Milestone 1 : Understanding the Problem

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Introduction

The buddy3 concept is a software-based application that will help bridge the gap between therapy sessions. Contemporary society has found itself rapidly approach a realization of how detrimental mental illness is to one's health. As technology continues to proliferate throughout the world and become more ingrained into the lifestyle of people, mobile devices have become an essential item to take around no matter the location. This also means that people constantly find themselves in a negative feedback loop where they can easily compare themselves to other more prosperous individuals and hate themselves for not doing more or even just being more a person that they want to become. On extreme cases, this has ultimately led to suicide due to the toil it has on one's mental health, which caused it to become the tenth most leading cause of death in U.S. (3).

buddy3 acts as a medium to help fill and express the words that are being stuck inside one's head and influencing negative behaviors. Through many tests conducted by various academic journals and by a survey done by the research team, the buddy3 team is developing a practical solution to this problem that haunts the youth and mentally ill of society.

To better determine the exact functionalities for the users of buddy3, the research team extensively looked into the current market to see what has been done and what the users did not find useful to gain insight into the decision making process. In addition, students and employees with mental health were also surveyed to gain extra feedback about what they would find helpful from a software system to ease their every-day lives.

Problem Statement

It was found that 17.3 million people in the United States suffer from major depressive episodes in 2017 (1). Within this large number of inflicted people, less than 50 percent sought out some form of treatment for it (2). Many patients who are suffering from a mental disorder often find it hard to open up to people due to their fear of being judged for their condition or their inability to speak what is on their mind. This, oftentimes, makes it hard for doctors and therapists to properly assess their problems and provide meaningful feedback during their sessions.

Target User Group

Primary and direct:

The primary users of the application would be the clinical patients dealing with stress, depression, anxiety, or other mental related issues. These will be the users that will have the most interaction with the system.

Secondary and indirect:

The secondary and indirect users would be therapists, psychiatrists, and other mental health professionals since this application will help them assess their patients. They would not use the system as often, but might utilize it to get useful information as well as for keeping a track record of patient's data.

Tertiary Users:

The tertiary users in this case would be other clinics that help people dealing with stress, depression, anxiety, or other mental health related issues. They are considered potential investors in the application.

Stakeholders:

The stakeholders are divided into four categories the latent, promotors, apathetic, and the defenders, and all of them are involved with the development of the application. The latent have high influence and low interest in the application, and in this case, they would be the therapist since they would not be using the application as often but will have high influence with the development of the system. The promoters would be the clinical patients since the application is designed mainly for their use so they have high influence and high interests. This pertains to how they will manage their stress related issues and relay it to their respected therapist. The defenders, who have low influence and high interest, would be other clinics in the same area wanting to implement this application to their patients for their convenience. And lastly the apathetic would be clinics in different states, so the research team would want them informed of the application they are designing and implementing for future funding.

Buddy3 Survey: An Overview

The research team conducted a survey on a group of 36 participants of which 7 were undergraduate students, 16 were graduate students, and 13 were employed in the workforce. These participants mainly were surveyed over various probing questions about mental disorders and how many are seeking therapist/psychiatrist in-person. Unfortunately, the test audience mainly contain people of youth and young adults. Future user-group studies will benefit from a wider range of individuals.

This survey was conducted using a Google Form that consisted of nine questions with either a yes/no, or short answer response. The link to this form was sent to the study group via text messages on GroupMe and WhatsApp and the responses were recorded under the responses tab on Google forms as the participants of the survey filled the forms.

Demographics:

Number of participants	36
Age Range	20 to 35 years
Average Age	27.5 years

Undergraduate Students:

Computer-related	3
Mechanical	1
Information Technology	2
Accounts and Finance	1
Total	**7**

Graduate Students:

Computer Science	8
Artificial Intelligence	8
Total	**16**

Full-Time Employees:

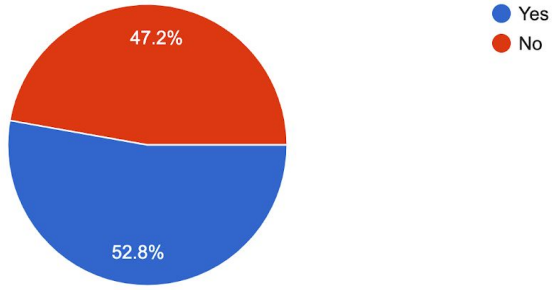
Software Engineer	8
Full-Stack Developer	4
Data scientist	1
Total	**13**

This survey proved to be helpful since it helped the researchers conclude for whether mental health applications with the ability to communicate results directly with the doctor are needed.

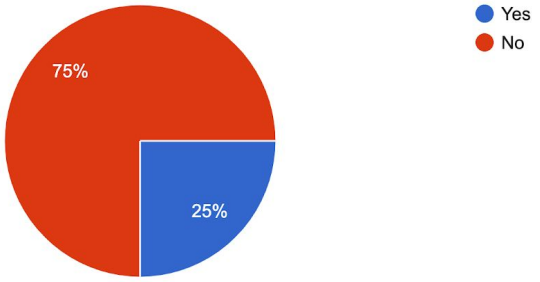
Survey Questions and Responses:

The following were the nine questions that were asked to this group of 36 people and the responses for the responses are shown below.

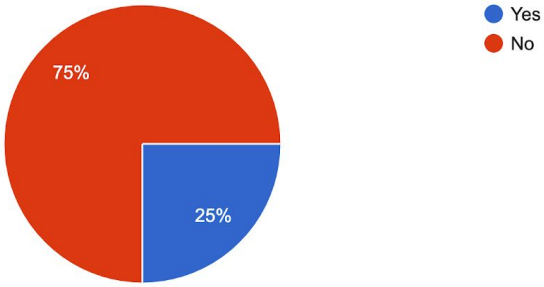
Have you ever experienced a depressive phase in the past year?
36 responses



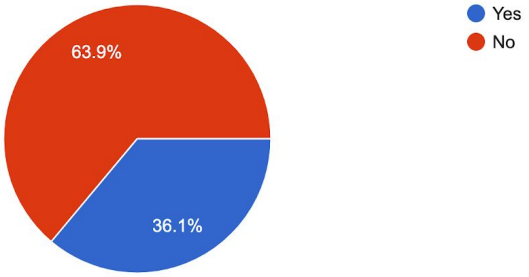
Have you ever suffered from an anxiety attack before?
36 responses



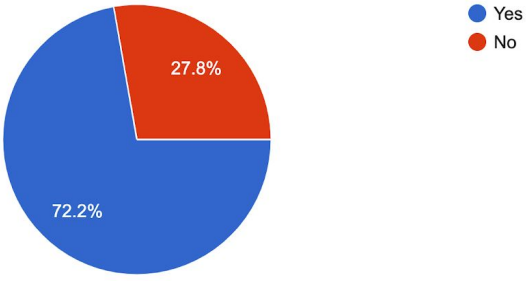
Have you ever visited a mental health therapist?
36 responses



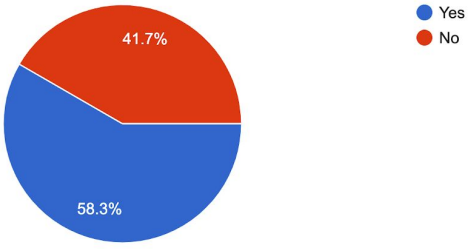
Have you ever talked about your depression episode with a friend?
36 responses



Are you comfortable talking about any mental disorders to a therapist?
36 responses

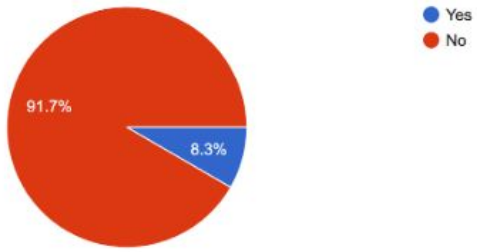


Do you feel going to a therapist is an effective form of relief for mental illness?
36 responses



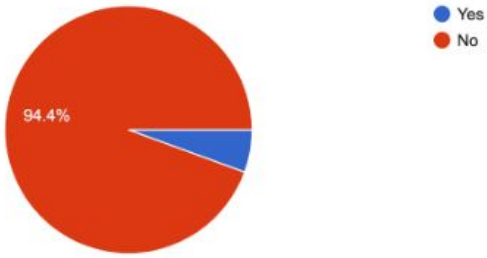
Have you ever tried any mental relief apps in the App Store/Play Store?

36 responses



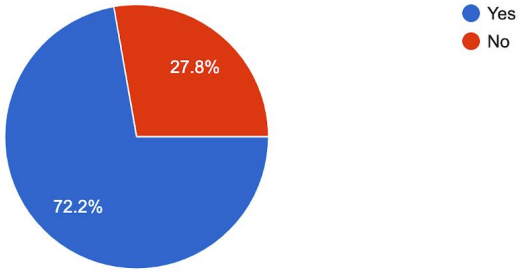
Did you previously or do you currently take medication for any health issues(e.g managing stress etc)?

36 responses



Would you feel comfortable to interact with an application that will hone to your symptoms to care for your needs?

36 responses



Summary of Data

The data recorded from the above survey shows that when asked if one has gone through a depressive phase in the past year, almost 52.8% of the population gave an affirmative response. Interestingly, when asked if one had suffered from an anxiety attack before, almost 25% of the population had suffered from such a condition. Twenty-five percent of the same population had visited a mental health therapist. There could be various reasons behind the participants' visit such as being incapable of handling stress, suicidal thoughts, loss of self-confidence, etc. Questions regarding the reasoning behind the participants' visit was not acquired.

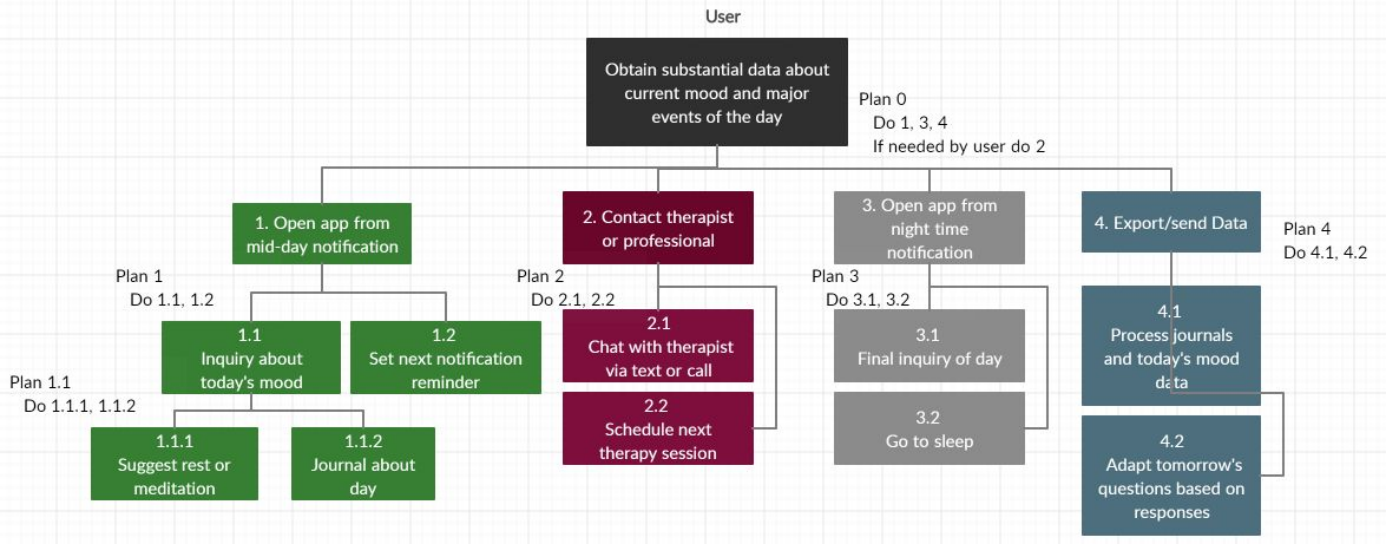
It was quite surprising to see that most people were uncomfortable with talking about their depressive episodes with their friends with only 36.1% actually opening up to someone. However, the majority of participants by 58.3% believe that seeing a therapist is beneficial to one's mental health. This was reaffirmed by 72.2% when querying if they would be comfortable talking to a mental health professional. This percentage was relatively higher than the percentage of those talking to a friend about such a condition. There could be several reasons behind this relatively higher percentage such as a patient being more comfortable talking about their situation to a therapist who being a stranger would not judge the patient, or a therapist being able to guide the patient well since he/she is professionally trained to do so. Results show that only 8.3% of the group has tried mental relief apps from the App Store/Play Store. People not being aware of such applications could be a major reason behind this less percentage.

When asked if one is currently taking (or has in the past, taken) medication for any type of mental health issues, 5.6% of the group did which clearly shows that these group of people were dealing with mental health conditions and seeked medical attention in order to deal with their issues.

Finally, when asked about one's comfort interacting with an application that will address symptoms of mental health issues and care for one's needs, 72.2% of the group agreed being comfortable interacting with such a form of relief for mental health. This final result clearly helped us achieve the purpose behind conducting this survey which was to find out the number of people who were aware of pre-existing mental health applications, how many of them use a mental health application, and how many prefer a mental health application over visiting a therapist/psychiatrist in-person.

Thus, several design implications emerge from this survey. First, the buddy3 concept encourages the idea of having this direct access to a therapist whenever they are in an unstable mental state. Majority of the participants are open to the idea of using the app to obtain a form of relief that they know would help them in the long run. Second, the buddy3 framework must be extensive enough to give users and incentive to consistently open the app, which would mean the app must offer substantial features. For example, buddy3 could offer daily missions or bonuses to users who open the app to talk about their day to improve the algorithm of the app to better cater to its user. buddy3 must also be able to extract meaningful data that could be used by the therapist during the patients therapy session.

Hierarchical Task Analysis



This Hierarchical Task Analysis is as follows:

- On 0 (the goal), the app wants to obtain new data about the user's day
- Do events 1, 3, and 4
- Do 2 if opened manually by the user
    - Subevents should be done in order
- Repeat 1,3,4 each day

The nature of the notifications will vary for each user as each notification will open to a specific script that is catered to the persona the system has of them. This persona is mainly made through each use of the app, which will be primarily from notifications of how there day is currently doing.

Current Market

The use of technology as a supplement to mainstream therapies for mental health issues is an emerging mental health treatment field which arguably has been proven to improve the accessibility, effectiveness, and affordability of mental health care. There exist various applications in the market that help users dealing with mental health issues. This report evaluates the examples of the most popular existing solutions as listed below:

- Moodfit:
  Moodfit is a daily mood and emotion journaling free-to-use application.
  Strengths: This app is voted as the best overall mental health app of 2019. It keeps track of daily goals that help improve the user's mood fitness and provides tools to help boost the user's mood

using cognitive behavioral therapy and custom reminders. This app aims to help users get actionable insight into what brings them up or down, understand how sleep and exercise can affect the user, and provide breathing exercises to calm the user as well as understands what medication and therapy would suit the user well (4).
Drawbacks: This app does not connect patient data to mental health professional.

- Talkspace:
  Talkspace is an online therapy app that helps connect patients with mental health professionals.
  Strengths: Unlike in-person therapy which would typically cost around $150 for each session weekly, Talkspace is a subscription service, starting at only $65 per week which would be billed monthly. All plans come with unlimited messaging, and you can even choose to add live video sessions (5).
  Drawbacks: This application does not track one's mood or emotion. Also, not everyone would prefer spending money on such an application which does not cover all the functionalities that it is supposed to if some similar and improved version of this application comes in market which is free to use.

- eMoods:
  eMoods is a mood application which is tailored mostly for those with bipolar disorder.
  Strengths: Free and easy to use mood tracker app for charting daily highs/lows, sleep, medications and other bipolar symptoms. This app helps users to track their moods intuitively. Also, it helps identify mood swings and patterns thereby, preparing users to be more confident (6) (7).
  Drawbacks: This app does not connect patient data to mental health professionals.

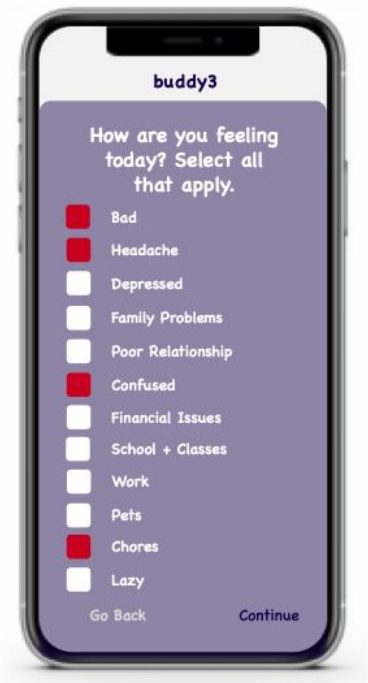
- MoodTools:
  MoodTools application helps users combat depression as well as alleviates one's negative mood.
  Strengths: MoodTools is a free application with a purely non-profit venture aimed at helping people suffering from clinical depression.This app is a perfect blend of various research-supported tools like 'thought diary', which helps improve the user's mood by analyzing thoughts and negative thinking pattern based on cognitive therapy. There are also activities that help one regain energy by tracking mood based on behavioral activation therapy, offers a safety plan that utilizes emergency resources during suicidal emergency, information that is a help guide, and videos about meditations and motivational talks (8).
  Drawbacks: This application competes well with our project.

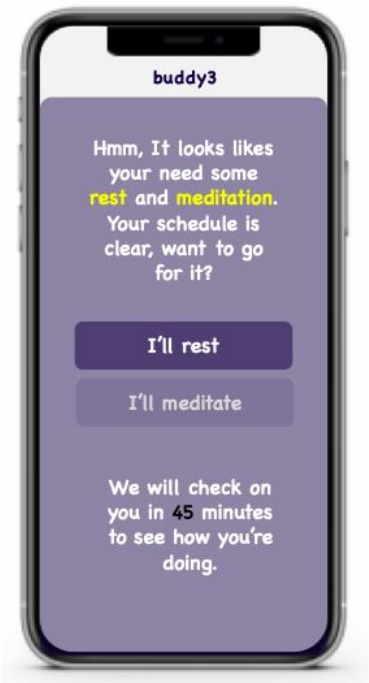
While on the other hand, buddy3 is a concept that helps bridge the gap between therapy sessions and also connects patient data to mental health professional. Our survey and the results drawn from it helped us recognize the importance of such an integrated solution. As we proceed with the designing of this buddy3 concept, there would be certain assumptions and analysis that would be done in order to improve this user-centered design.

Solution Overview

A patient-therapist companion application which allows primary users to periodically input their current moods, stress levels, and thoughts. The app will periodically learn from past inputs, for example, by analyzing for mood patterns or by highlighting periods that were an outlier to the norm. This analysis algorithm should all be done continuously from the user's responses to the notifications and sessions within the app. Based on this data, the app will continuously consolidate and learn about the user's emotions/thoughts and relay this data in an organized manner to their primary doctor or therapist. Any abnormal periods could then be addressed and talked about further and a cause or influence could be identified and rooted.

As a proof of concept, the research team created a prototype layout of the app to highlight key screens of the app and how information will be portrayed to the user. Since this is a companion app, it will require the information of the therapist the patient if any. However, a user could also simply use the app for self improvement purposes and the user could simply build their profile to pass on later to a professional. To get a better understanding of the patients health and needs, obtaining their medical ID or health insurance will streamline the work the app by filling in the user's persona within the database.





Finally, the last two screens show some ideas of how the user will interact with the application, by filling out short surveys of their day and journal and any thoughts that they have to get off their chest. The screen on the left will be different for each person after a persona has been created within the database to cater to their specific needs. It will also ask how they are currently feeling, an option to journal significant events or any thoughts that is weighing on their mind. The screen on the right is offered when analyzing their response and asking if they would like to partake in relaxation activities such as resting or meditating. At the end of the day, this all will then be packaged up in a report that will be sent to the therapist and can be analyzed further.

Summary and Evaluation

We have not found a system that offers the same companion solution that follows a patient along their path for a healthier mental lifestyle alongside their therapy visits. Although there are many systems that try to solve mental-health problems for its users, they all seem to follow the same framework of attempting to take their mind off the negatives of life through breathing exercises or meditation. However, the research team could not find any system that facilitates a direct information connection between a patient's day-to-day moods and events that strongly affect them with immediate feedback from the patient to the therapist.

The end goal of the buddy3 system is to create a more efficient connection between a therapist and their patients. This will be done by creating an app that will quickly adapt to its user through various notifications that will try to identify patterns in the user's mental state through each interaction. The research team believes that such a system discussed within this document would drastically improve each therapy session **as** the therapist will be able to analyze the daily moods. In addition, any significant events that the patient may have occurred and suppressed will be noted in the app and configure itself to produce better options when dealing with the patient.

Successful evaluation of the buddy3 system will occur if the target users find the system beneficial and open it on a daily basis to journal their day or at least when significant mood swings occur. As a stretch goal, it would also be they also were able to get some peace of mind by actively using this app. In addition, buddy3 will be successful if therapist can extract viable data and would recommend this system to all their patients to further grow the audience of the app.

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