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User Centered Scenario Based Approach for Designing Mobile Interfaces for Mild Anxiety and Depression Intervention

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15 December, 2020

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Abstract

Anxiety disorders affect millions of adults, especially 18- to 24-year-olds, in the United States every year. Waiting time and psychiatrist shortage are barriers to receiving mental health treatment. The situation is even worse under the pandemic. To address this concern, we developed an online therapy and counseling application called Psy Space. Currently, it is aimed at Penn State Chinese international students and designed for iOS devices. In this paper, we focused on the interface design of this application. In the pilot study, we conducted semi-structure interviews with seven potential users to understand Penn State Chinese international students' current practice of mitigating anxiety and depression, challenges of campus counseling system, and their concerns or suggestions about the application development. Then, we described the users' behavior in scenarios to explore the potential functionality and feasibility of the application. Based on the analysis of interviews and scenarios, we proposed application requirements and embedded them into application design. We presented the user interface sketches with storyboard and computer prototype with Adobe XD, and introduced the main functions in detail. The limitations of this work were also described.

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1   Introduction

According to the statistics from the Anxiety and Depression Association of America, anxiety disorders are the most common mental illness in the United States. They affect 40 million adults age 18 and older, or 18.1% of the population every year. Although anxiety disorders are highly treatable, only 36.9% of those suffering receive treatment. The situation is even worse under the pandemic. *The New York Times* reported that 18- to 24-year-old had the highest levels of anxiety and depressive symptoms in the new C.D.C. survey, and a quarter of them said they had seriously considered suicide.

Waiting time (Goldner, Jones, & Fang, 2011) and psychiatrist shortage (Huff, 2018) are barriers to receiving mental health treatment. Internet-delivered therapy and counseling are promising to address these challenges. Prior research indicated that Internet-delivered therapy could be considered as an alternative treatment to standard face-to-face cognitive therapy with the same level of efficiency (Marks et al., 2003; Andersson et al., 2005; Wright et al., 2005).

To mitigate mild depression and anxiety of college students, we developed a online therapy and counseling application called Psy Space. Currently, the app is aimed at Penn State college students and designed for iOS devices. Compared with counseling systems that solve long term mental distress, Psy Space focus on short term mental stress. In some cases, the users will have temporary mental issues that may not be addressed appropriately because of waiting time and lack of psychiatrist in the college counseling system. To ameliorate this problem, Psy Space recruits strictly-trained volunteers and connects with professional psychological counselors to provide counseling for users. We expect that users can find help via Psy Space even out of the regular service hours of the counseling office.

In this paper, we focused on the interface design of Psy Space. First, we conducted semi-structured interviews with seven potential users. The findings of the interviews were categorized into three themes, including current practice of mitigating depression and anxiety, challenges of campus counseling system, and the participants' concerns or suggestions about Psy Space. Second, we derived scenarios to describe the users' behaviors. By identifying actors in those scenarios and their interaction with the application, we explored the potential functionality and feasibility of the application. Based on the analysis of interviews and scenarios, we propose application requirements and embedded them into application development. Third, we designed and described the interface prototype that met the application requirements and the system functionalities. We presented the user interface sketches with storyboard and computer prototype with Adobe XD. The main functions of the application were introduced in detail. Moreover, we presented the limitations of this work.

2   Literature Review

2.1   Low-Fidelity Prototyping

Prototyping refers to the development of partial and/or tentative implementations of a system design. Its key motivation is to analyze and assess design without first incurring the costs and the work of fully implementing the designs. This concern has encouraged the development of a wide range of low-fidelity prototyping methods, such as paper

prototyping (Snyder, 2003), where the layout and key interactions of a user interface are mocked up with bits of paper; Wizard of Oz performative prototyping (Carroll & Aaronson, 1988), where a (concealed) human plays the part of an intelligent agent or other interactive capability; storyboard prototyping (Andriole, 1989), where a graphic organizer displayed in sequence for pre-visualizing user interface; and scenario-based prototyping (Rosson & Carroll, 2009), where scenarios are constructed to describe how people will use a system to accomplish work tasks and other activities.

One strength of low-fidelity prototypes is that they can be implemented relatively quickly and inexpensively to help designers reflect more concretely on a design, or even to evoke user experiences and reactions to the design. A potential downside of low-fidelity prototyping is that the prototype may be too crude to evoke experiences in designers and potential users that are useful in assessing and further developing the design. For example, one would not want to use a low-fidelity prototype to investigate temporal parameters for rapid input-output interactions. However, low-fidelity methods have a wide range of fundamental application and user interface issues (Virzi, Sokolov, & Karis, 1996; Chandler, Lo, & Sinha, 2002; Sauer, Seibel, & Rüttinger, 2010). In this work, we used storyboard prototyping to identify the tasks that the user interface is going to support. Furthermore, we used scenario-based prototyping to simulate how people will use the system and derived requirements to address potential problem.

2.2   Internet-Delivered Therapy and Counseling

Psychology researchers have conducted various study to test the feasibility and efficiency of internet-delivered therapy. Prior work pointed out that Internet-delivered therapy could be considered as a complement or treatment alternative for mild-to-moderate depression (Marks et al., 2003; Andersson et al., 2005). Wright et al. (2005) indicated that Internet-delivered cognitive therapy with reduced therapist contact was as efficacious as standard cognitive therapy. Internet-delivered therapy had the advantages of decreasing costs and improving access to cognitive therapy for depression. More specifically, Johnston et al. (2014) validated the efficacy and acceptability of Internet-delivered treatment, aiming for young adults aged 18–24 with symptoms of depression and anxiety.

Applications and systems have been developed to deliver Internet-based therapy and counseling. Mohr et al. (2017) introduced IntelliCare, which is a suite of skills-focused phone apps for reducing symptoms of depression and anxiety. Anand, Bein, Andro-Vasko, and Bein (2020) developed online therapy and Web counseling app called SpeakOut. Users can share problems or thoughts with trained listeners and professional therapists on this platform. Similar services are also available on 7 Cups, Sibly, Youper, and Wysa. However, some of these applications are commercially available, psychoeducational-tracked, untrained or simply-trained volunteers involved, and focus on solving long term mental distress. In this work, we focused on the interface design of a free, strictly-trained volunteers and counselors involved online therapy app, which aims to mitigate the short-term mild depression of 18 to 24 year old college students.

Table 1: Participants' demographic information.

ID	Gender	Age	Nation-ality	What will make you depressed or anxious?	Who do you talk to (when you are depressed or anxious)?	Will you use Psy Space?
P1	F	21 (undergrad)	CHN	Too much unfinished or uncertain work.	Friends or families.	It depends. Concerning privacy issues.
P2	M	19 (undergrad)	CHN	Uncertainty.	N/A	Yes. Will use it frequently.
P3	F	21 (undergrad)	CHN	N/A	Friends or strangers.	Probably.
P4	F	21 (undergrad)	CHN	Too much homework due.	Friends.	N/A
P5	F	20 (undergrad)	CHN	Too many courses.	N/A	No.
P6	F	21 (undergrad)	CHN	N/A	Roommates or close friends.	It depends. Concerning the anonymity.
P7	M	20 (undergrad)	CHN	Things beyond control.	Close friends or Penn State Counseling and Psychological Services.	Yes.

3 Pilot Study

In the pilot study, we conducted semi-structured interviews with seven participants. The purpose of the interviews was to understand how current Penn State college students mitigate the mild depression or anxiety, and whether they would like to use Psy Space according to our description of its main functions. In this section, we will present the method and results of the pilot study, and the application requirements derived from the analysis.

3.1 Method

We will introduce the information of participants, materials, design and procedure.

3.1.1 Participants

We conducted interviews with seven Penn State college students (aged 19-21). The demographic information of the participants can be found in Table 1.

3.1.2 Materials

The equipment used in the interviews was iPhone X. We used Recorder, a built-in application in iOS system, to record all the interviews.

3.1.3 Design and Procedure

We conducted semi-structured interviews with seven participants. In the interviews, we first indicated the purpose, participant's rights, and the strategy of protecting data privacy to the participant. All interviews were conducted face-to-face and recorded after consent.

In the interviews, we first asked questions about when the participants would feel stressful or anxious and what they would do to reduce the feeling. If the participants had experience in psychology counseling on campus, we would ask follow-up questions to identify their current practice of psychology counseling and the challenges they had during the experience. After describing the main functions of Psy Space, we asked the participants whether they would use such online counseling app, and what concerns or suggestions they had about the app.

3.2 Results

Five of these interviews lasted for six to twelve minutes depending on the participants' answers. Another two interviews lasted for twenty minutes because of extra suggestions about app development or follow-up questions about the participant's experience in psychology counseling.

All interviews were transcribed and coded by the researchers. We identified three themes based on the analysis of the interview data, including current practice of mitigating depression and anxiety, challenges of campus counseling system, and concerns and suggestions about Psy Space.

3.2.1 Current Practice of Mitigating Depression and Anxiety

Three participants (P1, P2, P4) indicated that distracting themselves from the depression or anxiety was a temporary solution. They mentioned that sleeping, watching videos, or playing computer games were effective ways to distract themselves.

Five participants (P1, P3, P4, P6, P7) tended to talk to their friends when they were depressed or anxious. P3 would talk to friends if it would not affect them because she was careful about others' feelings. She would rather talk to strangers about things that also make others feel depressed or anxious.

> "Because he/she [the stranger] is not my friend, I don't need to care if he/she would be in a bad mood after listening to me. The only thing I need to do is venting my frustrations."

P6 also cared about others' feelings. She liked talking with roommates or friends face to face because of their real reaction and immediate feedback.

> "I know better about my roommate's daily life, their reaction. For example, if I say something, I can immediately read from their faces if they understand it, or if they feel they don't want to hear too much."

Two participants (P2, P5) indicated that they would not talk with anybody when they were depressed. P2 might not talk to others because she was shy. Moreover, her depression and anxiety came from uncertainty. She believed that she could figure out the ways to solve the uncertain things by herself.

> "I don't like to share because... I feel a little bit embarrassed, or I don't know how to say it. I think it might be a small thing and other people can't help much. I can think of solutions by myself."

P5 was reluctant to talk with others about her anxiety. She had negative feedback about therapy and counseling because of previous bad experience.

> "I have met an unprofessional therapist. During the counseling, he was busy with his own stuff and even chatted with others over phone. That was ridiculous and unprofessional."

3.2.2 Challenges of Campus Counseling System

One participant (P7) had experience in psychology counseling on campus. We asked follow-up questions about his experience and the problems he encountered during the counseling.

P7 mentioned that the current psychology counseling service is only available at a particular time. If a request is sent out of the service hour, the user can leave a message and wait for the reply.

> "And apparently, they are only open from Monday to Friday from 9am to 5pm. So, when I reached them out of the service hour, they asked me to leave a message. And about two days later, like a Tuesday, they called me back and asked me what I need."

P7 indicated one challenge of the current system was that the waiting time was too long. In most cases, students needed to wait for about one month to see a psychologist or consultant after making an appointment.

> "So, it took them two weeks to get me into the appointment system. And I was pretty lucky because ... usually it takes us students more than three weeks or even like one month and a half to get into the appointment system and then finally be able to see a psychologist or consultant to help them with the problem."

Lack of psychiatrists is another challenge in the current system. This problem is particularly severe during the pandemic when more students have mental chaos and require psychology counseling but only a small number of psychiatrists are available to help them.

> "So, pick a place like State College, we will have less number of psychologists available to help the patients so there is a gap between the patient number. Right now during the pandemic, a lot of students are having mental chaos ... and there are not so many psychiatrists available to help them."

P7 believed that online therapy sites could ameliorate the challenges of long waiting time and lack of psychiatrists. Moreover, online therapy sites can provide immediate assistance when students having suicidal or self-harm thoughts before it is too late.

> "If students have suicidal thoughts or self-harm thoughts, sometimes the system cannot help them. So I feel like online therapy site being a useful platform for students to fix this gap between the lack of psychiatrists and the actual stress as students have."

Based on the analysis, we found that Psy Space is promising to ameliorate the challenges of long waiting time and lack of psychiatrists in Penn State's psychology counseling system. As one type of online therapies, Psy Space is as efficacious as, and even more cost-efficient and accessible than standard cognitive therapy for depression (Wright et al., 2005). We can conclude that Psy Space is an emerging but powerful online psychology platform for Penn State students to solve the mild depression and anxiety issues.

3.2.3   Concerns and Suggestions

P1 mentioned that anxiety might derive from being busy. For those users, they don't have time, or they might be unwilling to spend time counseling via Psy Space.

> "If I am anxious because of busy. I don't have time to use Psy Space."

P1 indicated that she would consult with a specific therapist or volunteer if she would use Psy Space for multiple times. Anxiety might come from a series of consecutive things. Thus, she would rather talk with a therapist or volunteer who is familiar with her background than repeating issues to someone that she never met before.

> "If I talk to another therapist or volunteer, I must introduce my background once again.

Two participants (P1, P2) believed that it was more efficient and effective to talk with therapist in a specific area of expertise if they had problem in that area. Thus, it was necessary for users to find therapists in different areas of expertise on Psy Space.

> P2: "I think one-on-one therapist must be someone in area of expertise. Unlike AI chatbots that answer my questions mechanically, professional therapists are more friendly. I feel like they are really helping me... I think I can believe them because they are professional."

Two participants (P2, P3) believed that therapists and volunteers are strangers even if they are professional. They were concerned about whether therapists and volunteers could care about users and whether they could provide useful suggestions from the users' perspectives.

> P2: "I don't trust strangers very much. I will consider whether they can care about me or think about solutions from my perspective."
> P3: "If it is something very personal, I feel that others may not want to listen too much, or they cannot give me any useful advice."

Two participants (P2, P3) expressed their concerns about the "Community". They believed that users are more likely to post frustrating stories when they are depressed or anxious, which will have negative effect on other users. Moreover, it was unlikely to receive potential solutions or useful suggestions from other users.

> P2: "I don't think other users are able to provide suggestions for me because, like me, they are also depressed and need help from others."
> P3: "I want to find solutions or suggestion via Psy Space when I am in a bad mood. I don't think I would like to see someone else who are also depressed and read their stories. Another thing is that I don't think I will use the app and give others suggestions when I am in a good mood."

Three participants (P1, P2, P6) emphasized the importance of protecting the users' privacy. Their first concern was about privacy issues and anonymity.

> P2: *"I will believe my privacy is protected, if there are sentences indicating that before counseling."*
>
> P6: *"My first concern was about privacy protection. How anonymous is it?"*

3.3 Application Requirements

Based on the results of pilot study, we identified several application requirements. First, the app must protect the users' privacy and guarantee anonymity. Second, the app needs to skip unnecessary processes to avoid information overload and shorten time. Third, users can only read posts from volunteers but not other users. It can avoid negative emotions passing among users. Forth, posts will be reviewed by the administrator to prevent improper content. Last but not least, it is significant that users can reach out to therapists in different areas of expertise via Psy Space.

4 Scenarios

4.1 Scenarios of Current Practices

Scenarios are made up to describe how people will use a system to accomplish work tasks. Based on the information we gained from our interview about expectations of the app by potential users, we started to write up scenarios describing the user's behaviors. In our scenarios, we defined two potential users who are Penn State students (Table 2). By identifying actors in those scenarios and their interaction with the application, we analyzed and discussed the potential functionality and feasibility of the application, which sets the stage for the design of our application interface.

4.1.1 Scenarios Transformation

From the analysis in Table 2, Table 3, and Table 4, we identified a mobile application aimed to provide a virtual community with one-on-one counseling services that can reduce stress and anxiety of students at Penn State.

Based on the described activity scenarios we discussed and identified the most important design claims.

Design claim 1. *By enabling users to share their concerns and accessing the one-on-one counseling services, a virtual community is established for users to reduce their stress and anxiety.* This allows users to communicate and to seek for help whenever there is stress and anxiety.

Design claim 2. *There are some professional psychological articles written by counselors and volunteers for users to better understand themselves.* This allows users to learn about their inner state and to understand psychological reasons behind their moods and actions.

Design claim 3. *The interface should provide users with peace and tranquility. Users should be able to access the service in a short time after they open the app.* The targeted users are people who try to seek some stress/anxiety relief. Therefore, the

Table 2: Actors Involved in the Scenarios as Stakeholders

Actors
1. XiaoZhang is a freshman studying abroad in the United States in the College of Engineering of a university. This is the first time for him to go abroad alone and it is also the first time for him to come to the U.S. The huge cultural difference has caused him to become very introverted. Except for chatting with his Chinese roommates in the dormitory, he seldom communicated with others in English. He tried to immerse himself in the American culture by joining different school clubs and activities, but because he knew very little about the American culture, it was difficult for him to participate in daily conversations.   Day after day, the pressure of both academics and social life made XiaoZhang think about the counseling provided by his school. However, as an introvert, he was too embarrassed to talk face to face with a stranger, and he was afraid of being judged by others for exposing his weaknesses and shortcomings. As a result, XiaoZhang was at an impasse. There was supposed to be a bright future ahead of him, but now he is lost in his lonely life as an international student.
2. XiaoLee is an undergraduate student at an average American university. He has excellent grades but is an introverted boy with low self-esteem. Because he failed the college entrance exam in China, he had no choice but to study abroad. In his heart, studying abroad was only an alternative plan for him, and with the "Eat the Rich" mentality (a slogan used in opposition to income or wealth inequality) of "keyboard warriors" (People who act tough, or put down others over the internet) on the Internet towards international students, he increasingly felt that he was a student who studied abroad because he could not get into a domestic university.   Every day, he would keep a very full schedule, fearing that others would quietly surpass him. Whenever there was nothing to do, XiaoLee would feel an inner emptiness and felt like he was missing something. In terms of achievement, XiaoLee may be suffering from an "achievement addiction". He wants to prove the value and meaning of his life by the things he has accomplished and the great things he has done. Without any psychological guidance, XiaoLee rarely really pays attention to his own thoughts and feelings. He does not accept his shortcomings and always wants to be the perfect person. Despite XiaoLee's academic success, he often feels lost and empty, not knowing what he is really working for.

interface should calm users down and bring them to the services as fast as possible. Long waiting time might make their problems disappear or get worse.

4.1.2 Application Requirements

The proposed scenario of Penn State students set the stage for us to address what were the major requirements of the application. At this stage, we summarized our considerations and discussions we had after discussing and brainstorming after the scenario design. Table 5 explains the detailed reasoning for each requirement.

5 Design Representations

5.1 User Interfaces Sketches

At the beginning phase of our design, our team decided to prototype the interface of the app by sketching a storyboard. Each of our members was assigned to a part of the design. To prepare for the design of our Minimal Viable Product (MVP), we listed all necessary screens: Launch Screen, Register Page, Sign in Page, Create an Account

Table 3: Scenario of Current Practices

Scenarios
1. XiaoZhang adjusted to the life in the United States and looked for resources and one-on-one counseling service.

A week later, XiaoZhang saw a software called Psy Space in the circle of WeChat friends. Out of curiosity, XiaoZhang downloaded the software and registered his account. In the community of Psy Space, he found that there were many international students who, like him, were troubled by not being able to integrate into American culture.

Although the software did not solve XiaoZhang's problem for the time being, he realized that he was not the only one suffering from this problem and felt much less lonely than before. He began to look for relevant resources in the software, and by reading many similar stories of others, XiaoZhang related a lot to his personal experience. Seeing how others solved their problems step by step, XiaoZhang slowly regained some confidence and found the courage to try different ways to assimilate into American culture.

He no longer felt inferior simply because he didn't fit in, because so many others faced the same difficulties. XiaoZhang slowly realized that many American students and international students from other countries are eager to make friends with people from different countries, including himself. And they would not give XiaoZhang a cold shoulder because of cultural differences or introversion. In this way, XiaoZhang gradually adjusted to the life in the United States. Whenever he had some psychological thoughts or difficulties, he would open Psy Space to look for relevant resources or one-on-one counseling service.

2. XiaoLee accepted his imperfections and started his way to self-actualization.

XiaoLee heard his roommate mention an app called Psy Space, which is said to help users better understand their mental state and offers many free resources as well as paid one-on-one counseling services. Knowing that he often felt lost, XiaoLee downloaded the app to give it a try. He learned the term "achievement addiction" while reading articles about it, and felt that he lacked the inner knowledge and that many of his decisions were based on external factors and he was not following his heart.

XiaoLee gradually came to realize what it meant to love himself. He stopped being too hard on himself, picking on his own shortcomings, and comparing himself to others. Instead, he learned to accept his imperfections and explore interesting things other than academics. Slowly, he discovered the beauty of life and became clear about what he wanted to do. He believes that everyone has a different spark, and so does he. He realized that even though he didn't go to a university in China, he had chosen the right path for himself based on the wealth his parents had saved up. At the same time, he became an excellent undergraduate after studying on his own. After climbing Maslow's pyramid of love needs and esteem needs, XiaoLee is now on his way to the top of self-actualization!

Page, Home Page, Posting Page, My Account Page, Counselling Page, Counselor Page, and Volunteer Page.

As Figure 1a and Figure 1b displays, our team sketched pages including the basic structure of the application. Full storyboard sketches are attached in Appendix-A. In the previous section we described the functional and non-functional system requirements of our application design. By combining our interface sketches with those requirements, our team prototyped the application with Adobe XD.

5.2 Computer Prototype

Adobe XD is a user experience design tool for prototyping web applications and mobile applications. By using this tool, our team designed the prototype of Psy Space fulfilling requirements mentioned earlier.

As Figure 2a displays, there are four items in the tab bar of Psy Space which

Table 4: Claims for the Scenarios of Current Practices

Claims	
Situation features	**Pros (+) and Cons (-)**
In the community of Psy Space, he found that there were many international students who, like him, were troubled by not being able to integrate into the American culture. Whenever he had some psychological thoughts or difficulties, he would open Psy Space to look for relevant resources or one-on-one counseling service.	+ There is a virtual community for students to communicate their worries in their lives + There are resources for students to read to reduce their (mild) psychological thoughts and difficulties + There are one-on-one counseling services for students to gain help - The content of the community is largely influenced by users, some negative emotions might be passed among users - By communicating with others, there is potential privacy issues - Counseling services might not have a immediate response
He learned the term "achievement addiction" while reading articles about it, and felt that he lacked the inner knowledge and that many of his decisions were based on external factors and he was not following his heart.	+ There are some professional psychological articles for users to better understand themselves - Users might not be able to find the exact article they are looking for

consist the main functions of the application. Homepage is the page that user will see after they have logged in or signed up. The process of registering and signing in an account will be described in next section. In this section, the main functions will be introduced. Full application prototype screens are attached in Appendix-B.

The Psy Space app consists of four parts: Community, Counselling, Plan, and User. Community and Counselling sections are designed through this semester, while Plan is still in progress.

Community, as shown in both Figure 2a and Figure 2b, the first item in the tab bar, is the part of the system where users, volunteers, and counselors can post content. There are four sub-tabs in Community: Friends, Volunteers, Sharing, and Articles. Under Friends tab, users can view the posts posted by other users they followed. Under Volunteers tab, users can view the posts posted by volunteers in the app. Volunteers are volunteered to participate in the application to help users. They are not as professional as counselors but they are required to have some psychology background to become

Table 5: Functional and Non-Functional System Requirements

Functional requirements	
The application allows the exchange of information among users and between users and therapists/volunteers, guaranteeing anonymity.	By sharing personal experience and information, the community requires users to be anonymous during communication. Violation action should result in penalties such as permanent ban.
The application should avoid negative emotions passing among users, and avoid spam.	The content users post will be reviewed by the administrator. If any improper content is detected, the improper content will be removed.
Environmental and contextual Requirements	
The application could be used in a silent environment.	Users might seek for counseling and emotional support from the app while they are alone. If there is any music in the app, it should be soothing and relaxing.
Users may have to believe in psychological knowledge.	The application is mainly based on knowledge in psychology to provide users advice and support.
Data requirements	
The application has a database which stores users' data about their posting, articles, and their counseling record.	It is important to protect user's privacy and anonymity.
User profiles	
Most users will be in the range of 18 to 23 years old.	Currently the targeted users are Penn State **Chinese international** students
Users are facing pressure from studying and uncertainty from the job, their mild symptoms are not too severe and don't need medical attention.	
Users are required to be familiar with using applications on mobile phones.	
Usability requirements	
The application should be easy to use and should take the user a little time to register.	Users want to reduce their mild stress and anxiety as fast as possible. If it takes too much time for a user to register and login, the stress and anxiety may disappear or get worse.
The user interface should have a relaxing color and smooth navigation animation.	This application provides emotional support and counseling for users. Therefore, the background color and screen navigation animation should be relaxing to calm users down.

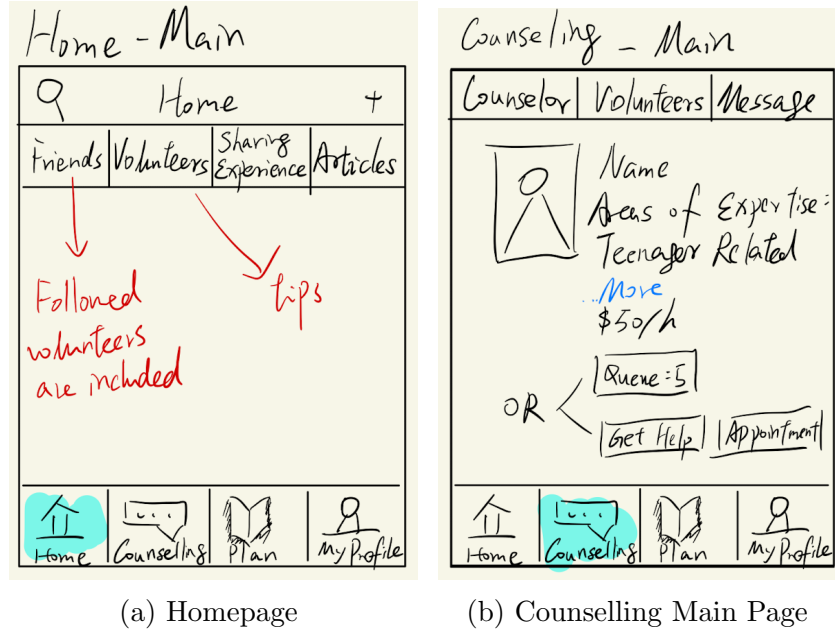(a) Homepage   (b) Counselling Main Page

Figure 1: Examples of storyboard design

volunteers. Sharing is the tab for users to share their counselling experience. Articles is the tab for counselors and volunteers to post professional psychological articles. Those articles will become helpful to users to better understand themselves.

Counselling is another important part of this application. Three sub-tabs are under Counselling tab: Counselor, Volunteer, and Chat. There are two ways for users to get counselling services: Volunteer and Counselor. Volunteers will be Penn State students who volunteer to help and chat with users with problems. Counselors will be professional counselors who are expert in psychological counselling. Users can choose weather they just want free volunteer to talk to or they want to ask for professional counselling with some cost. Counselors have their name, photo, rating, areas of expertise, and their price displayed. Volunteers have their name, when they joined, and their availability status displayed. All messages histories can be viewed in Chat tab.

Plan is the part that our team has only designed the home screen interface without any further functions. It aims to run some psychological tests on users and then let them build up a plan to improve their mental health.

User is the part that users can see topics they followed, their stared articles, and their plan. Users can also change their profile, check their test results, provide feedback to development group, ask for technical support, change the notification setting, and change the privacy setting.

6 Conclusion

6.1 Limitations

At this stage of our design, we identified some limitations which are potential improvements for this application in the future.

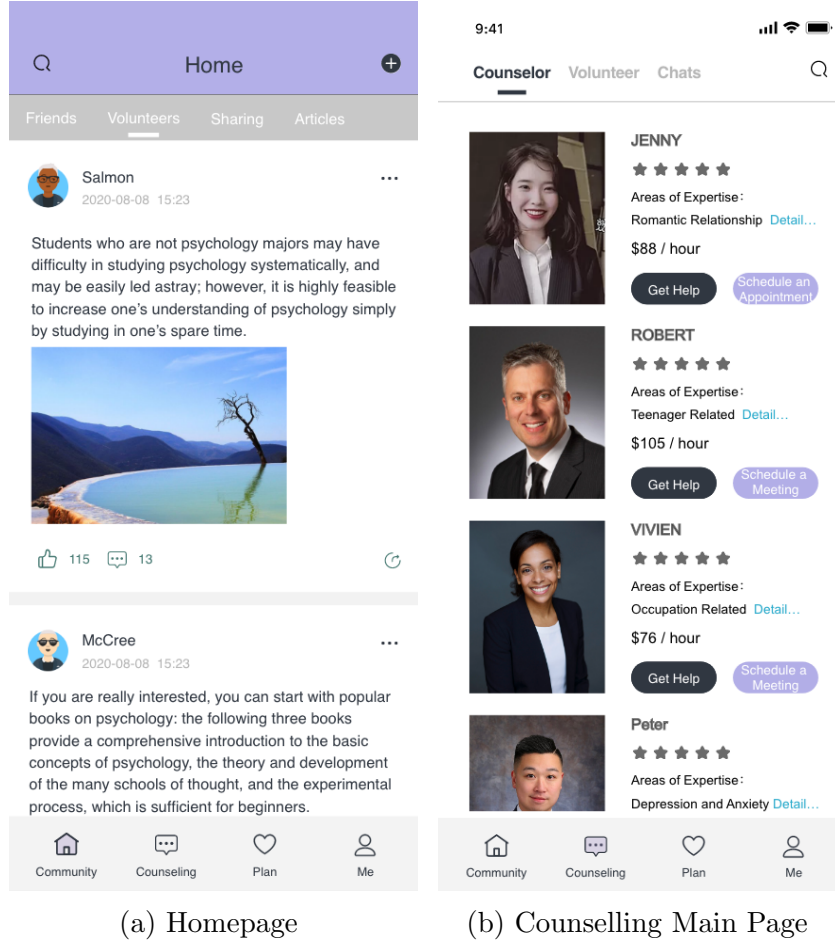(a) Homepage   (b) Counselling Main Page

Figure 2: Examples of Adobe XD design of Psy Space

The feasibility of this application is still unknown. The main issue of this application is the unbalanced number of volunteers and users. We are expecting users able to receive counselling services right after they ask for it in the app. However, the number of volunteers is limited, which means that when the active user number surpasses number of volunteers, the experience for users will fall dramatically. The long waiting time will become a huge problem for users. Even if we tried to design the interface based on the reflection on task analysis to shorten the time users spend on registering and logging in, as long as the queue time becomes long, poor user experience can be predicted.

We interviewed with a small number of prospective users. Some of the interviews lasted relatively short because of the participants' limited experience. Only one participant had experience in psychology counseling on campus. Thus, the challenges of campus counseling system might be not fully explored.

It is a limitation of our work that we designed and studied low-fidelity prototypes; through accompanying narrative we described interaction scenarios, but our participants were not able to actually interact with the computational support suggested by the prototype. Our future direction is to implement and study higher fidelity prototypes and systems to more thoroughly explore and develop the functionality of Psy Space.

6.2 Conclusion

In this paper, we applied user centered scenario based approach to design mobile interfaces for mild anxiety and depression intervention. They allowed the exchange of information among users and between users and therapists/volunteers. Users could have one-on-one counseling with therapists in different areas of expertise, or chat with volunteers even out of the regular service hours of the counseling office.

We conducted interviews with potential user and derived scenarios of users' behaviors to explore the application requirements. During the design process, we considered several factors such as privacy and anonymity, users' emotions, spam prevention. To address these concerns, we carried out a list of non-functional requirements. They were aimed to guarantee anonymity, avoid negative emotions passing among users, mitigate users' depression and anxiety with the relaxing background color.

We designed and described the low-fidelity interface prototypes that met the application requirements and the system functionalities. We presented the user interface sketches with storyboard and computer prototype with Adobe XD. The main functions of the application were introduced in detail.
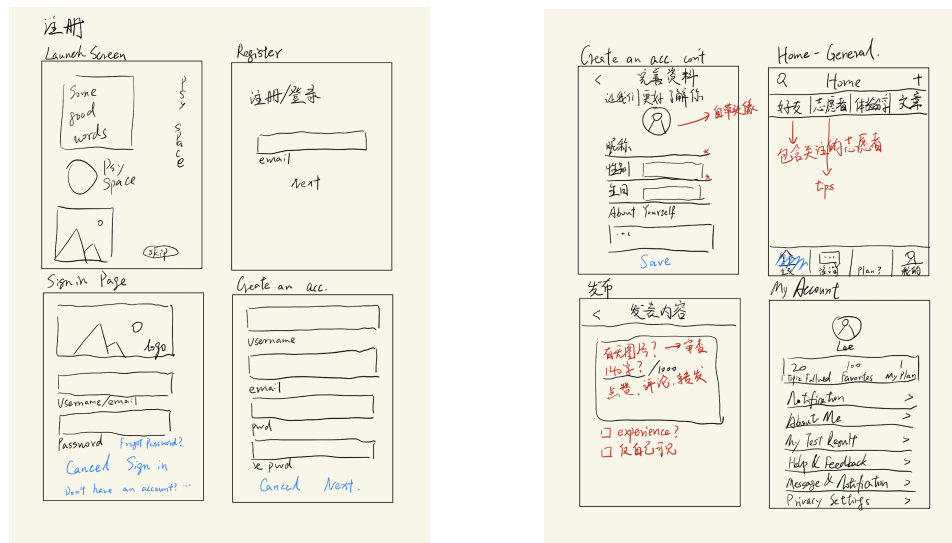
In the future, we will develop a high-fidelity prototype and perform a usability field test with Penn State college students for design validation. Moreover, we will collect further requirements from other stakeholders, including therapists and volunteers.

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A Psy Space App Storyboard Design

(a) Storyboard Design 1

(b) Storyboard Deign 2

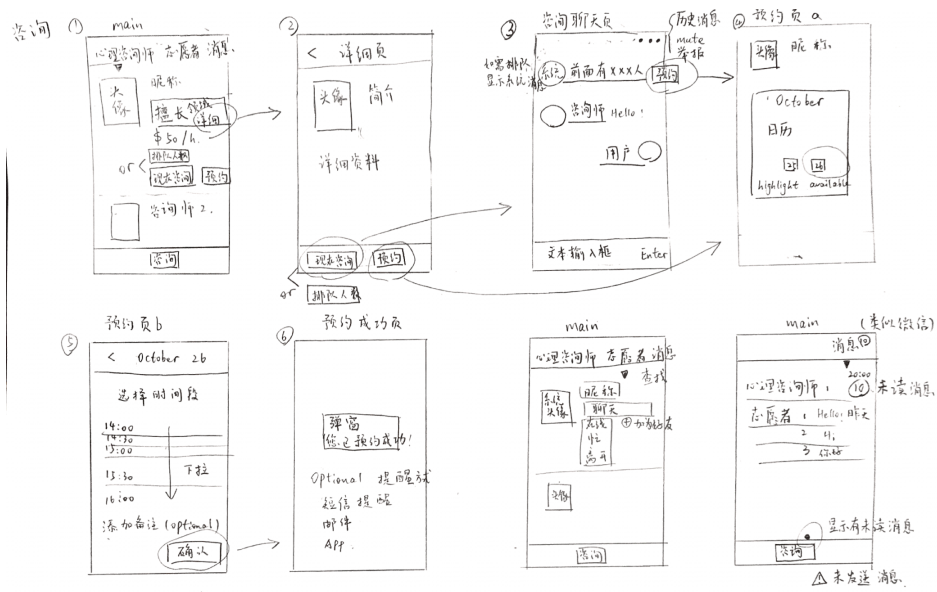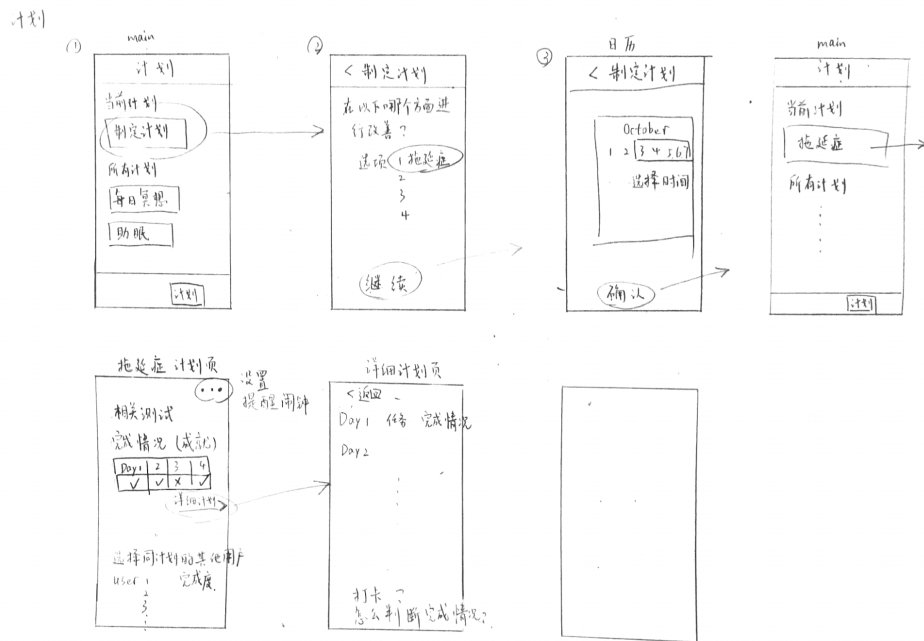Figure 3: Storyboard Design Part 1

Figure 4: Storyboard Design 3

Figure 5: Storyboard Deign 4

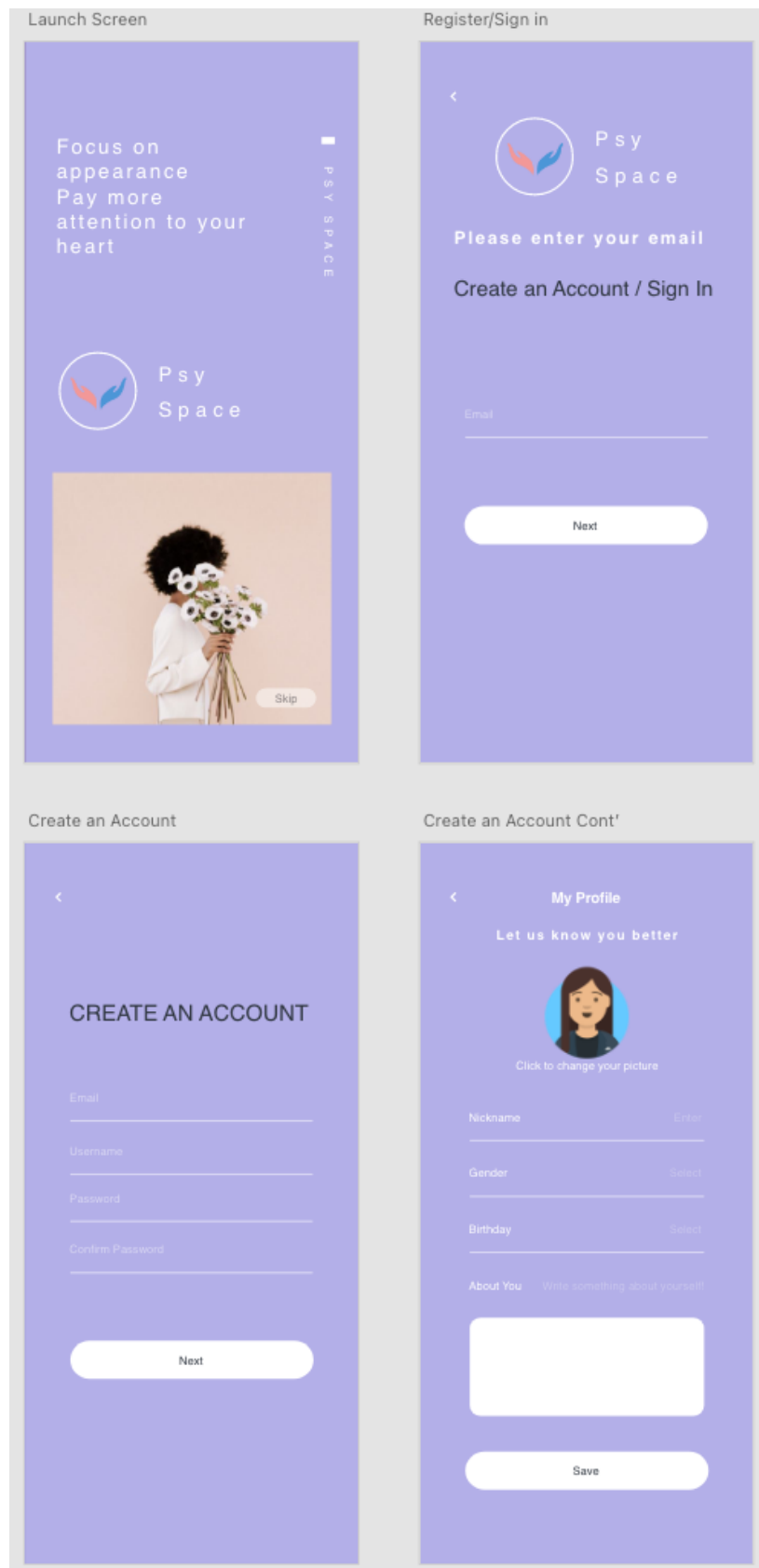# B   Psy Space App Adobe XD Design
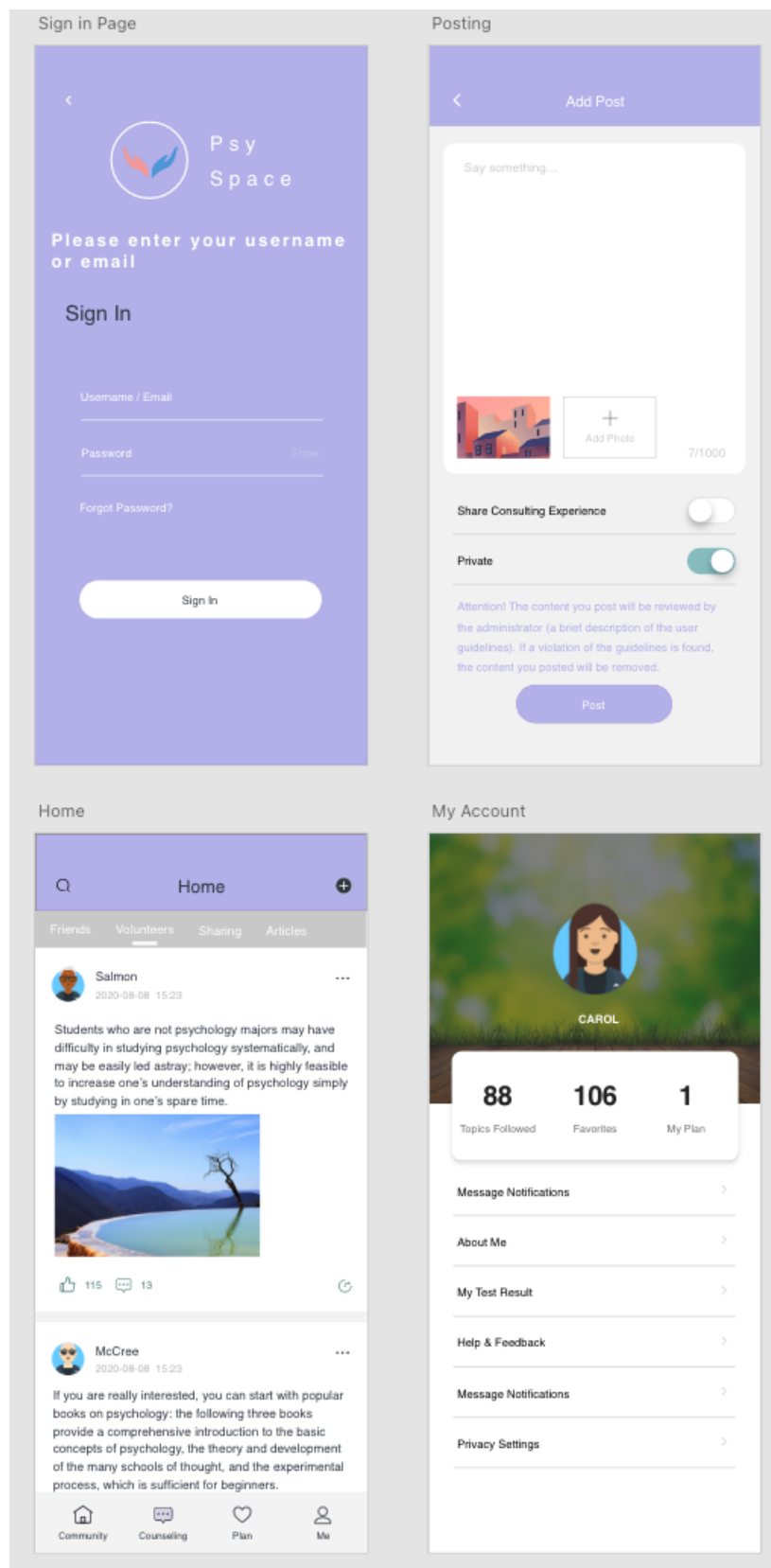
Figure 6: Psy Space Adobe XD Design Part 1

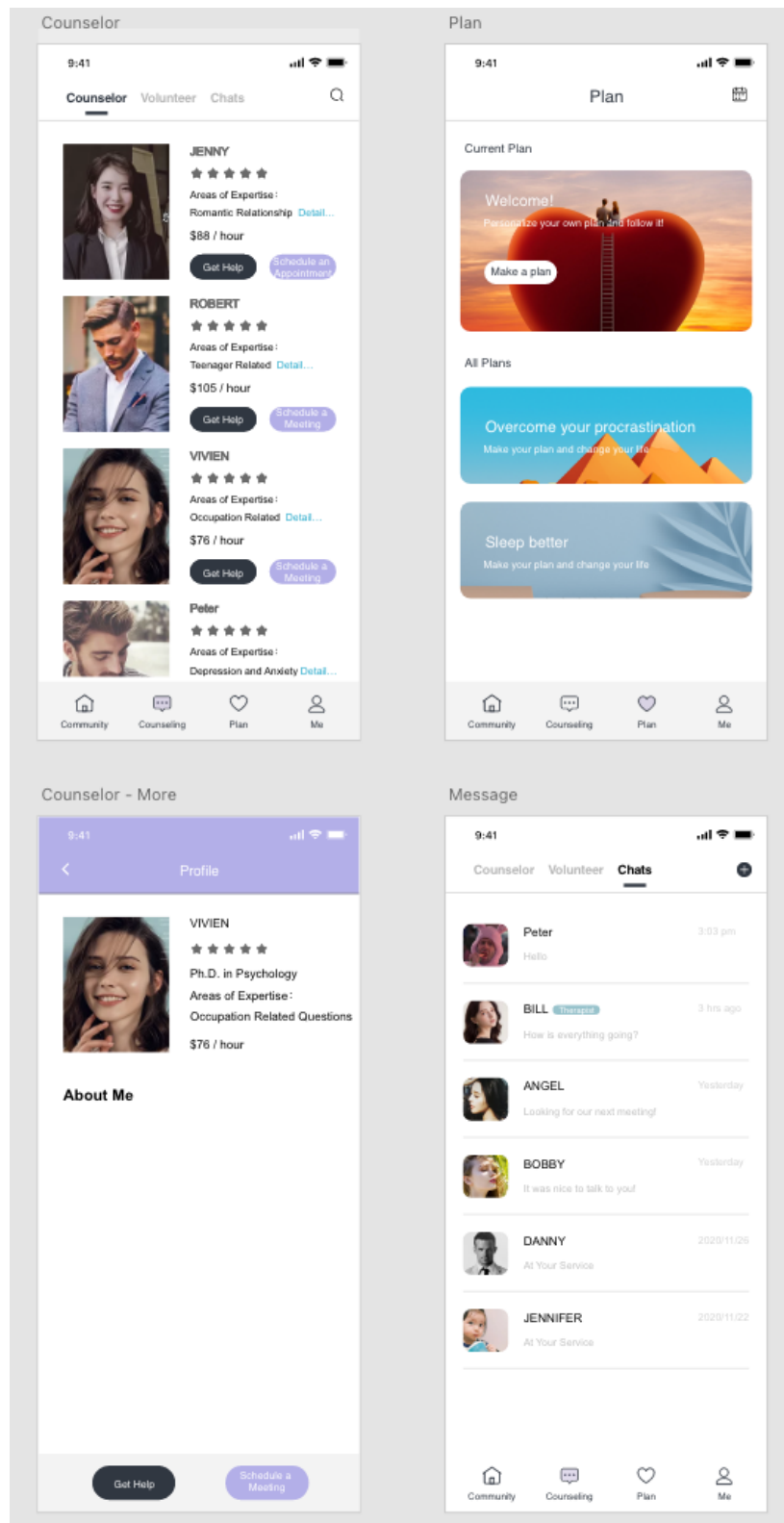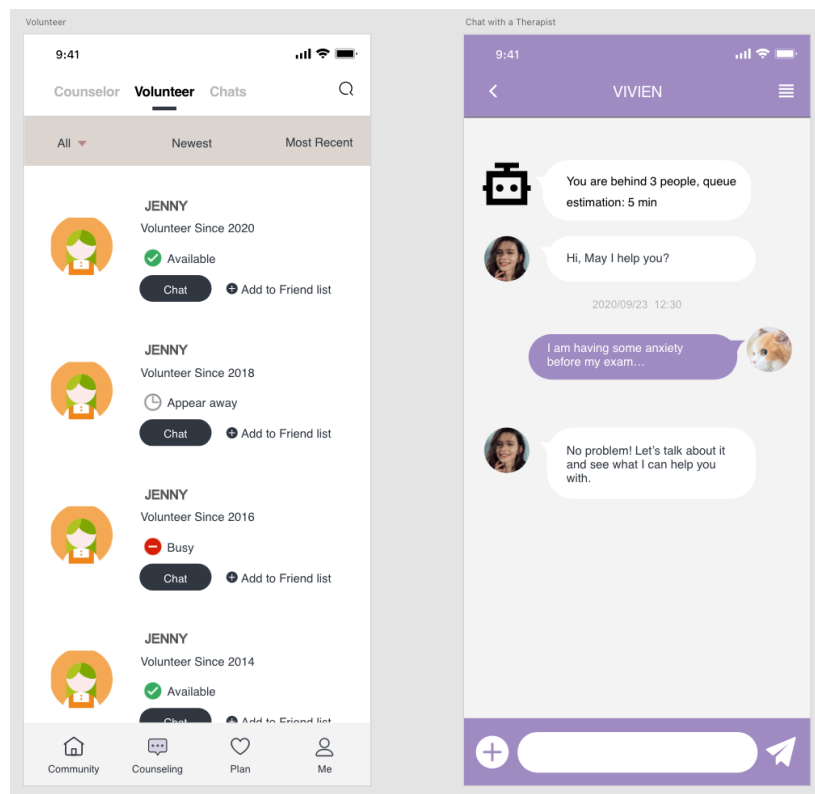Figure 7: Psy Space Adobe XD Design Part 2

Figure 8: Psy Space Adobe XD Design Part 3

Figure 9: Psy Space Adobe XD Design Part 4