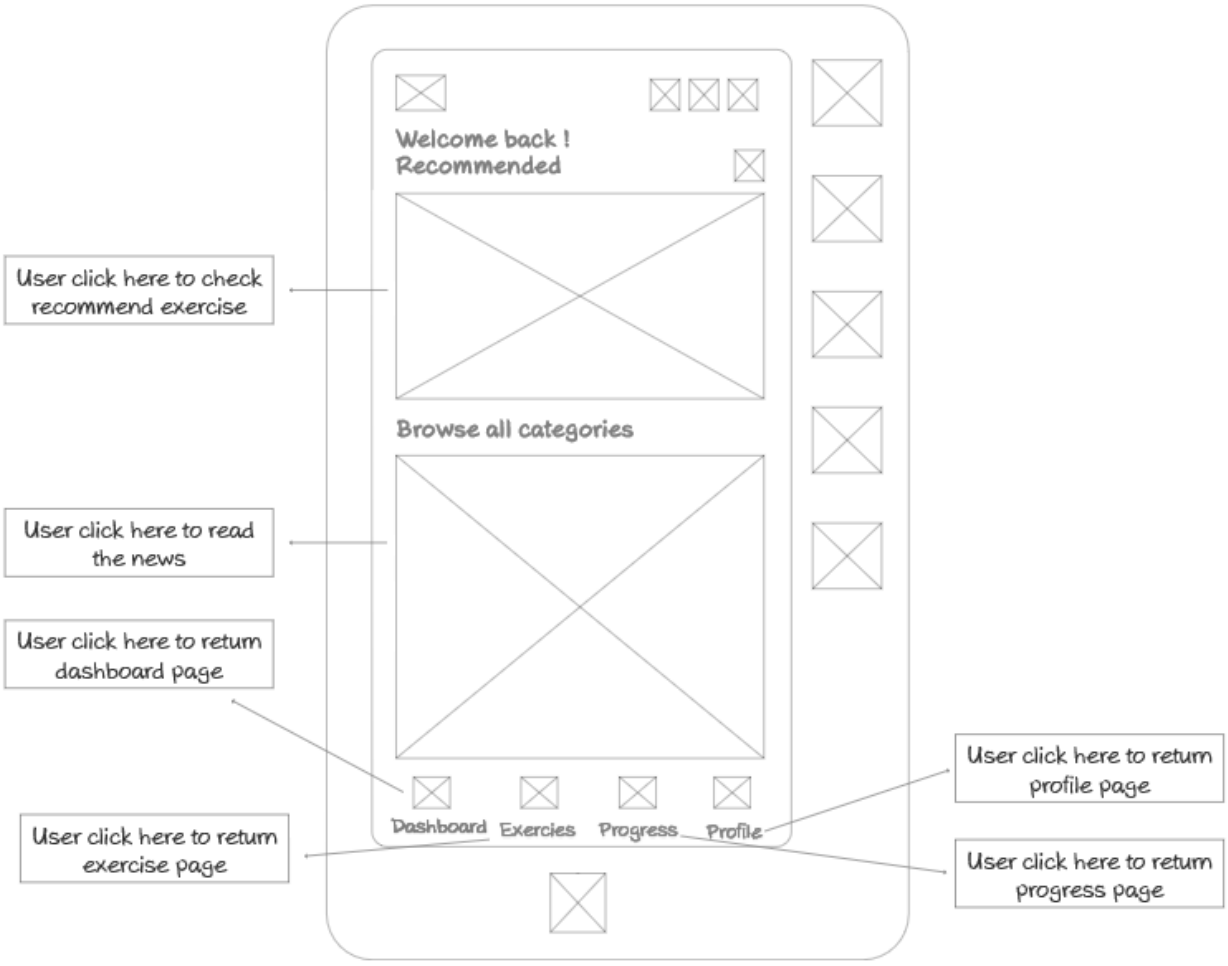

Figure 18: Wireframe: Dashboard Page

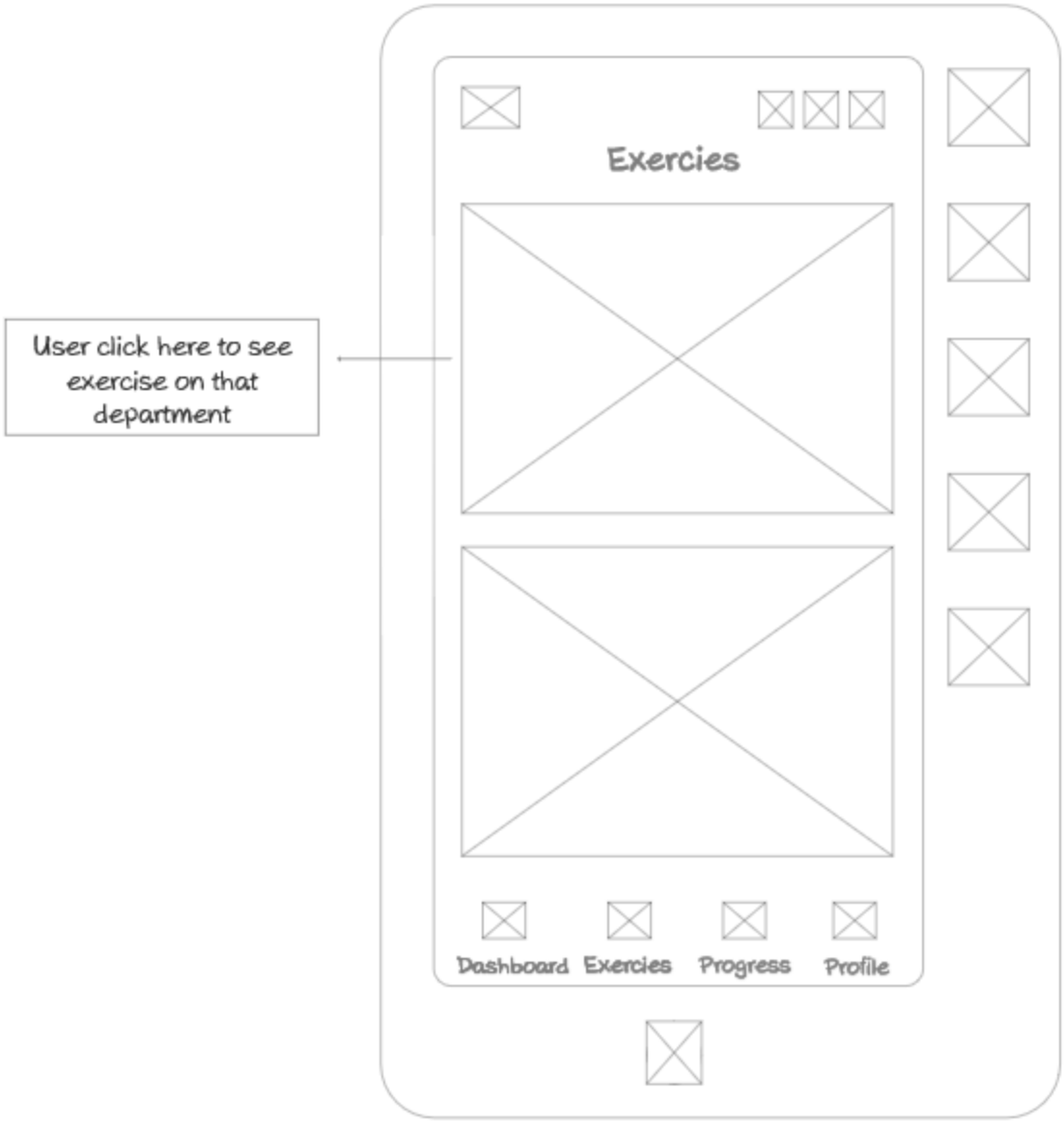

Figure 19: Wireframe: Exercise Page

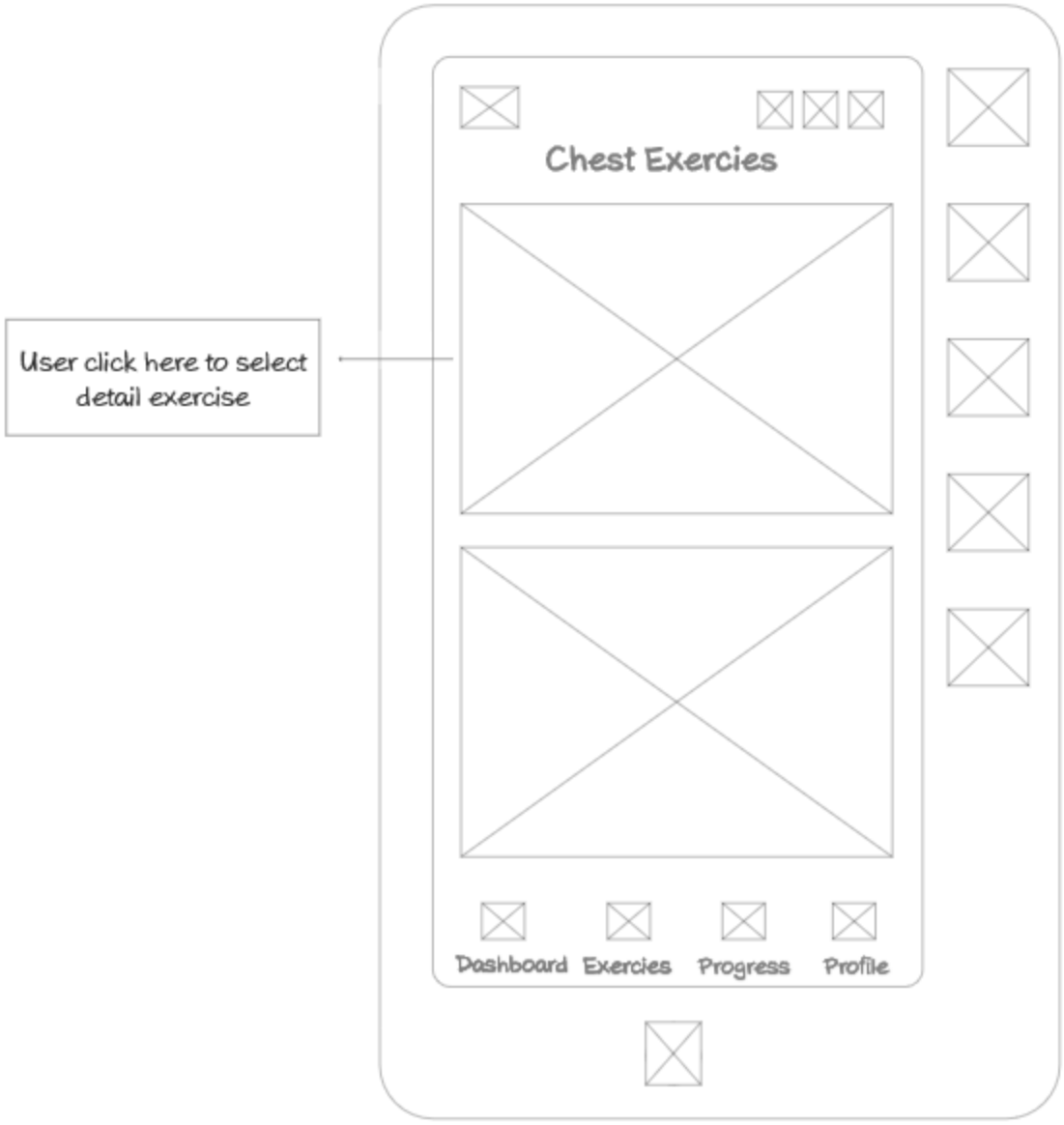

Figure 20: Wireframe: Select Exercise Page

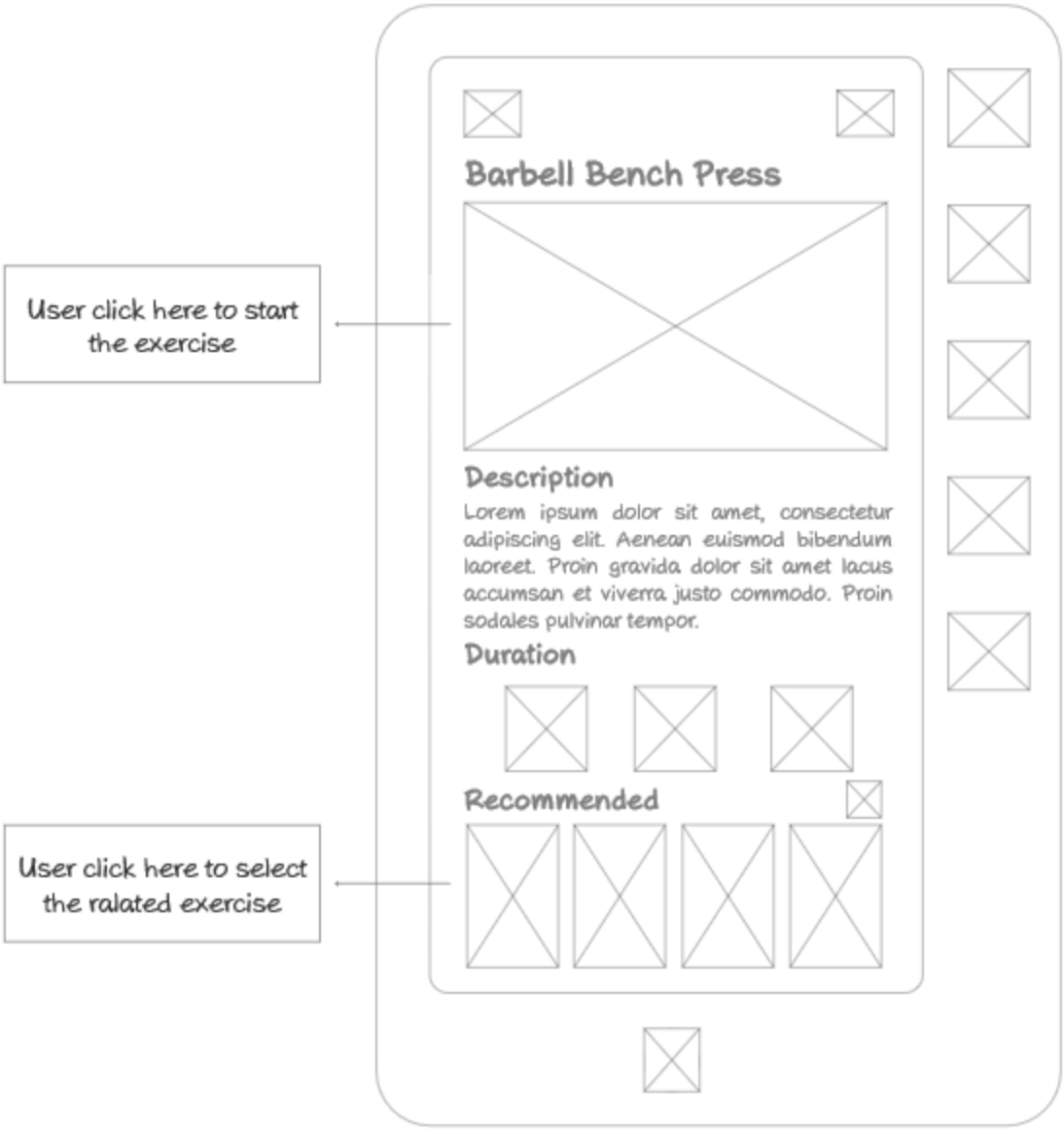

Figure 21: Wireframe: Detail Exericse Page

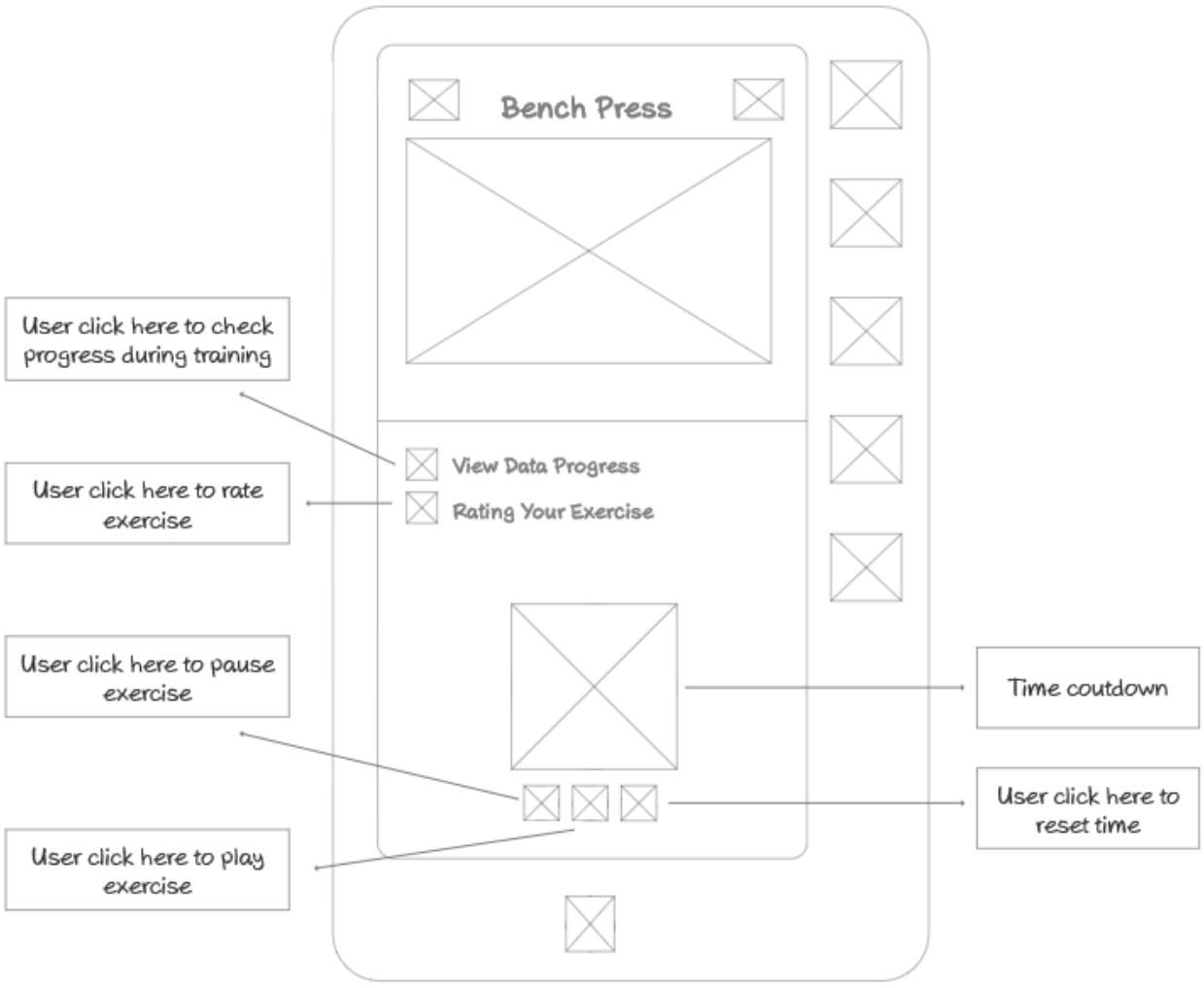

Figure 22: Wireframe: Training Page

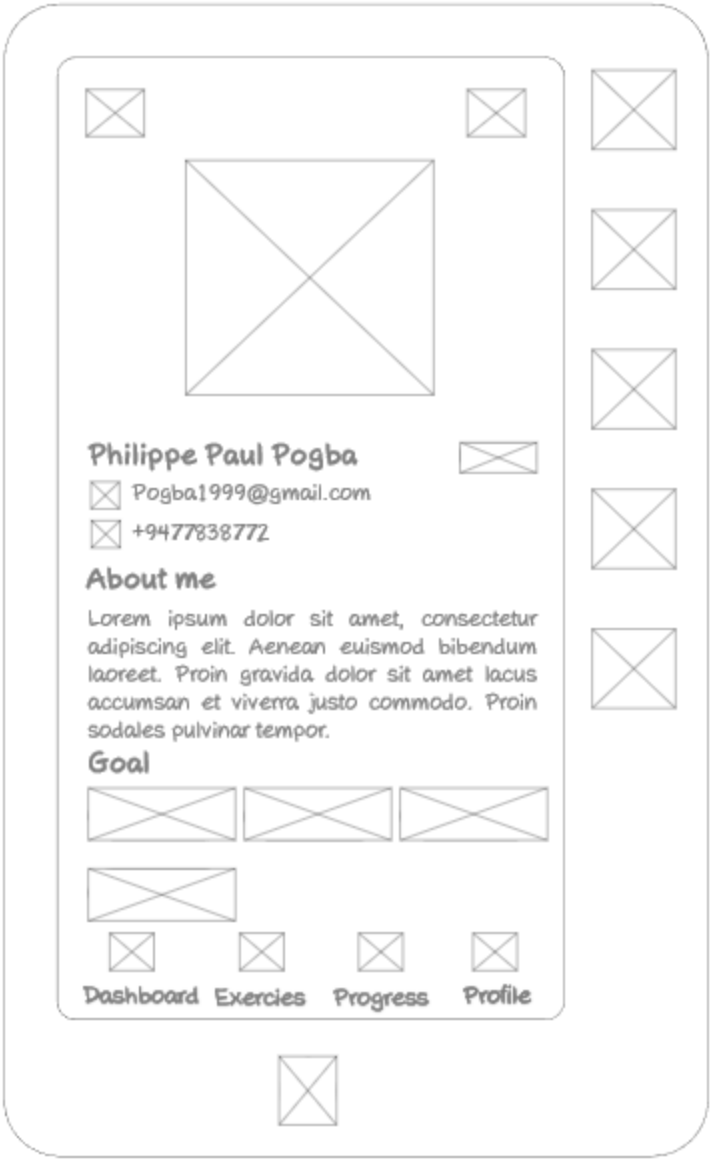

Figure 23: Wireframe: Profile Page

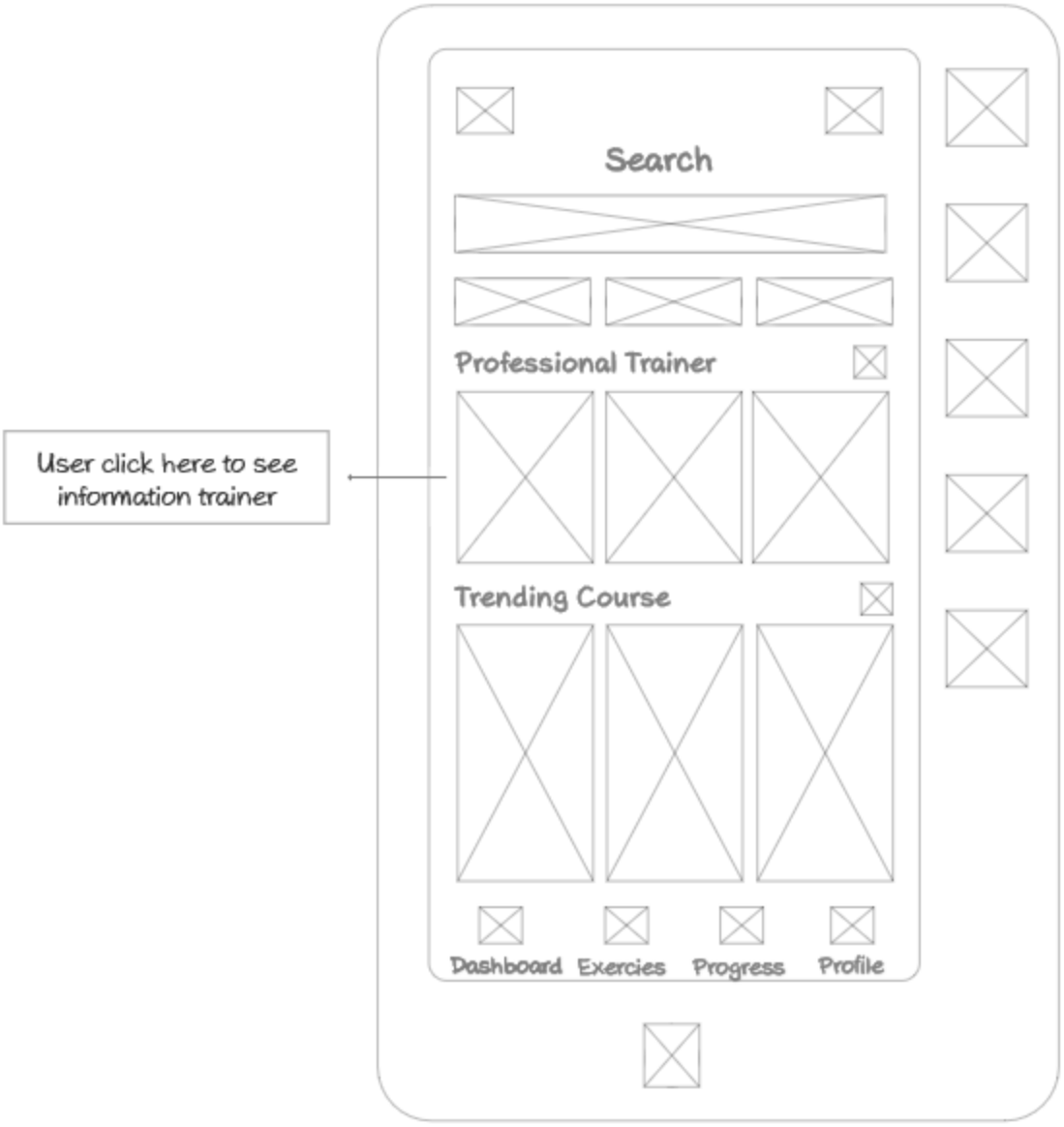

Figure 24: Wireframe: Search Page

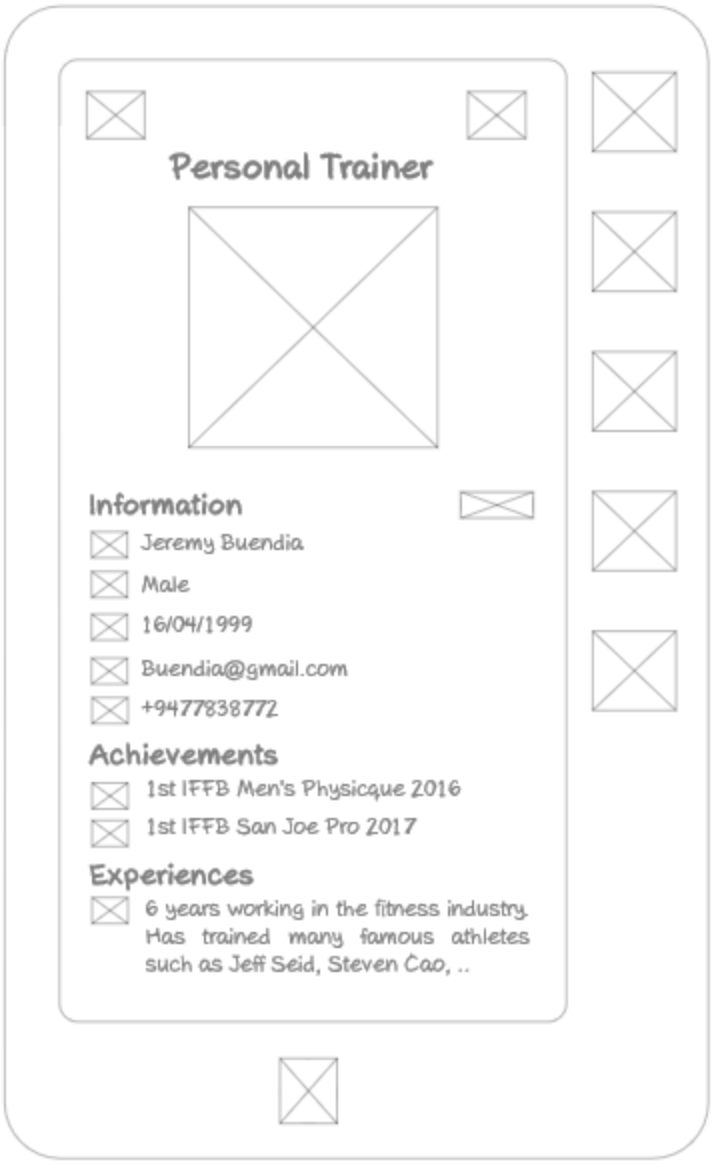

Figure 25: Wireframe: Profile Trainer Page

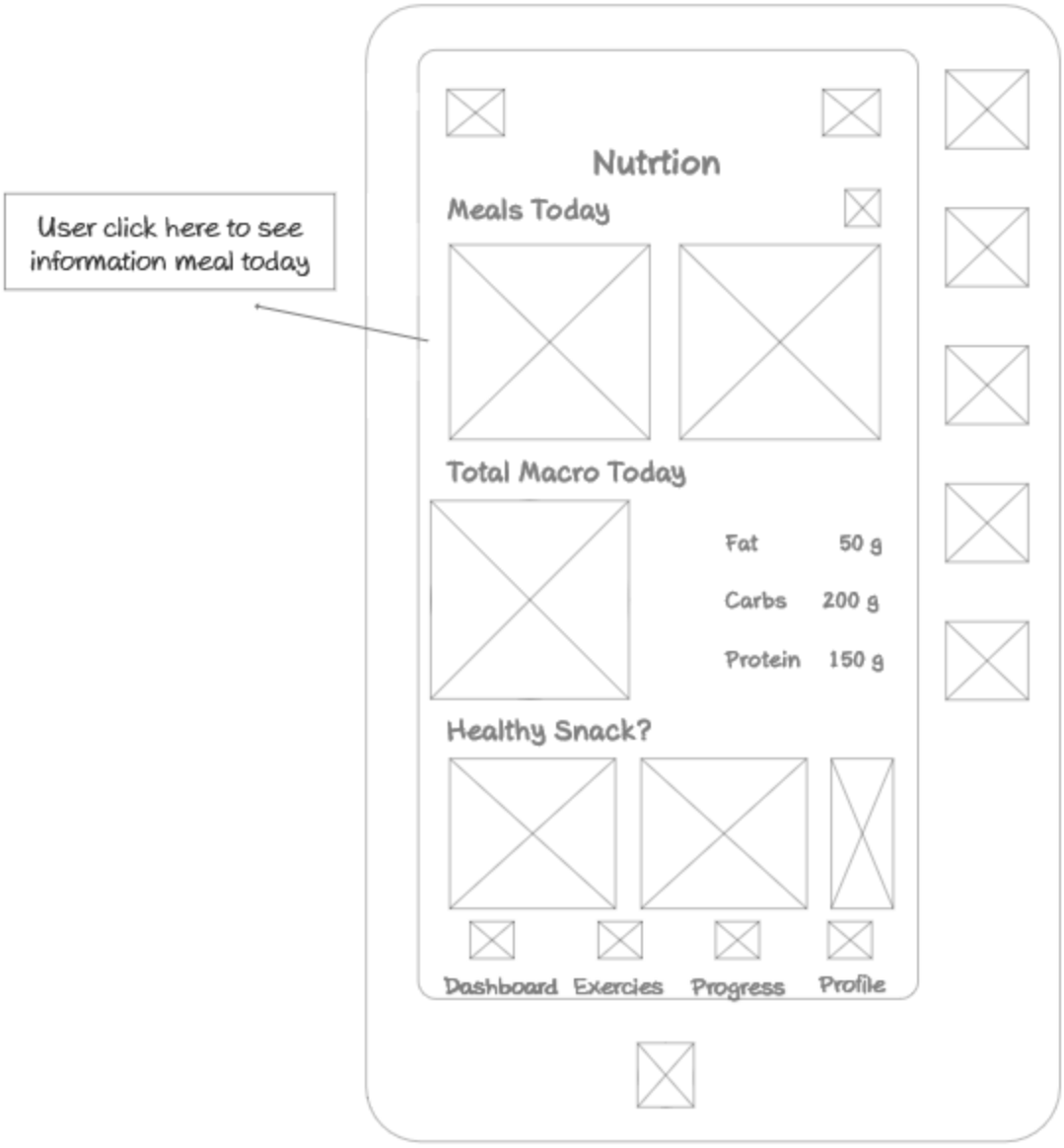

Figure 26: Wireframe: Nutrition Page

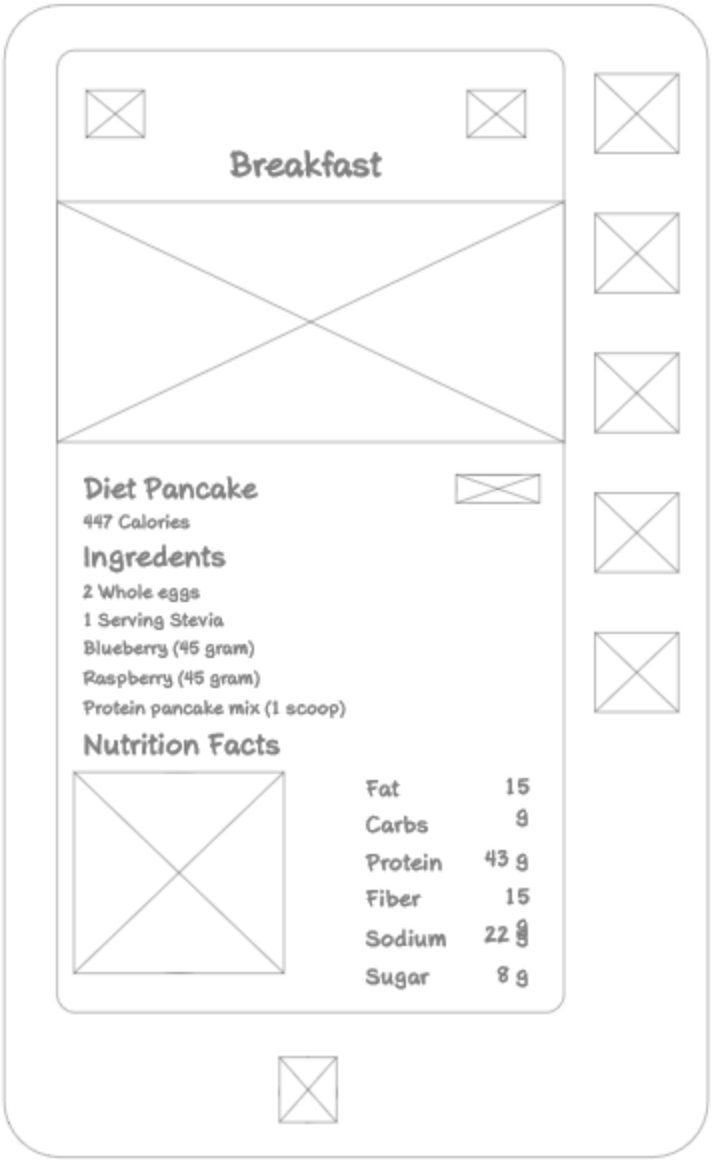

Figure 27: Wireframe: Detail Nutrition Page

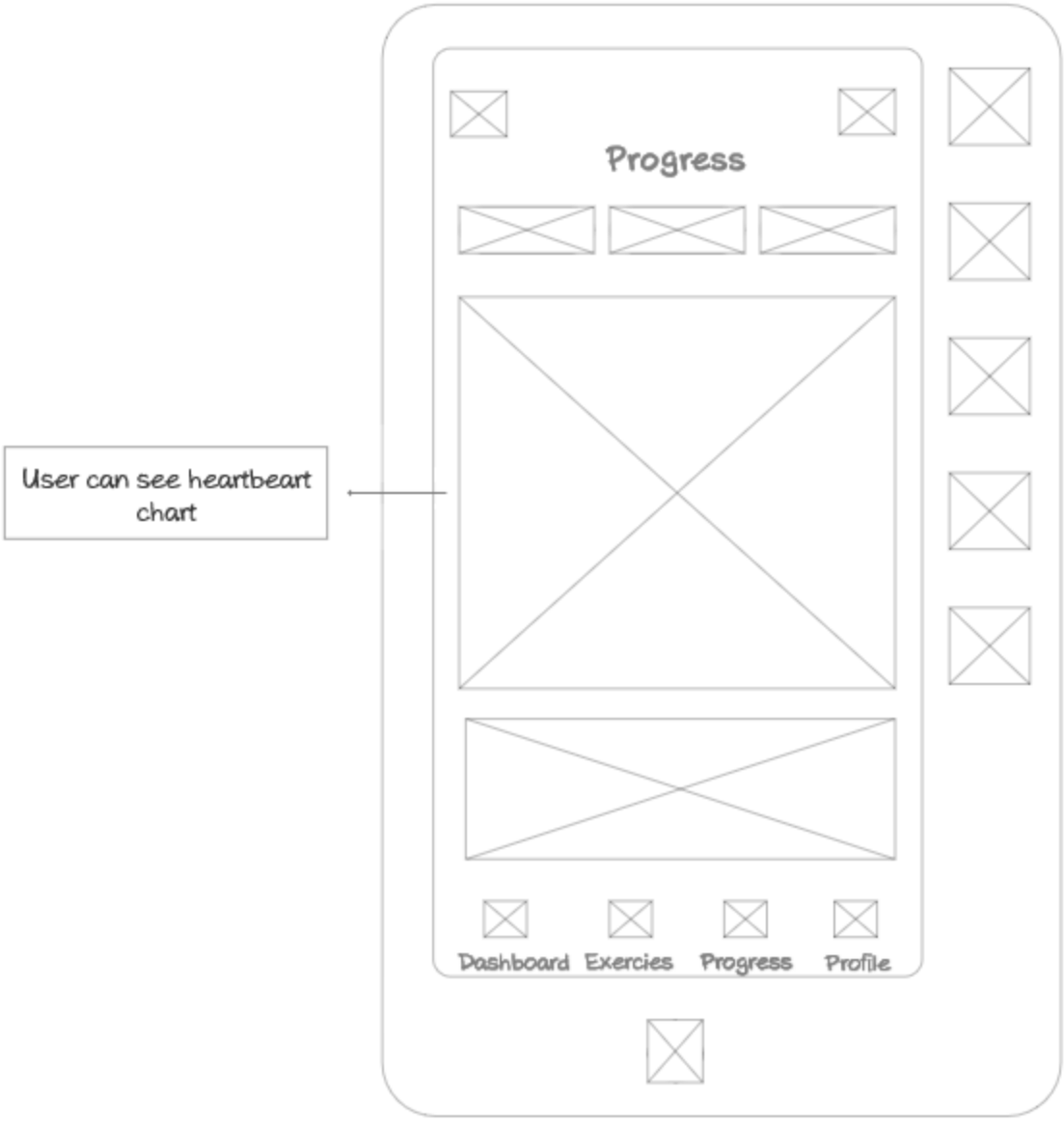

Figure 28: Wireframe: Progress Page

5.6. Paper Prototype

For mobile screen:

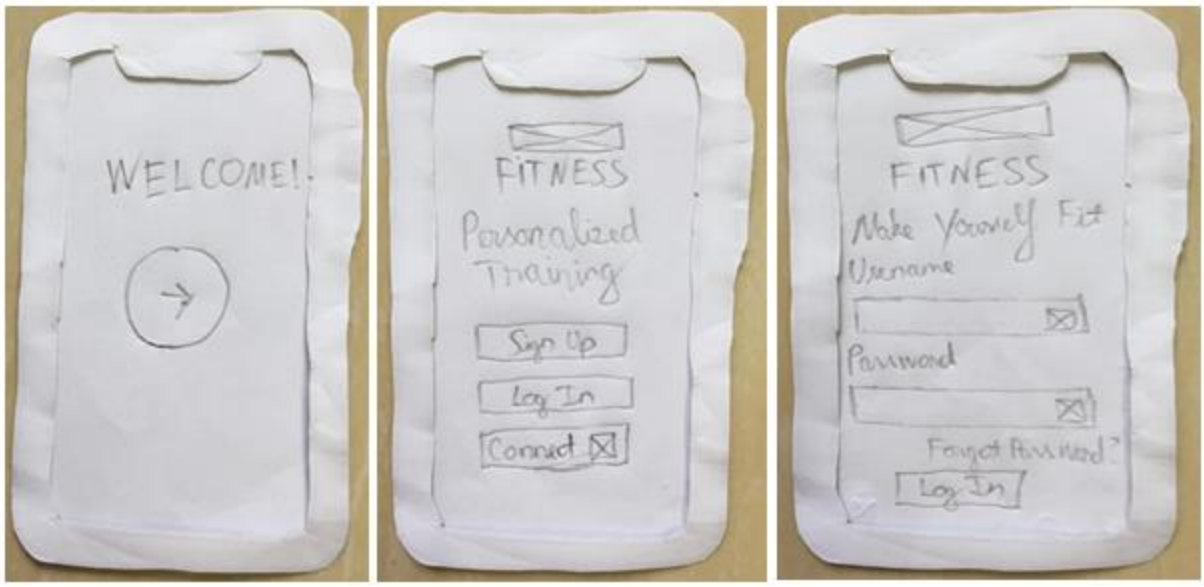

Figure 29: Paper Prototype for Mobile Screen

As you can see Figure 29, this is a hand drawn paper prototype by me for a mobile interface including pages like welcome, selection and login page.

For big screen:

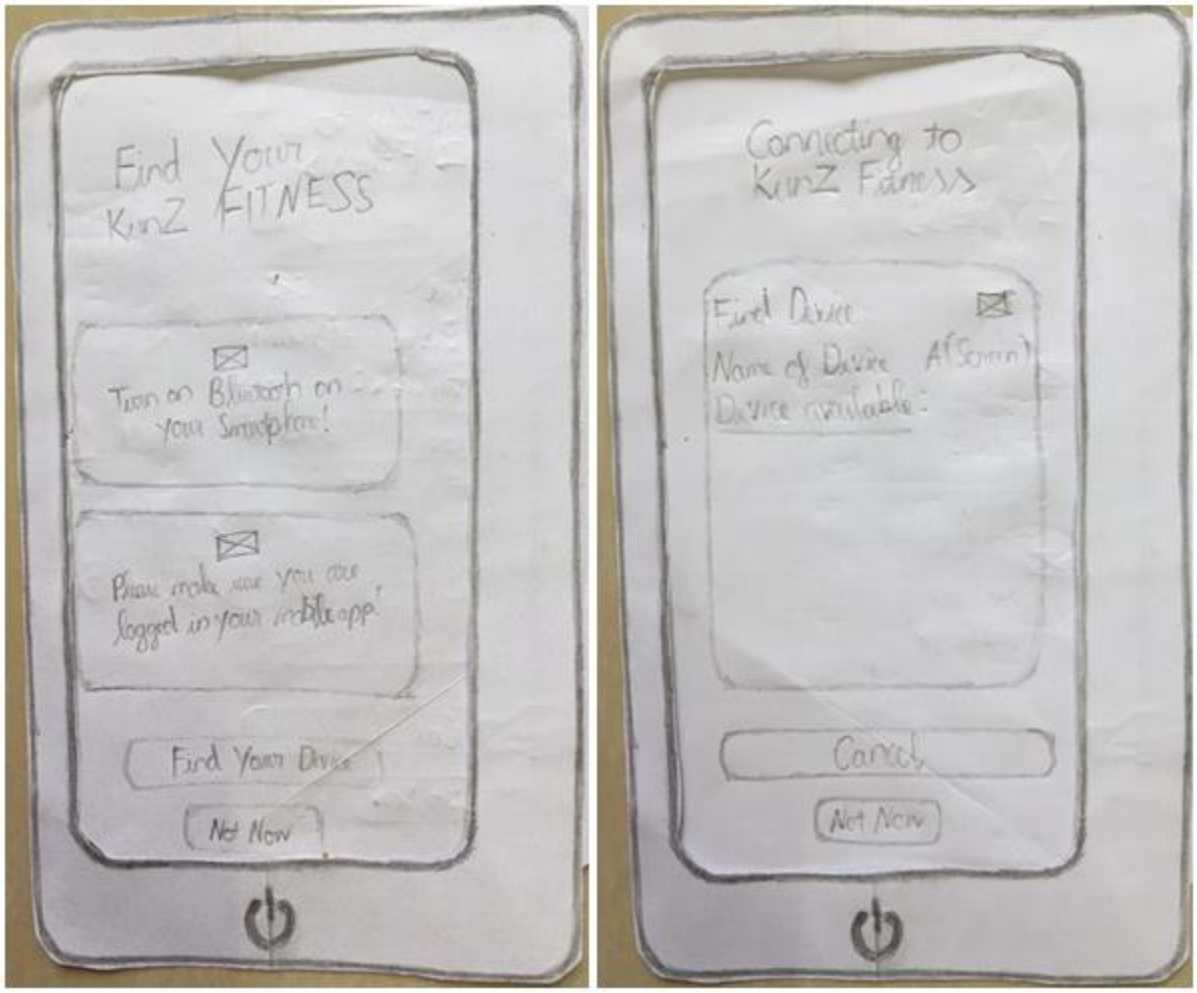

Figure 30: Paper Prototype for Big Screen

As you can see Figure 30, here is the paper prototype of the find device and connection device page on the big screen..

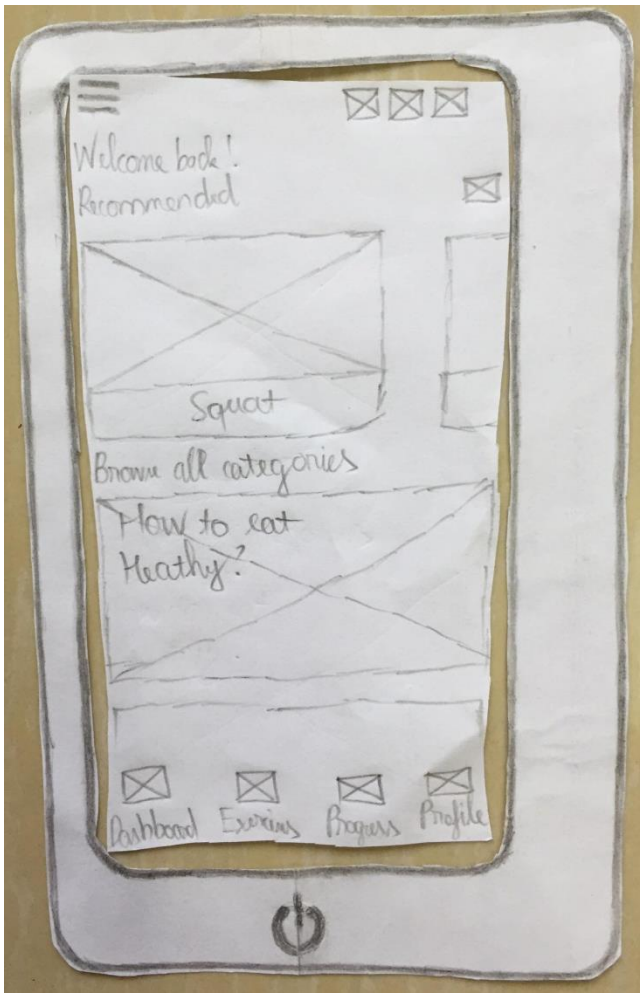

Figure 31: Paper Prototype for Big Screen

As you can see Figure 31, here is the paper prototype of the big screen dashboard.

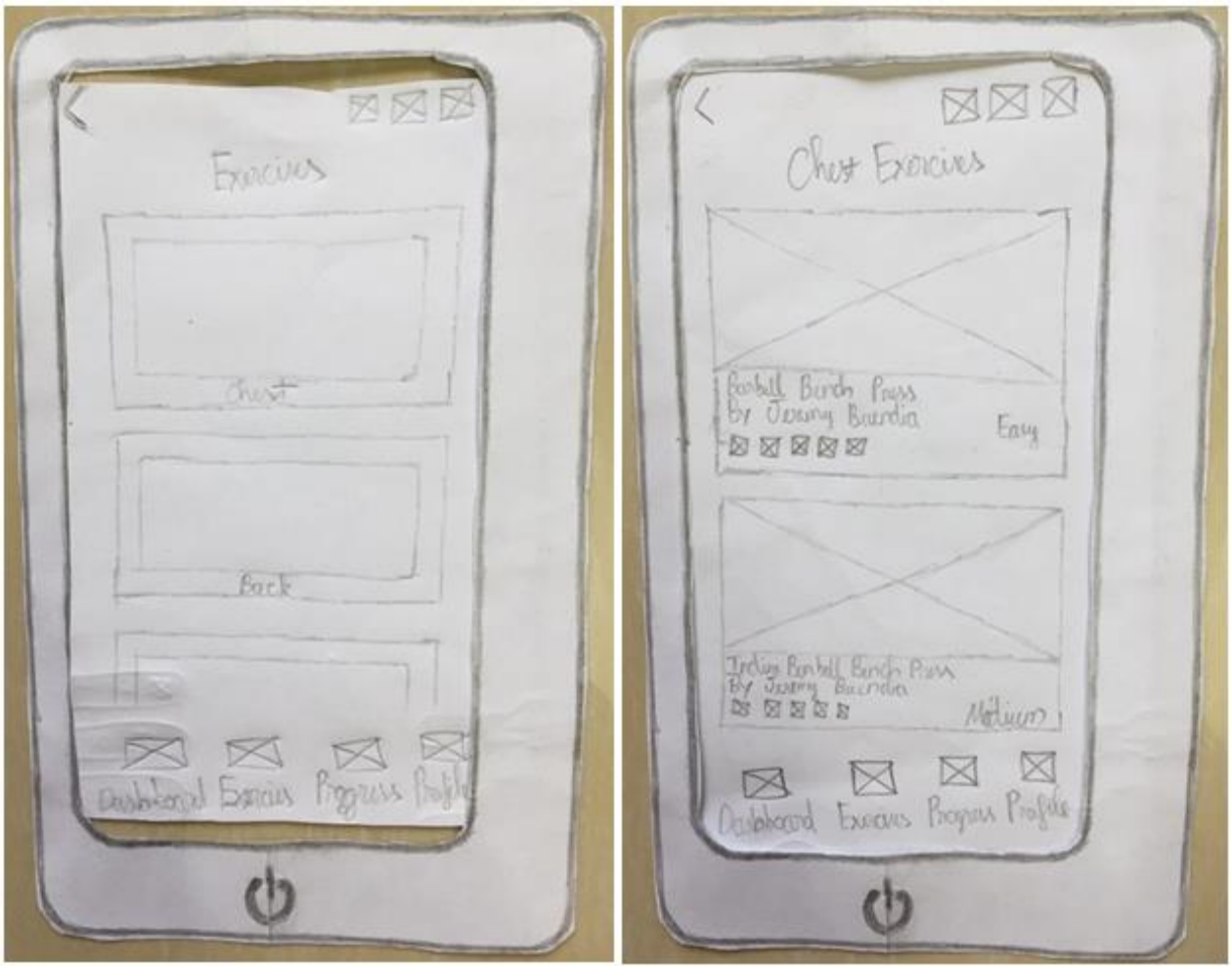

Figure 32: Paper Prototype for Big Screen

As you can see Figure 32, here is the paper prototype of the exercise and select exercise page on the big screen.

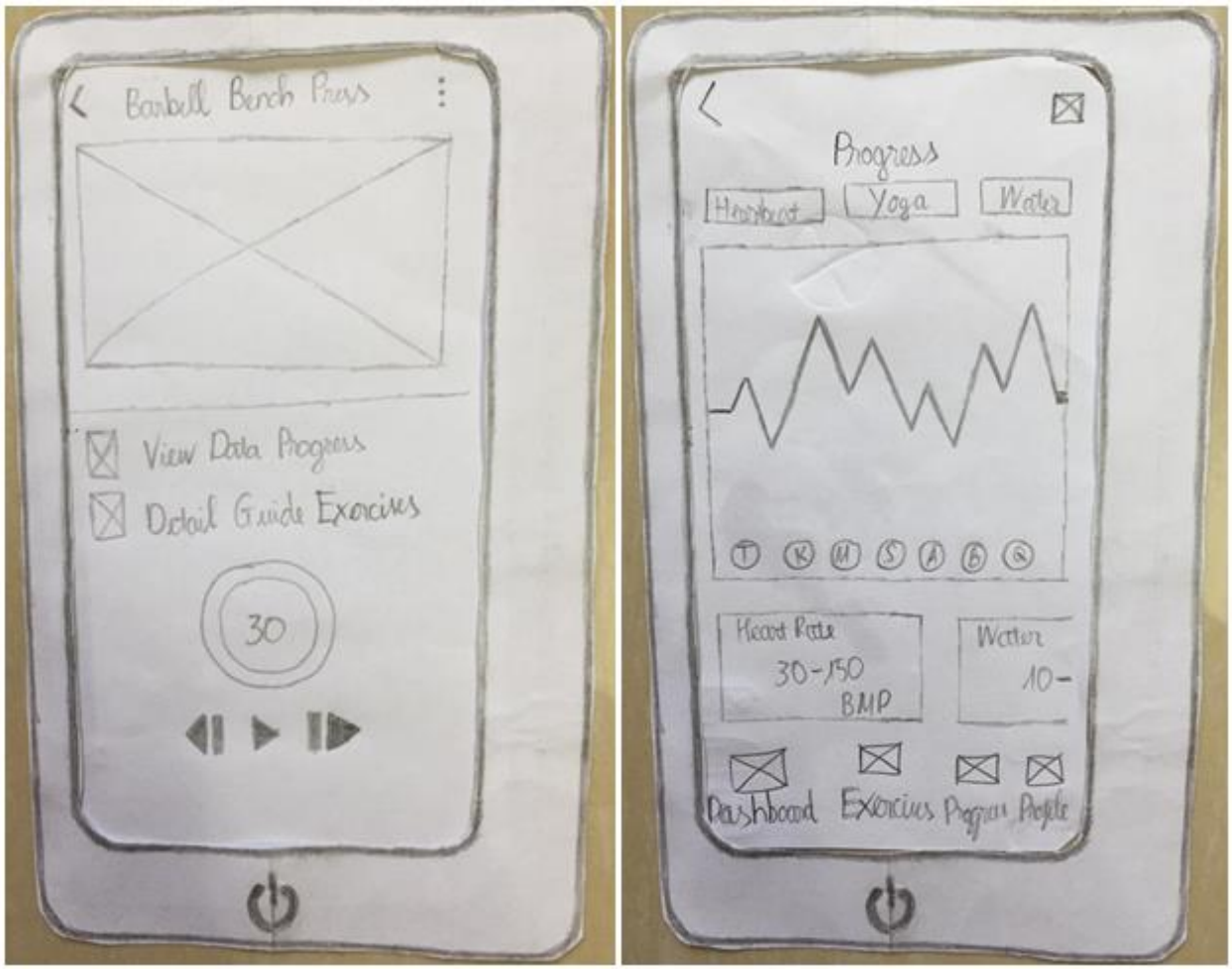

Figure 33: Paper Prototype for Big Screen

As you can see Figure 33, here is a paper prototype with a training page and progress page on the big screen.

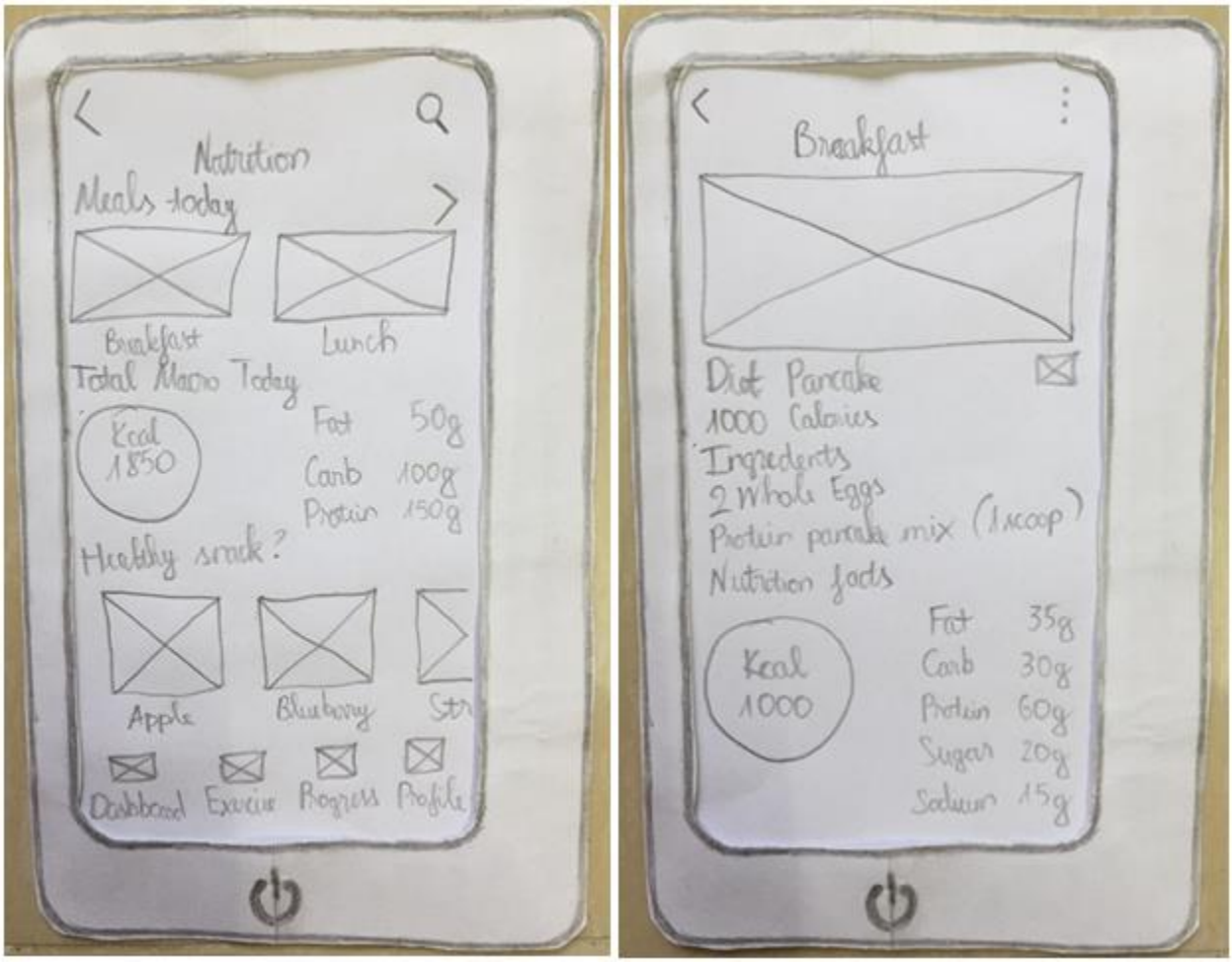

Figure 34: Paper Prototype for Big Screen

As you can see Figure 34, here is the paper prototype including the nutrition page and the nutrition detail page on the big screen.

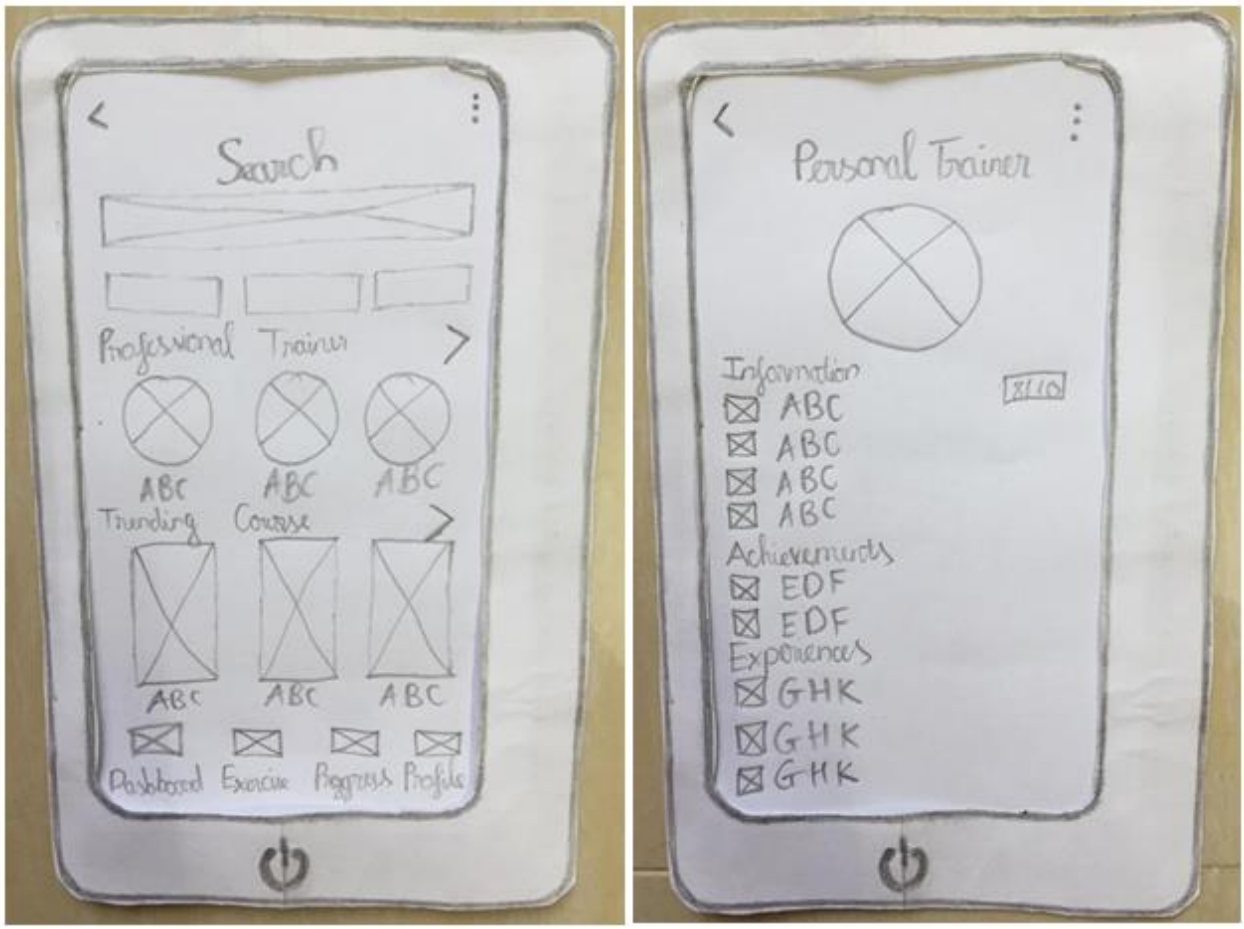

Figure 35: Paper Prototype for Big Screen

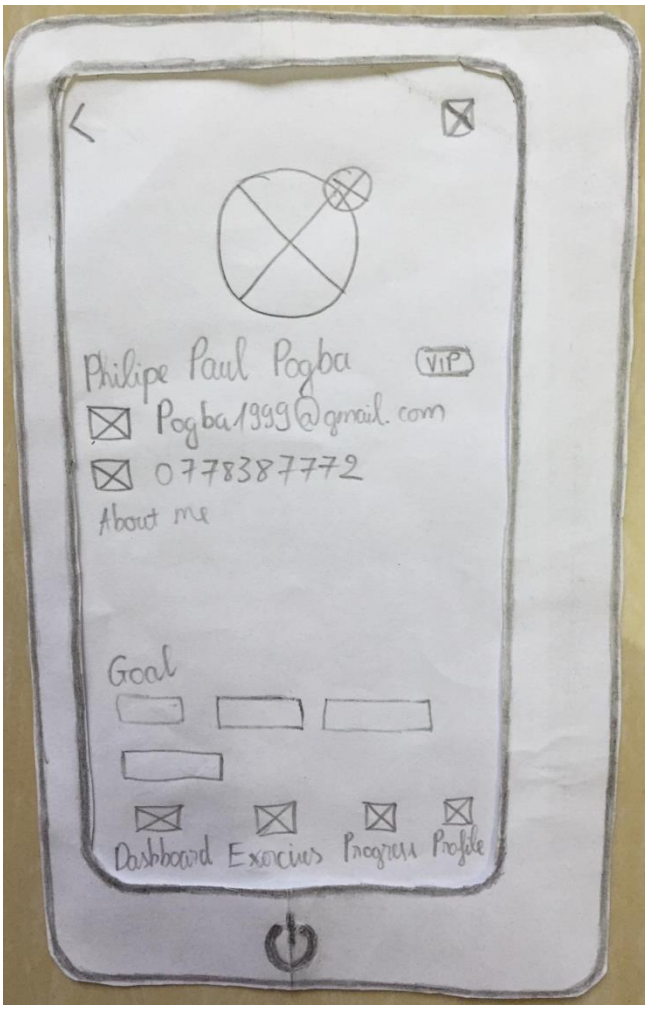

Figure 36: Paper Prototype for Big Screen

5.7. High-Fidelity Prototype

According to the 5th edition of 2019's book entitled “Beyond Human-Computer Interaction” on page 429, high-fidelity prototype is a prototype of a product built on a computer with almost the same interactions as an end product when it reaches the user.

The tool I used to create the High-Fidelity Prototype is also Axure. Below are picture of all the wireframes I have designed:

For interface High-Fidelity Prototype of mobile:

Figure 37: High-Fidelity Prototype for Mobile Screen

For interface High-Fidelity Prototype of big screen:

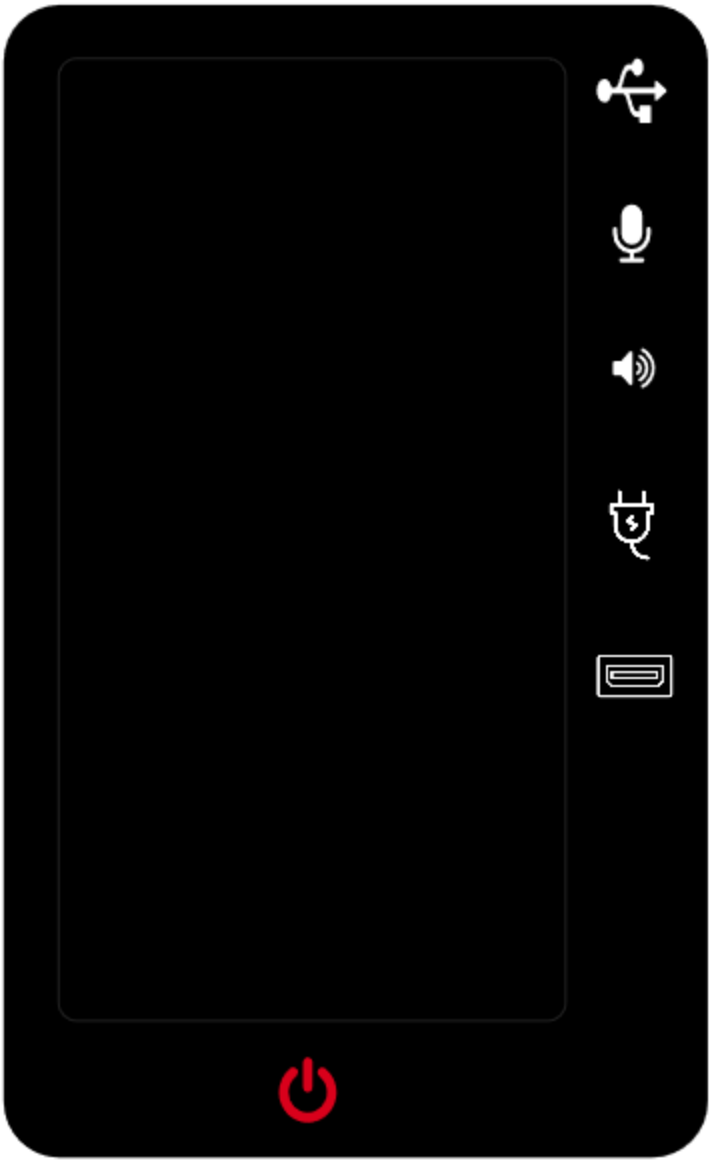

Figure 38: High-Fidelity Prototype: Big Screen

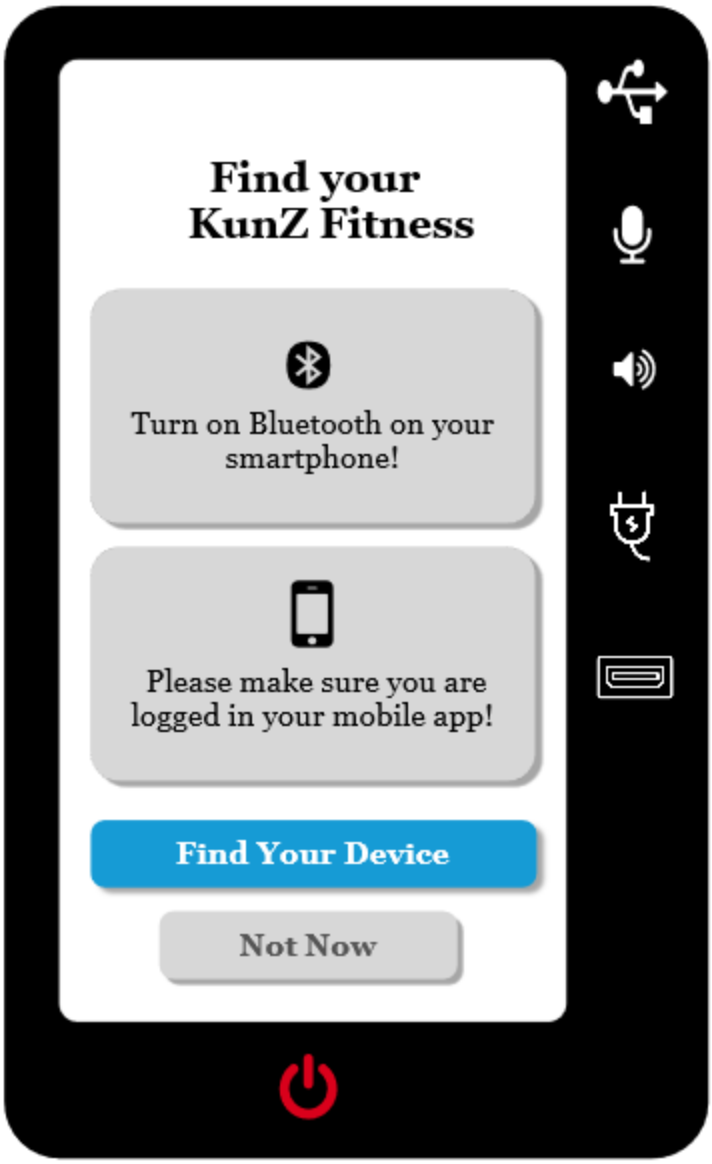

Figure 39: High-Fidelity Prototype: Find Device

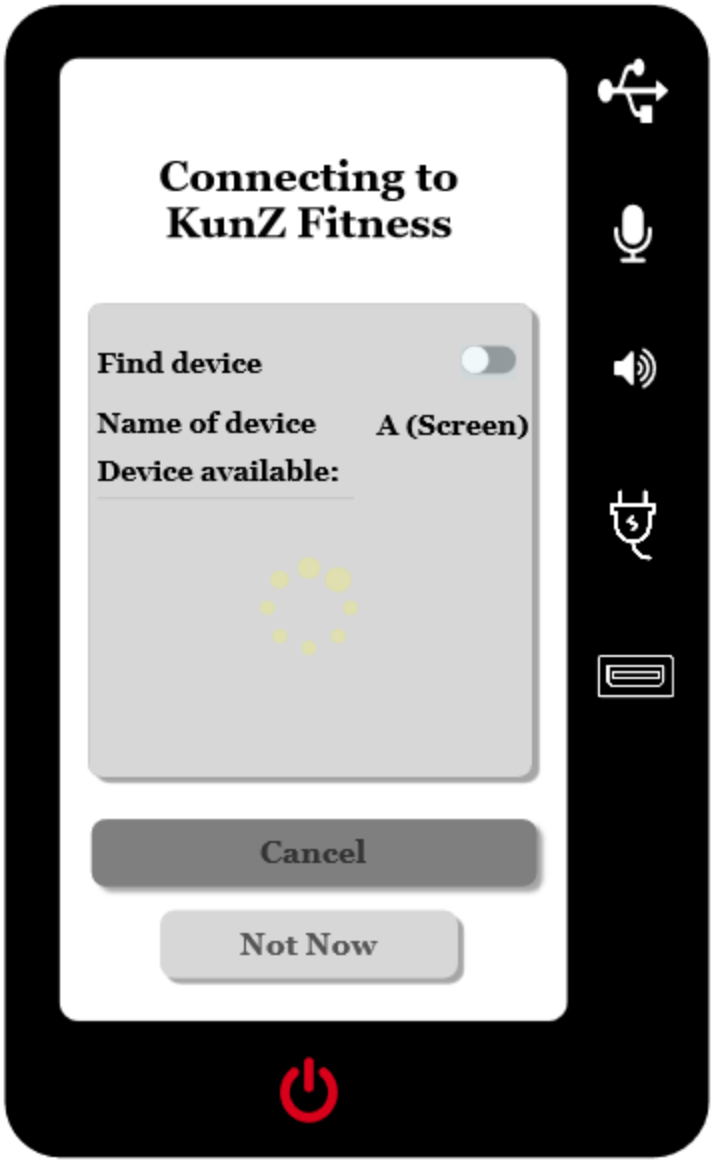

Figure 40: High-Fidelity Prototype: Connection Page

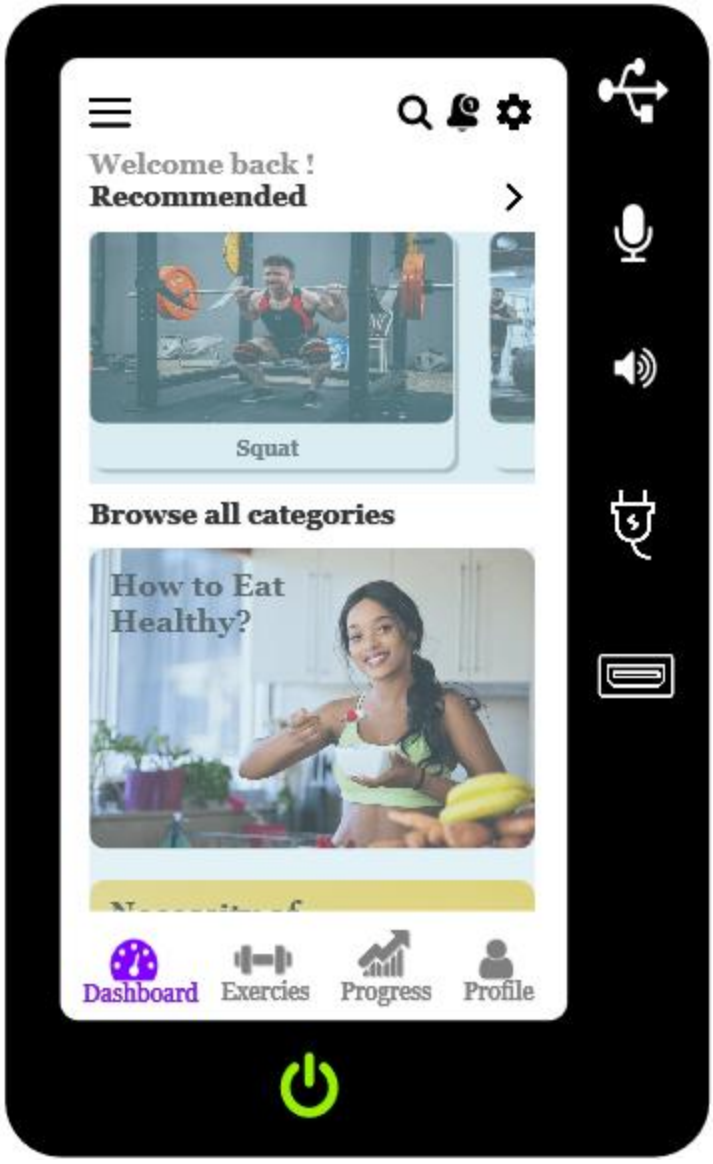

Figure 41: High-Fidelity Prototype: Dashboard Page

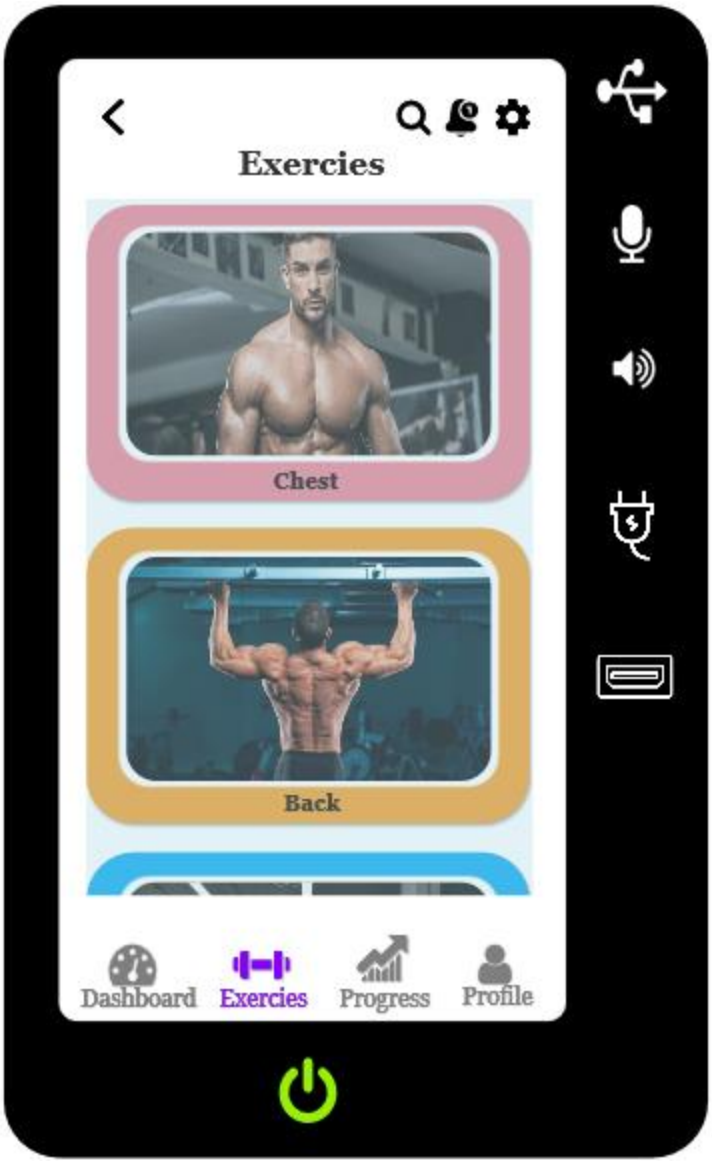

Figure 42: High-Fidelity Prototype: Exercises Page

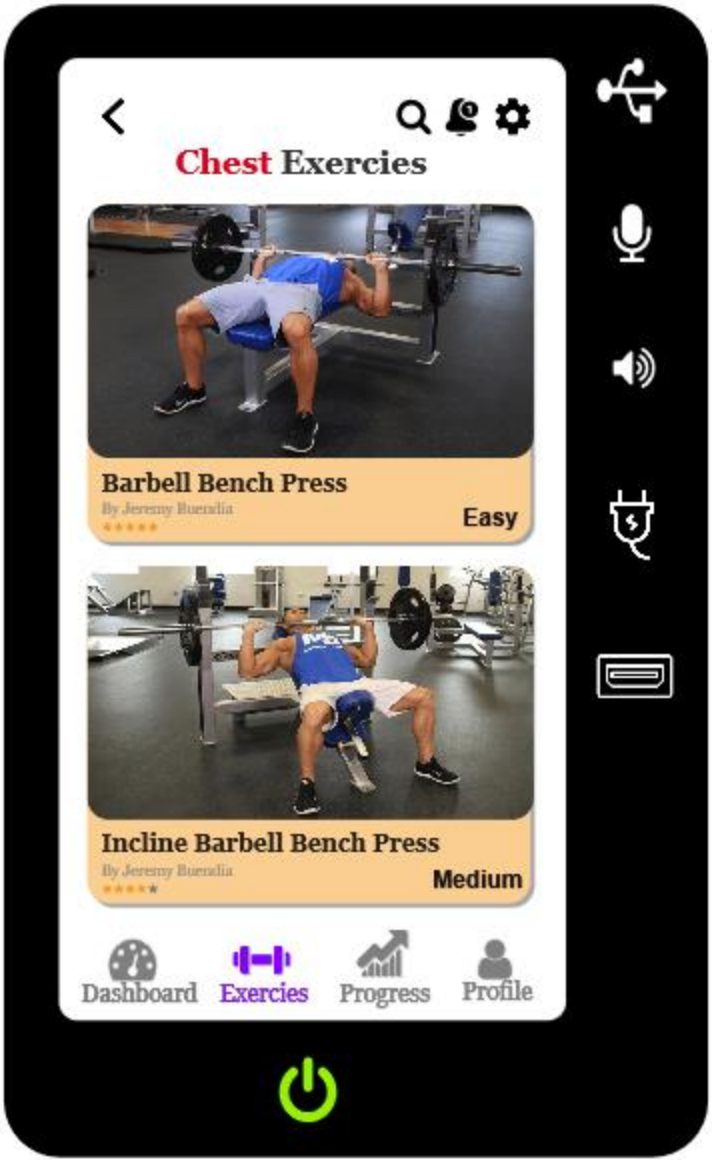

Figure 43: High-Fidelity Prototype: Select Exercise Page

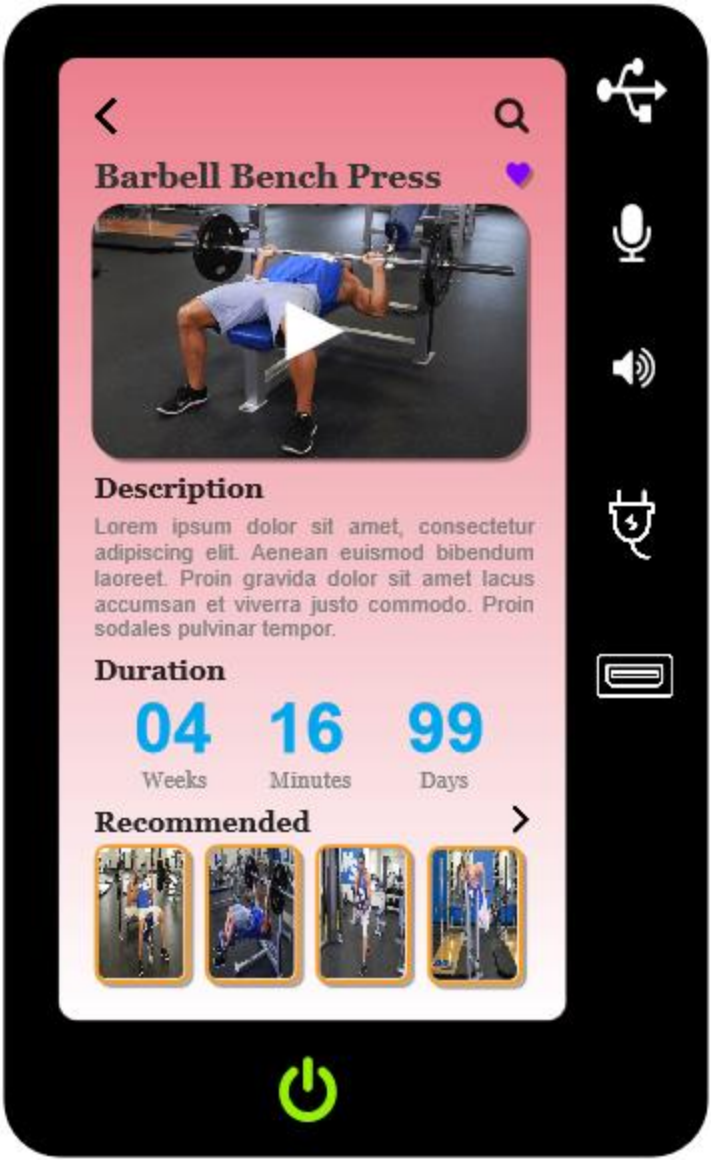

Figure 44: High-Fidelity Prototype: Detail Exercise Page

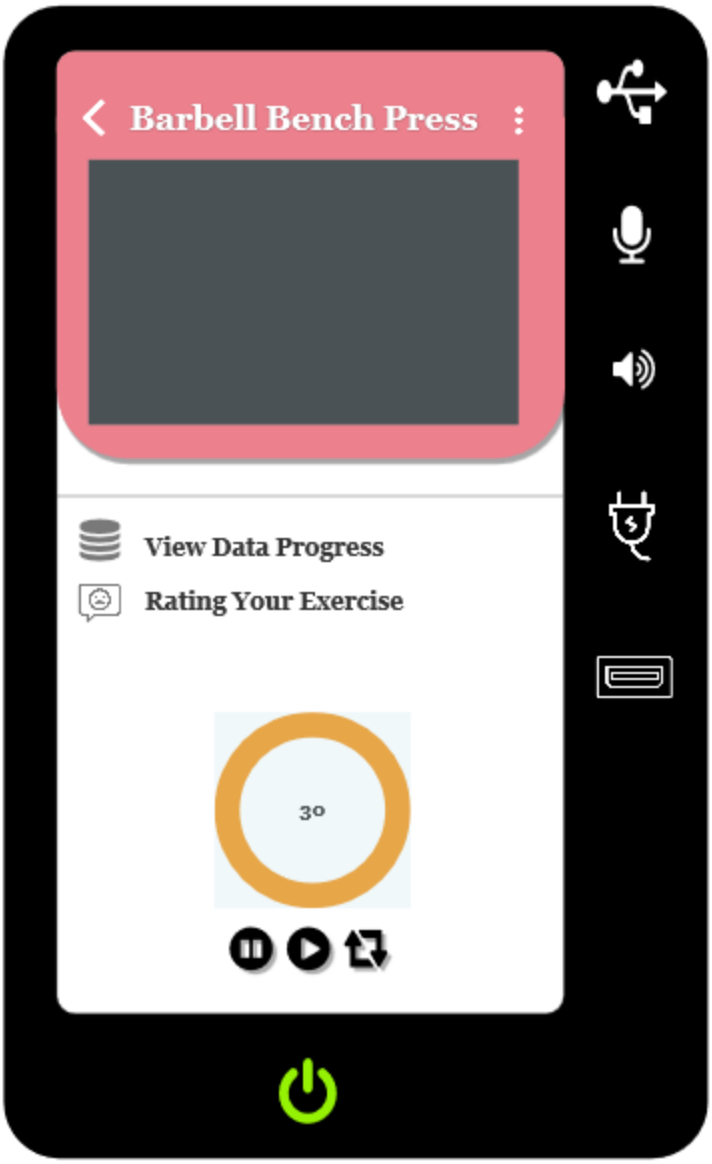

Figure 45: High-Fidelity Prototype: Training Page

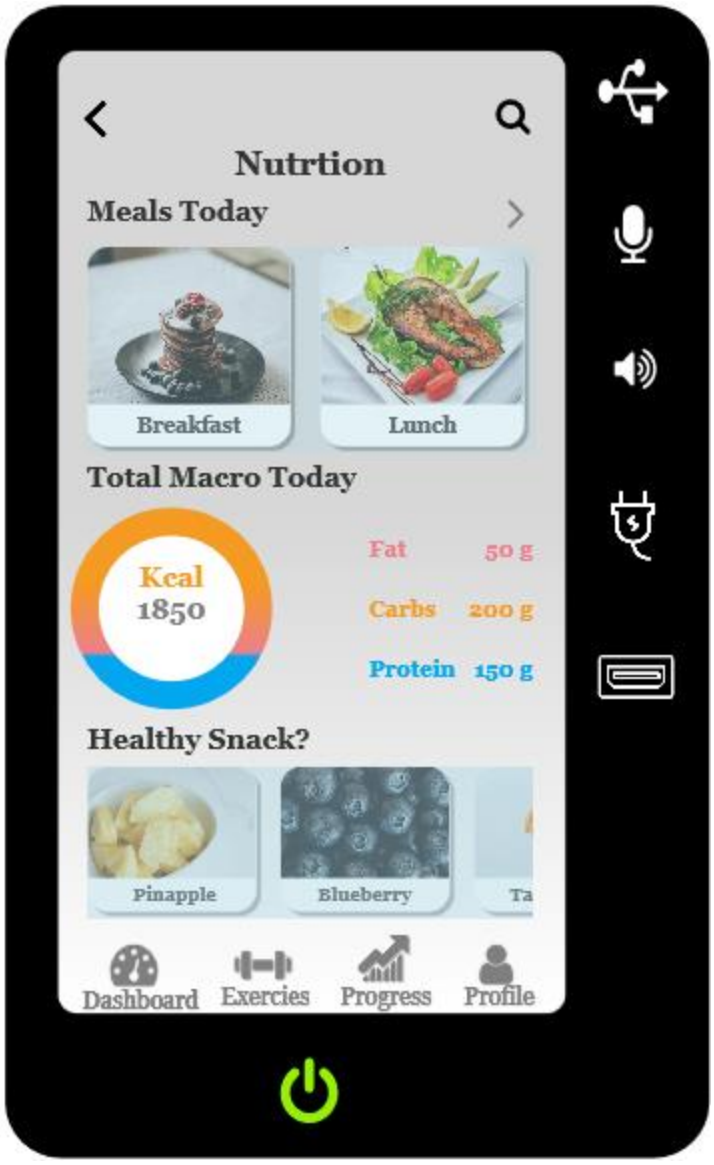

Figure 46: High-Fidelity Prototype: Nutrition Page

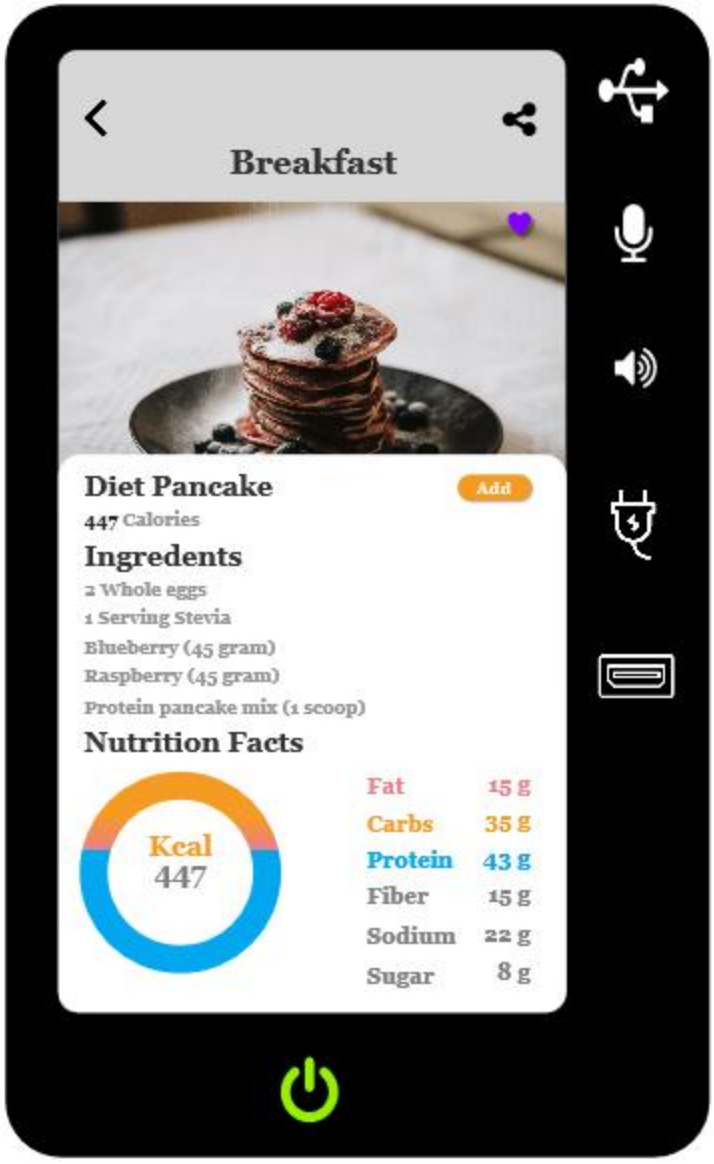

Figure 47: High-Fidelity Prototype: Detail Nutrition Page

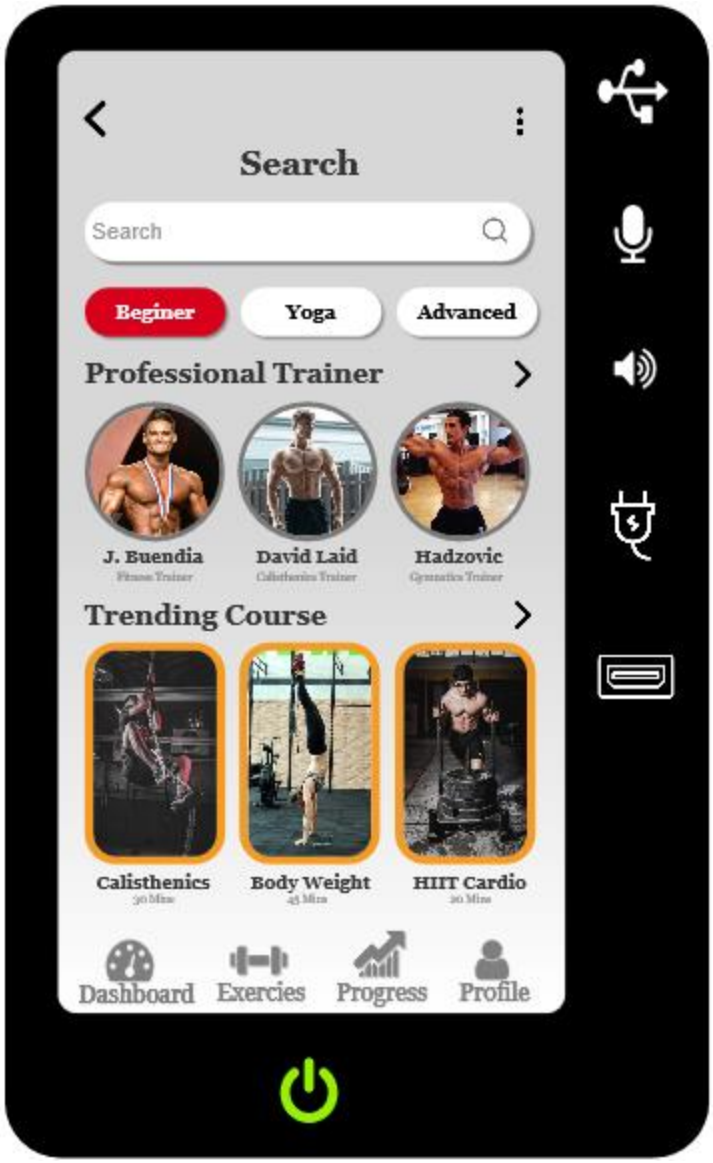

Figure 48: High-Fidelity Prototype: Search Page

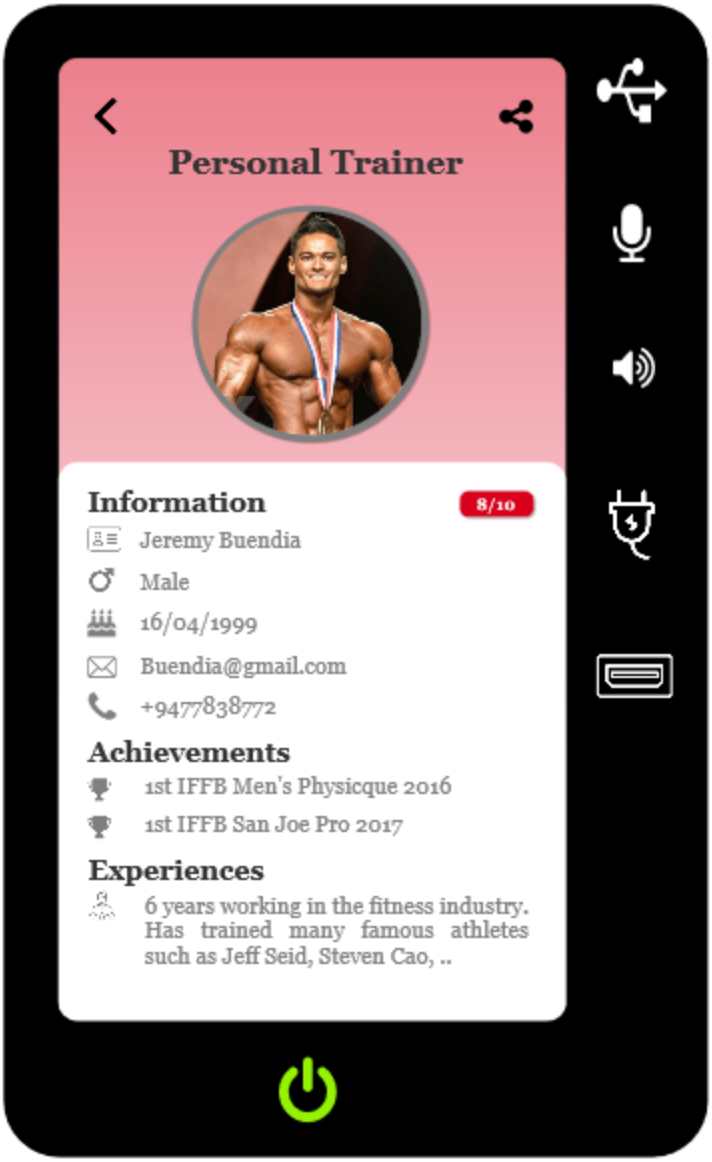

Figure 49: High-Fidelity Prototype: Information Trainer Page

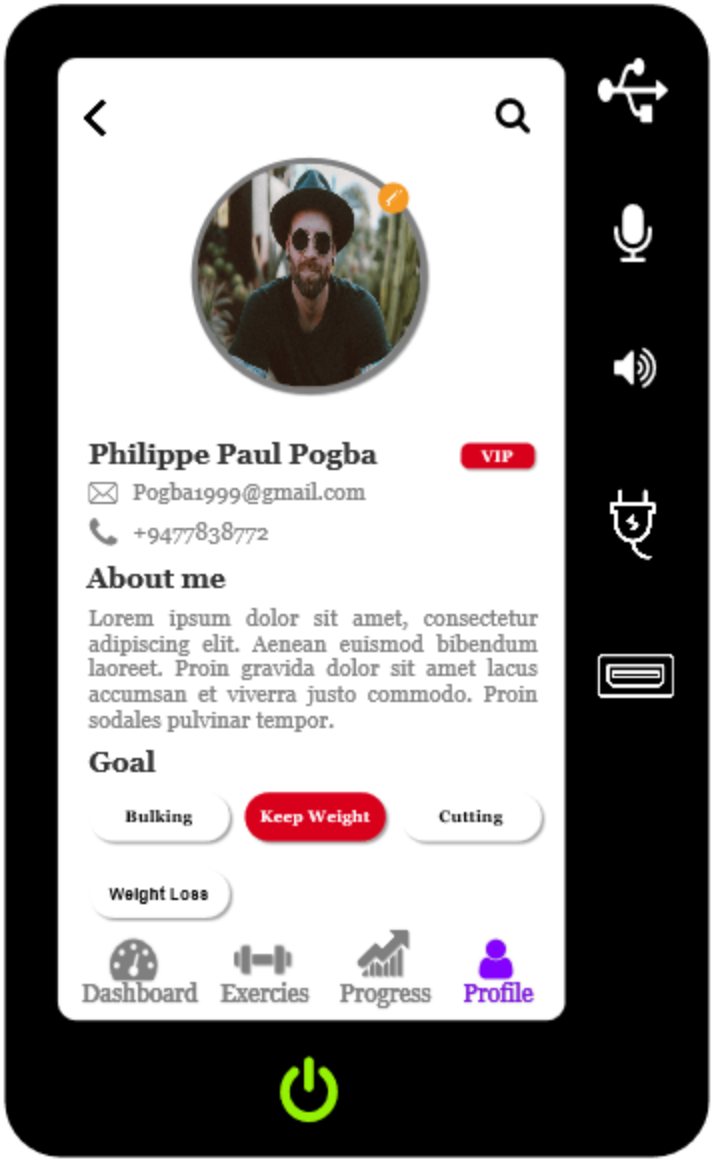

Figure 50: High-Fidelity Prototype: Profile Page

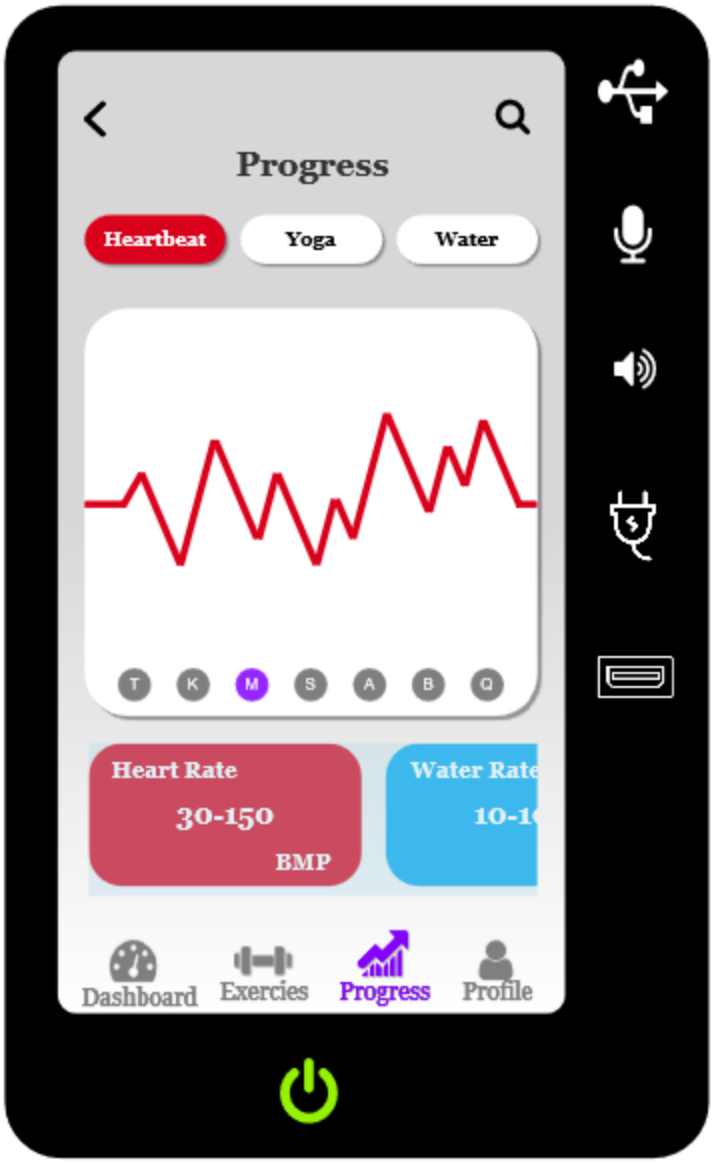

Figure 51: High-Fidelity Prototype: Progress Page

5.8. Moodboard

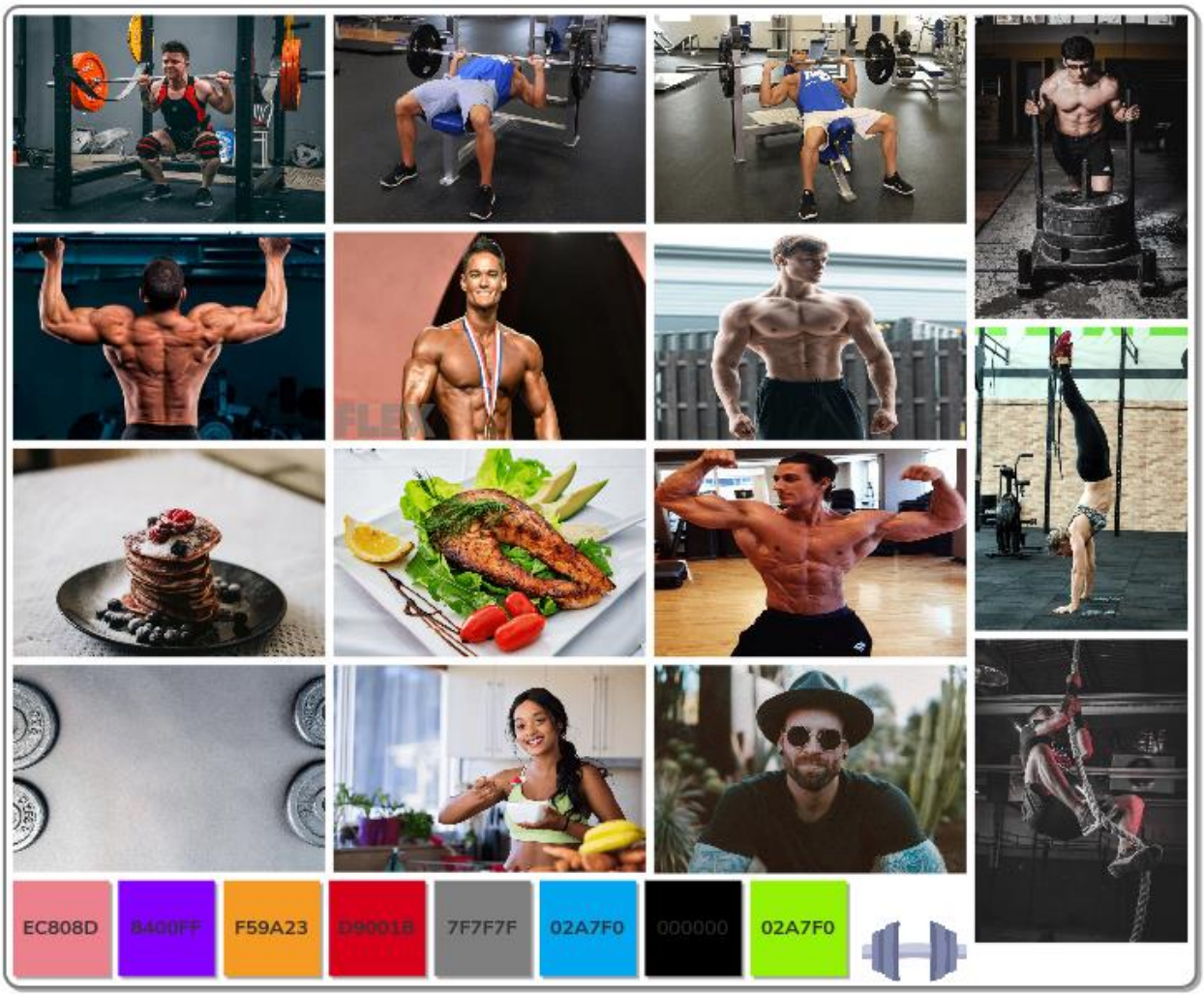

Figure 52: Moodboard For High-Fidelity Prototype

6. Evaluation

According to the 5th edition of 2019's book entitled “Beyond Human-Computer Interaction” Chapter 14 on page 496, evaluation focuses on both the usability of the system (that is, how easy it is to learn and to use) and on the users’ experiences when interacting with it (for example, how satisfying, enjoyable, or motivating the interaction is).

6.1. Types of Evaluation

Depending on the installation, user participation, and control level, evaluation includes the following three types:

- **Natural settings involving users:** To determine how a product will be used in the real world, with little or no control over user activities.
- **Controlled settings directly involving users:** In order to measure or observe certain behaviors and test hypotheses, human activities must be clearly controlled. Experiments and usability testing are the main methods to be executed.
- **Any settings not directly involving users:** In order to identify the most obvious usability problems, researchers and consultants criticize, predict, and model aspects of the interface. The range of methods includes walk-throughs, inspections, models, heuristics, and analytics.

6.2. Heuristic Evaluation

Based on Mr. Jacob Nielsen's definition of Heuristic Evaluation on November 1, 1994, Heuristic Evaluation is the activity of surveying and evaluating the compliance of an interface with a recognized, by a small team comprising user interface design experts. (Jacob Nielsen, 1994)

The original set of heuristics for HCI evaluation were empirically derived from the analysis of 249 usability problems (Nielsen, 1994b); a revised version of these heuristics follows (Nielsen, 2014: useit.com):

- **Visibility of System Status**

Always keep users informed about what's going on, by providing appropriate feedback in a reasonable time.

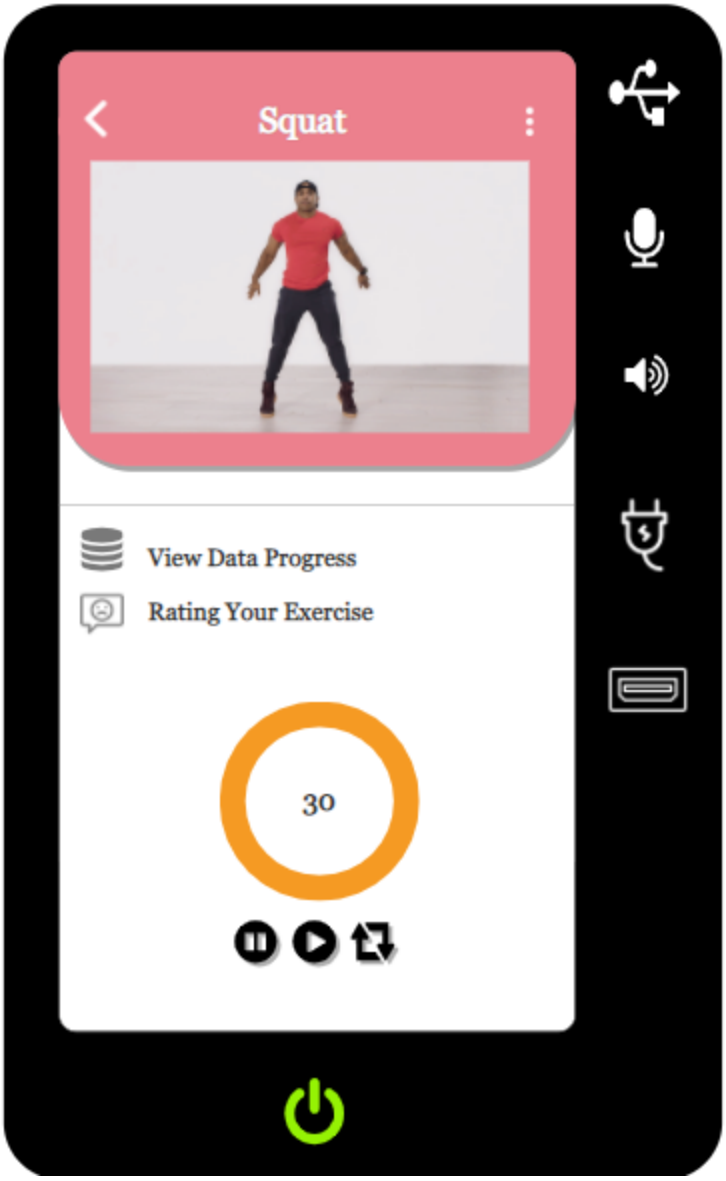

Figure 53: Example for Visibility of System Status

As you can see Figure 53, we have 3 main functions including start, stop and reset exercises. These 3 functions represent the 3 statuses corresponding to the training instruction GiF attached inside the display. The system must always inform or provide users with what is going on. Specifically, when the user presses the button (in the middle), the screen will return GiF in dynamic form and countdown start time (30s or less). When the user presses the button (on the left), the GiF in dynamic form will be stopped and time also stops. If the user presses the

button  (on the right), a black screen will appear and the time will be reset to 30 seconds. Therefore, the user will easily visualize the visibility of system status inside product.

- **Match Between System and the Real World**

Speak in the language of the user, using words, phrases and concepts that are familiar to the user, not the words of the system.

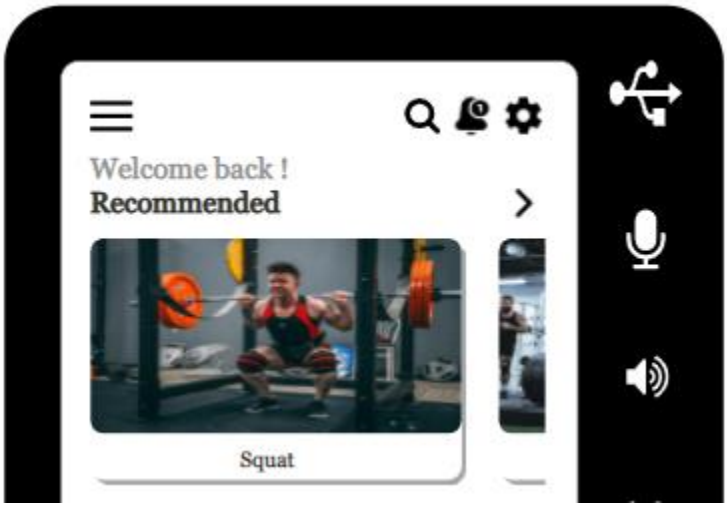

Figure 54: Example for Match Between System and the Real World

As you can see Figure 54, I used the phrase "Welcome back!". After the user successfully logged in, the system will return to the Dashboard screen. Inside the Dashboard screen, the phrase "Welcome back!" is designed at the top, it's the same way we welcome someone back. And I have applied it in product design. Aims to create a sense of closeness to users when they start and return to using the product.

- **User Control and Freedom**

Provides a variety of ways to allow users to easily escape from unwanted places by clearly showing 'Leaving' (Exit).

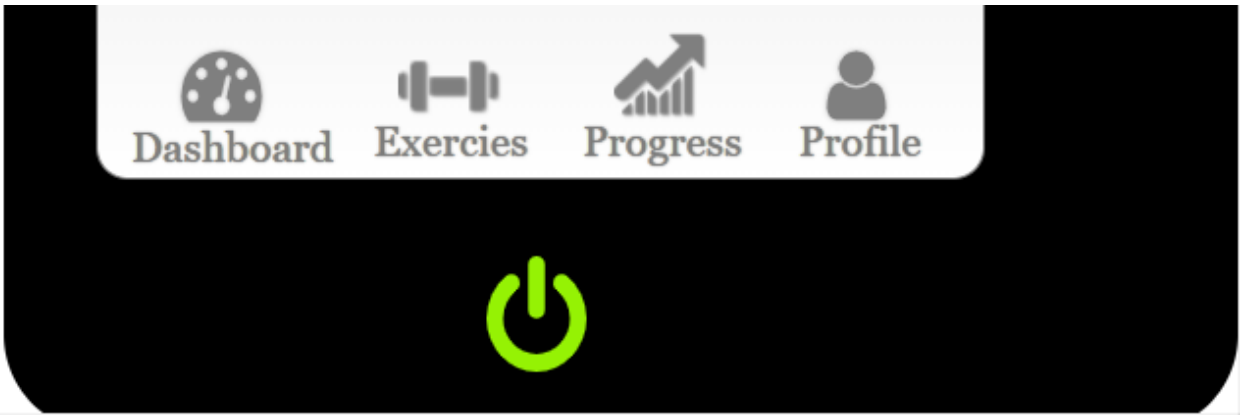

Figure 55: Example for User Control and Freedom

As you can see Figure 55, I have implemented and designed key functions in the product. When the user clicks on these functions, it will immediately return to the desired screen. Ensuring the user is easy to manipulate, instead of having to go back step by step, it will take time, causing boring and troublesome for the user.

- **Consistency and Standards**

Avoid making users wonder if different words, situations, or actions mean the same?

Figure 56: Example for Consistency and Standards

As you can see Figure 56, these are the functional interfaces of icons. I used the same colors of the icons as in the picture in the whole product. Their colors should be the same on all other pages within the product. The asynchronous and uniform design can cause confusion for users. More serious may cause discomfort for the user experience.

- **Error Prevention**

Prevent errors at first if possible.

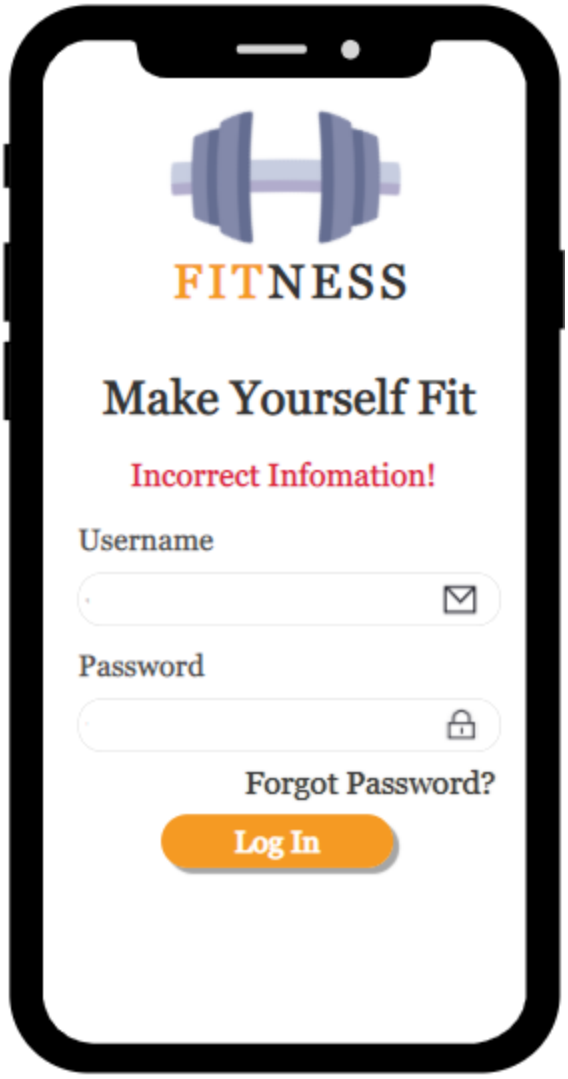

Figure 57: Example for Error Prevention

As you can see Figure 57, , during login process, when the user enters incorrect information including username and password. The system will display a message with the phrase "Incorrect Information!" to report errors to users.

- **Recognition Rather Than Recall**

Make objects, actions, and options clearly visible.

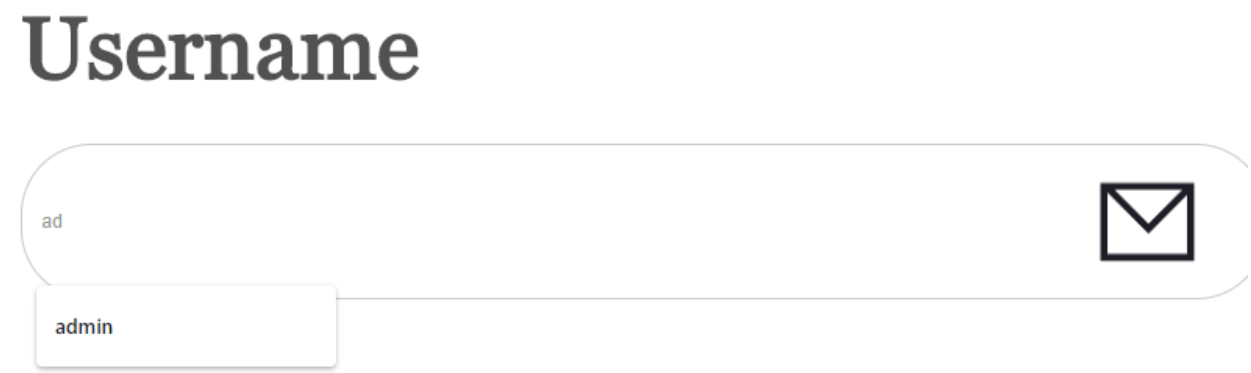

Figure 58: Example for Recognition Rather Than Recall

As you can see Figure 58, when the user starts entering the character "ad" in the username box it will show the user a username hint that also begins with the letter "ad". So when needed, remind users again of such information, they will feel extremely grateful and feel the product understands them very well, necessary at the moment of need.

- **Flexibility and Efficiency of Use**

Providing quick features [for example, keyboard shortcuts], these features are invisible to novice users, but allow experienced users to perform tasks more quickly.

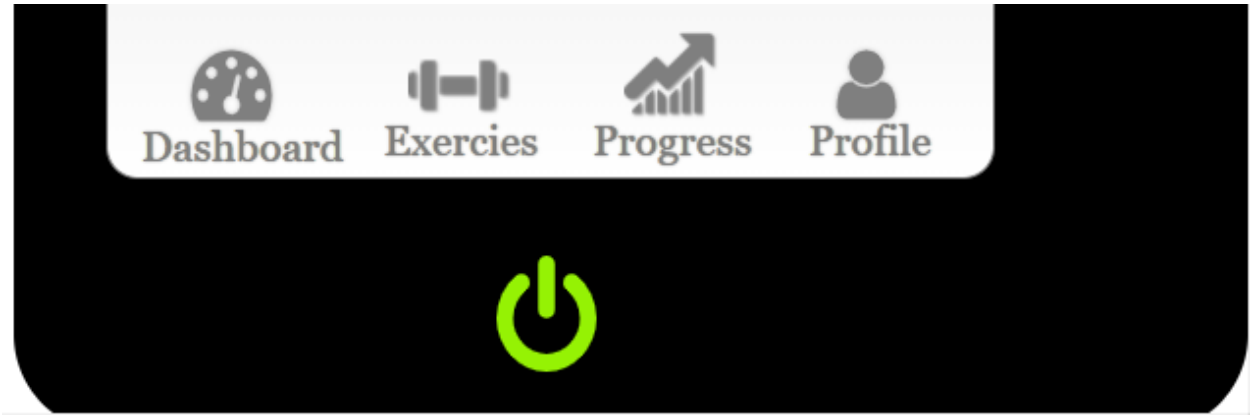

Figure 59: Example for Flexibility and Efficiency of Use

As you can see Figure 59, I have designed and implemented these 4 main functions almost entirely inside the product, supporting the user to manipulate quickly and flexibly. When users want to return to that screen quickly, what they need to do is simply click on the icons as shown in the picture and it will return the desired screen to the user..

- **Aesthetic and Minimalist Design**

Avoid using irrelevant or unnecessary information.

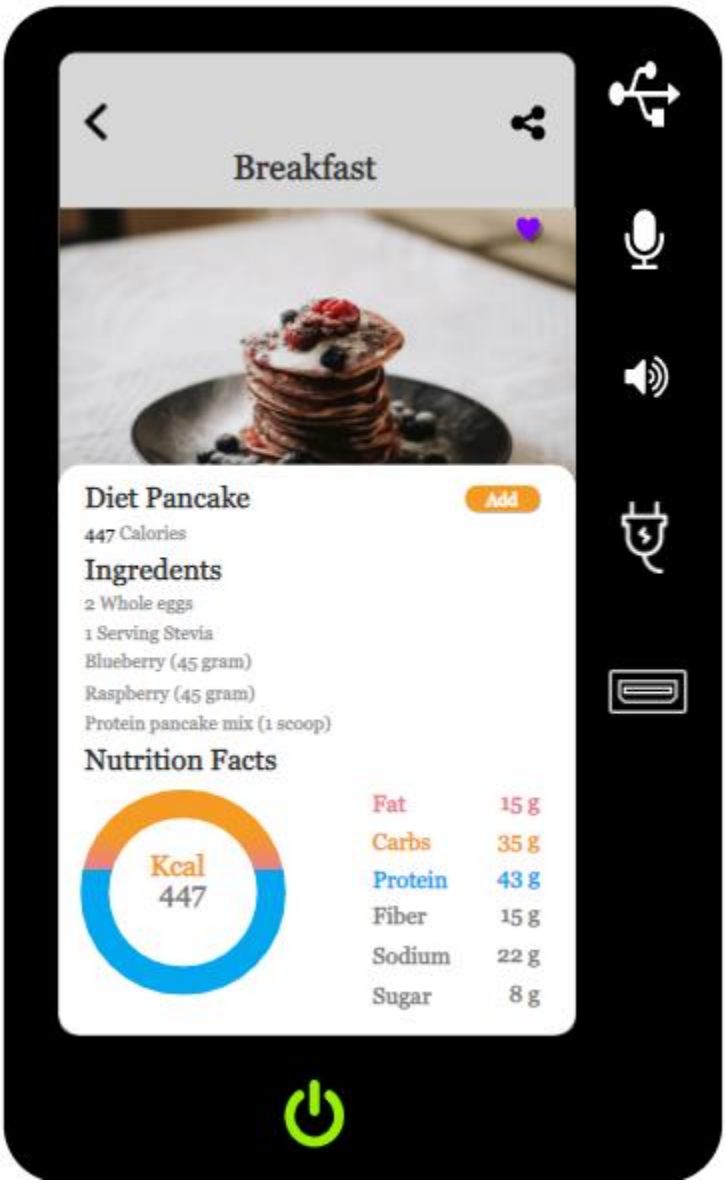

Figure 60: Example for Aesthetic and Minimalist Design

As you can see Figure 60, this is a screen where the nutrition details of the user are stored. For example, when a user clicks to see the nutrition of a breakfast, just need to provide them the necessary information about the breakfast such as how many calories, how much macros, image name and the ingredients inside the dish. What is included in the meal. Information must be

optimized, optimize the interface to remove unnecessary content, prioritize important content. Therefore, a product that is aesthetic and optimal makes users appreciate and leave a deep impression on them when using and feel like, love for the next use.

- **Help Users Recognize, Diagnose, and Recover from Errors**

Use simple language to describe the nature of the problem and suggest a way to solve it.

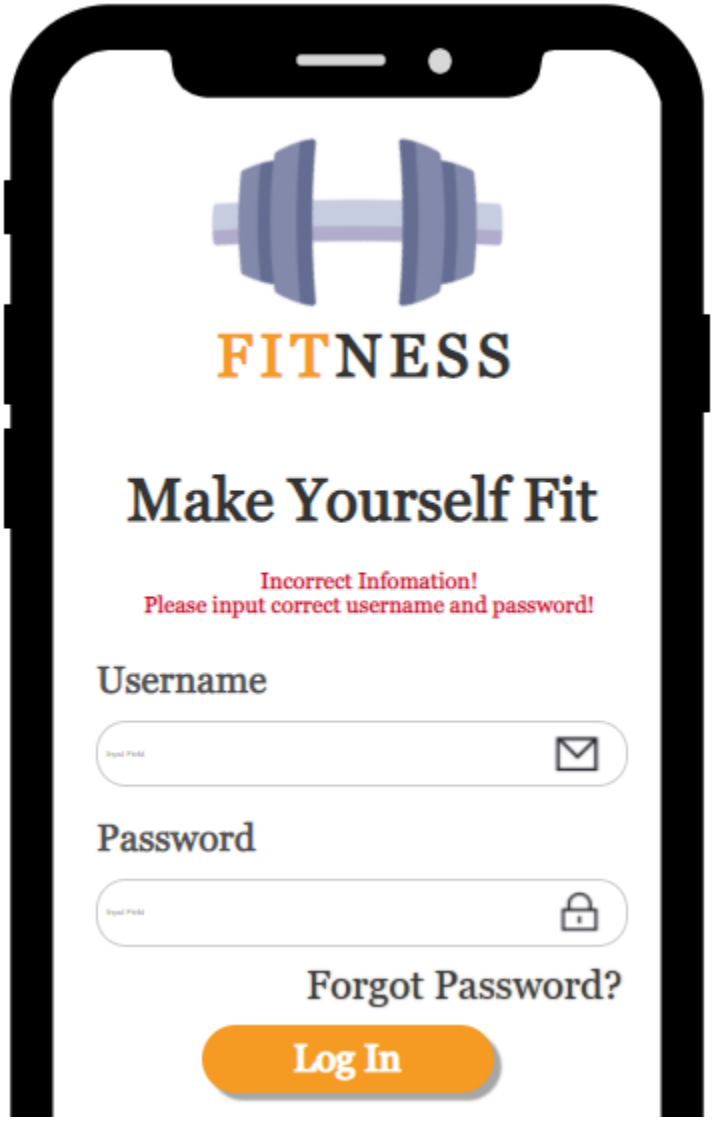

Figure 61: Example for Help Users Recognize, Diagnose, and Recover from Errors

As you can see Figure 61, during login to the system, if the user enters incorrect information, either username or password. The system will show the user the following message: “Incorrect

Information! Please input correct username and password! ”. This message will help the user understand and clearly that they have entered the wrong username or password. And all they need to do is enter the correct username and password.

- **Help and Documentation**

Provides information that is easily searchable and provides complete help.

Conclusion

After finishing this course, I have an overview about Human Computer Interaction Design. I also know and understand how the procedures and processes more clearly to develop and design a product to be implemented. All the theories about rules on Interaction Design can be applied to reality in product design. More importantly, my skill about Axure has been improved. Besides, I also encountered some problems and limitations at work. Such as not understood clearly about requirements assigned in coursework (detail specification) about how to interact between mobile application and screen wall display. Leading to develop product slowly. If the project would be developed further in the future, I will proceed and further develop the Scan Body function and integrate more AI-oriented user audio recognition.

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