

DESIGNING A MOBILE APPLICATION TO MANAGE AND REDUCE COMMON MENTAL HEALTH PROBLEMS DURING THE COVID-19 PANDEMIC

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Abstract

Alongside the expanding dispersal of data on the number of instances of death because of the Coronavirus outbreak, a large part of the data introduced by the media unveils the more stressed and causes a mental effect, in particular a psychological problem that causes a psychosomatic issue. This application plans to assist individuals with overseeing and lessen sensations of stress or sadness in overabundance by doing contemplation that should be possible even at home and to expand the utilization of the application, the gamification technique is utilized to inspire clients to seek after existing objectives and structure new schedules for the client to rehash the action until the new propensity is shaped. The aftereffects of the assessment utilizing the ease of use testing imply that they are at a moderate level dependent on the principle markers. Along these lines, it tends to be reasoned that the plan of the arrangement gives a positive discernment as far as client experience and convenience.

1.0 INTRODUCTION

In this study, we discuss a scalable, effective, and accessible application designed to address psychological problems related to the mood and anxiety caused by the covid-19 virus pandemic that can change people's mindset in the face of this situation, as the distribution of information presented by the media makes people more apprehensive than ever. Health care media should therefore be able to present information about knowledge and understanding of this current outbreak without causing panic and promoting rational thinking because when people are too stressed about something it can lead to one psychological impact which is psychosomatic. It's a disorder of the mind that causes physical complaints without having symptoms of those. Furthermore, many people are alarmed by the amount of news information that makes them continuously think negatively about this plague. In recent years, many apps have been developed to facilitate ways of monitoring and reducing stressful psychological conditions, and also providing education on psychotherapy, therapeutic programs also have been developed for mental - health conditions such as depression, anxiety, stress, bipolar, and more. Randomized controlled trial (RCT) data showing that an app for mental health can clinically be time and cost-effective and in some cases such as depression and anxiety achieve comparable results to face-to-face treatment[1].

Technology-based mental health applications have potential and can be the solution to mental health care, facilitating access, and reducing barriers to help communities in these pandemic situations. Because when people become aware of having problems in mental

health, they often have difficulty seeking help either financially or socially. However, this app has both limitations and challenges, users must have smartphones to use the app, and internet access that can cause trouble to people living in remote areas. The content of this application is based on how to reduce and manage stress in people and can be expected to improve positive psychologies using the gamification method by directing users to meditations that can keep the mind calm and positive.

In previous studies, there have been several journals that discuss designing mobile or web-based mental health applications. Among these are:

Research conducted by Joseph Firth, PhD; John Torous, MD, entitled "Smartphone Apps for Schizophrenia: A Systematic Review" is more focused on users who have schizophrenia problems. This research was conducted using a quantitative method. Meanwhile, what distinguishes their research from researchers is that it focuses on general mental health problems such as stress and research methods that use design thinking[2].

Research conducted by Gavin Doherty, David Coyle, Mark Matthews entitled "Design and Evaluation Guidelines for Mental Health Technologies " is more focused on discussing guidelines and how to evaluate the design of a technology related to mental health. Meanwhile, what distinguishes their research from researchers is that it focuses on discussing the design of applications to manage and reduce disturbances in mental health in general by doing meditation[3].

Research conducted by Nasser F BinDhim, Alexandra Hawkey, Lyndal Trevena entitled "A Systematic Review of Quality Assessment Methods for Smartphone Health Apps " more aims to explain and summarize the methodology used to determine the quality of an application related to health and propose criteria for evaluating the quality of health-related applications. Meanwhile, what distinguishes their research from researchers is to focus on the purpose of designing applications for manage and prevent mental health in general by doing meditation and conducting usability testing on the design of the application to get feedback from users regarding how effective and easy to use the application is while in use by the user[4].

Research conducted by Stephen M. Schueller, Jason J. Washburn, Matthew Price entitled "Exploring Mental Health Providers' Interest in Using Web and Mobile-Based Tools in their Practices" are more focused on discussing the increasing number of sites or applications related to health, but during the development process often the needs and interests of providers are ignored, to explore related interests, a mixed-method approach is used between qualitative and quantitative such as interviews and short surveys. which overall shows that health-related sites and applications are in great demand by highlighting several areas such as user-friendliness, safety, and patient privacy. While what distinguishes their research from researchers is that it focuses on the purpose of designing applications to manage and prevent mental health in general by doing meditation. as well as conducting usability testing on the design of the application to get feedback from users regarding how effective and easy to use the application is while in use by the user[5].

Research conducted by John Torous, Patrick Staples, Meghan Shanahan, Charlie Lin, Pamela Peck, Mather Keshavan, Jukka-Pekka Onnela entitled "Utilizing a Personal Smartphone Custom App to Assess the Patient Health Questionnaire-9 (PHQ-9) Depressive Symptoms in Patients With Major Depressive Disorder "focuses more on the discussion of how effective the application is to monitor patient symptoms using the Patient Health Questionnaire-9 (PHQ-9) method using the patient completing three survey sessions per day contained in the application, with the result that the patient with major depressive disorder can use this application to self-assess the symptoms of major depressive disorder. Meanwhile, what distinguishes their research from researchers is to focus on the purpose of designing applications to manage and prevent mental health in general by doing meditation and conducting usability testing on the design of the application. to get feedback from users regarding how effective and easy to use the application is while in use by the user[6].

Research conducted by Stoyan R Stoyanov, Leanne Hides, David J Kavanagh, Oksana Zelenko, Dian Tjondronegoro, Madhavan Mani entitled "Mobile App Rating Scale: A New Tool for Assessing the Quality of Health Mobile Apps "focuses more on the discussion of the rapidly growing use of mobile health-related applications that require a reliable multidimensional measure for testing, classifying and ranking the quality of these health applications by using the literature search method to identify articles containing web quality rating criteria or applications that published between January 2000 to January 2013. Whereas what distinguishes their research from researchers is that it focuses on the purpose of this study is to

design an application to manage and reduce the level of mental health disorders in general and to do testing using the usability testing method to get results of how effective and ease of use of this application by users[7].

Research conducted by Jhon Goodwin, Jhon Cummins, Laura Behan, Sinead M. O'Brien entitled "Development of a mental health smartphone app: perspectives of mental health service users" focuses more on the discussion to get a point of view from the point of view of mental health service users in developing mental health applications. by using a qualitative descriptive method which has the result that the interviewee defines that a good application is based on its ease of use. In the research conducted by this researcher, it was found that by conducting tests using the usability testing method, we can get results to define applications that are designed to be easy to use by users[8].

Research conducted by Patricia A Arean, Kevin A Hallgren, Joshua T Jordan, Adam Gazzaley, David V Atkins, Patrick J Heagerty, Joaquin A Anguera entitled "The Use and Effectiveness of Mobile Apps for Depression: Results From a Fully Remote Clinical Trial "focuses more on the discussion that mobile applications for mental health have the potential to overcome the problem of barriers to access to mental health care. The research aims to document and compare usage patterns and clinical results that have the result that mobile applications for mental health. can reach a large number of people and is useful for low-grade depressive disorder. Whereas what distinguishes their research from researchers is that the focus is on the purpose of this study is to design applications to manage and reduce the level of mental health disorders in general by doing meditation and conducting tests using the usability testing method to get results. effective and easy to use this application by users. Whereas what distinguishes their research from researchers is that the focus is on the purpose of this study is to design applications to manage and reduce the level of mental health disorders in general by doing meditation and conducting tests using the usability testing method to get results. effective and easy to use this application by users[9].

Research conducted by Jakob E. Bardram, Mads Frost, K'aroly Sz'ant'o, Maria Faurholt-Jepsen, Maj Vinberg, Lars Vedel Kessing entitled "Designing Mobile Health Technology for Bipolar Disorder: A Field Trial of the MONARCA System" focuses more on designing applications specifically for bipolar disorder sufferers using the MONARCA method. Meanwhile, what distinguishes their research from researchers is that the focus is on the purpose of this study is to design applications to manage and reduce the level of mental health disorders in general by doing meditation and by using the design thinking method to carry out application design[10].

Some previous studies have differed with researchers, based on previous studies widely discussed related to the treatment of mental health disorders that are specific to certain disorders, while this research focused on mental health disorders in general. And in some other studies focused on how to solve the problem, whereas in previous studies mostly conducted by conducting a short survey to find out the level of mental health disorders of patients, while in this study focused on problem solving by doing meditation.

There are many different definitions of mental health, but basically, mental health means having the ability to adapt well to the challenges and problems of life. There are positive and negative challenges. Mental health problems may arise when a person is faced with a job or pressures far greater than usual. It happens as part of normal behavior and not a mental illness[11]. Mental health is more than just a mental disorder. It is stated in the constitution of WHO that "health is a complete state of our physical, mental and social well-being, not just some disease or weakness." The concept of mental health includes subjective welfare, self-efficacy awareness, independence, competence, generality, and recognition of the ability to recognize the intellectual and emotional potential of a person. Mental health is about increasing individual and community competence and their empowerment to achieve their own goals[12].

Physical activity plays an important role in managing minor mental health problems, especially depression and anxiety. Although people with depression tend to be less physically active than those who do not suffer from depression. Exercise such as aerobic or strength training has been shown to significantly reduce the symptoms of depression, but physical activity is unproven to prevent depression from arising. Symptoms of depression can be diminished by meditating or relaxation[13].

2.0 THEORETICAL

2.1. Theory is related to the object of research

Digital Mental Health

Possession of mobile phones has increased exponentially in the last two decades, in 2010, global mobiles reached 5 billion users, and this number is expected to rise to 50 billion users by 2020[1]. Smartphones can be used in many ways for the benefit of clients and counselors in the mental health care field[14]. Mental health apps are software designed for smartphones and tablets used to improve health or for research and health care. It is estimated that more than 3,000 mental health apps are available at app stores around the world and their numbers are rising, such as Riliv, What's Up?, Pacifia, and Depression CBT[15].

The most common mental healthcare app is related to self-management, which has a function to help clients manage their symptoms independently by allowing them to monitor their problems, such as anxiety, depression, drug use, or lack of sleep. Digital mental-health apps can also help clients to contact counselors as soon as they have problems and would like to obtain more effective counseling facilities by sharing data collected through surveillance and self-assessment with the counselor[14].

2.2. Theories system used

Gamification

Gamification is a new solution that can help fight issues with motivation and create additional well-being. To "gamify" something doesn't mean turning it into a digital game. Gamification is the use of "based mechanical, aesthetic, and game thinking to engage people, motivate actions, encourage and solve problems." Gamification can enhance user motivation to pursue existing goals, but it does not in itself create a new purpose for the user. These goals may require the formation of a new grouping routine and excellent gamification in motivating people to repeat the task until the new habit is established[16]. In short, Miranda olff suggested that Gamification is a process of turning a learning activity into a game[17].

Usability Testing

Usability testing is the method of performing a utility evaluation in which users participate directly, users are invited to perform tasks on a given product or are simply asked to explore it freely, while their behavior is observed and noted to identify flaws in a design that causes error or difficulty for the user. Once identified, a design recommendation will be proposed to increase the ergonomic quality of the product[18].

Prototype Modelling

A prototype is a system made based on the final system to be built, demonstrating system features before fully implemented. Prototyping allows users to interact with the system at the beginning of the development process and helps them understand and clarify what the system needs. Prototype requirements and specs are refined and modified when users and technicians interact with the prototype. Because the user is involved during all phases of development. The Model system development life cycle prototyping consists of six steps:

1. Identify first-user needs.
2. Early system design development.
3. Development, evaluation, and prototype revision.
4. System implementation.
5. Installation and systems review.
- 6.The maintenance and evolution of systems[19].

3.0 METHODOLOGY

The image above shows the methodology used in the design of this user experience. The scope of research that focus does is to design the application user experience to manage and reduce such mild mental illnesses as stress. The study involves students as well as other stakeholders. According to Tim Brown, the Executive Chair of IDEO, design thinking is a human-centered approach to innovation that draws from the designer's toolkit to integrate the needs of people, the possibilities of technology, and the requirements for business success[20].

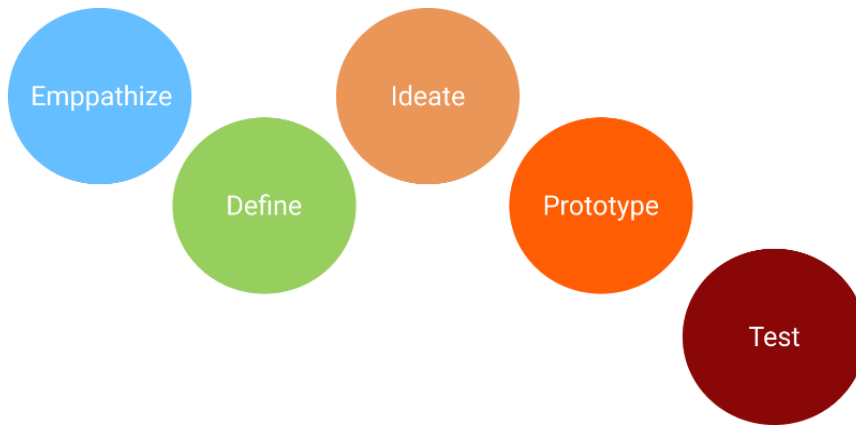


Image 1. Research Methodology (adopted from[21])

4.0 RESULTS AND DISCUSSION

In this section, the research report uses the design thinking method described earlier, where there are 5 stages to get a result, namely empathize, define, ideate, prototype, test.

4.1 Empathize

To understand the problem, the approach with empathy is used to analyze what the user feels and thinks about the plague, as well as the information that is circulating by using the user interviews to identify the habits, needs, and difficulties experienced by the user. This research requires a minimum of 5 participants with student criteria of stakeholders affected by the plague who in particular follow the news of the covid-19 virus outbreak. In an interview with the user, the main question of the interview focuses on the user's responses to the covid-19 virus outbreak, from what sources did the user get the news related to the covid-19 outbreak. What is the news that creates the most stressful or frustrating effect for the user about this covid-19 issues, how the user handles the situation, and what effect it has on the users.

4.2 Define

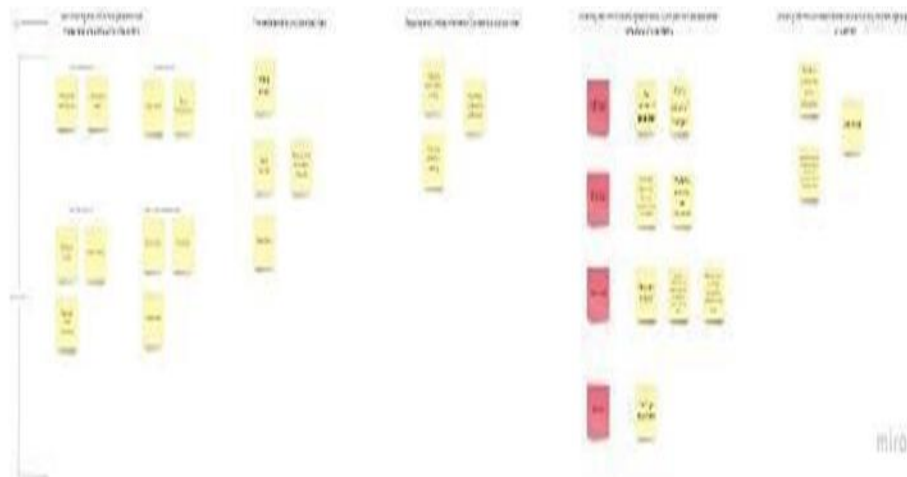


Image 2. the results of observations using the Affinity Diagram

To do a data collection from observation in previous research through user interviews, the begin to outline the problems and complaints of each user by using the Affinity diagram Method for then grouping the problem points and categorizing them to see users patterns. The can be deduced to general management and reduction in mental health, which is:

1. Using curation in selecting which information that might cause negative thoughts for the user.
2. Collaborating with experts to reduce stress levels or depression.
3. Advising the users to do positive activities such as meditation that can be done at home.

According to Natassa R. Tejenda and Luh Made Karisma Sukmayanti, mediation can help individuals generate more positive emotions, maintain emotional stability and engage in

conscious behavior. This is because the individual who meditates shows a greater volume of gray matter in the left-frontal cortex and the volume of the right hippocampus. Both parts of the brain play a role in emotional regulation and in controlling individual responses[22].

4.3 Ideate

Sketching out the key idea solution to solve the problem stated above.

User Journey

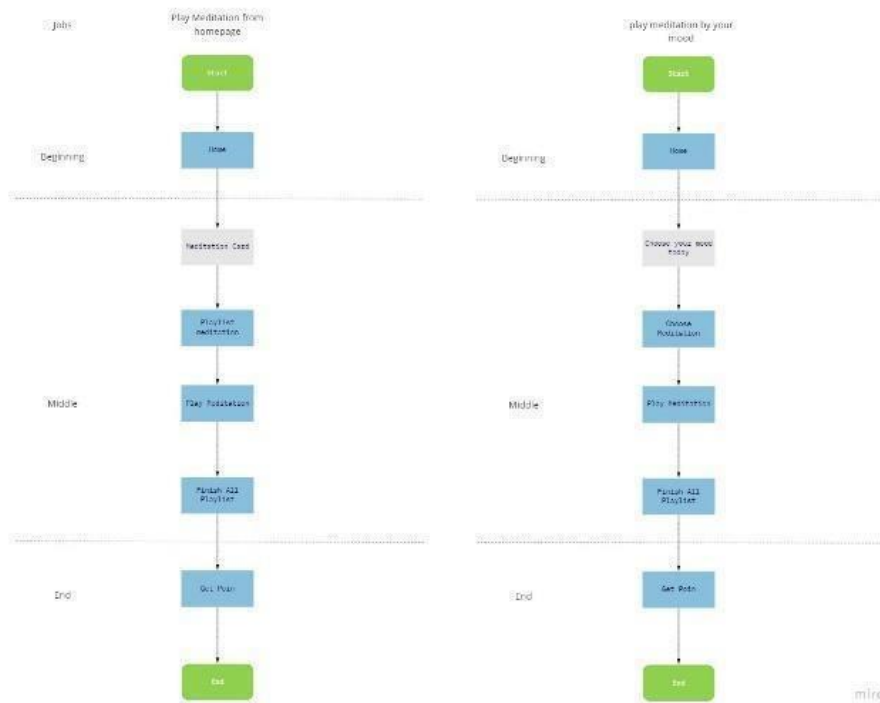


Image 3. the user's journey when using the application

In the process of creating an app to solve the problem, we are trying to understand the process when the user wants to do meditation as a first-time user and how to do it based on the user's mood at the time using this app.

Wireframe

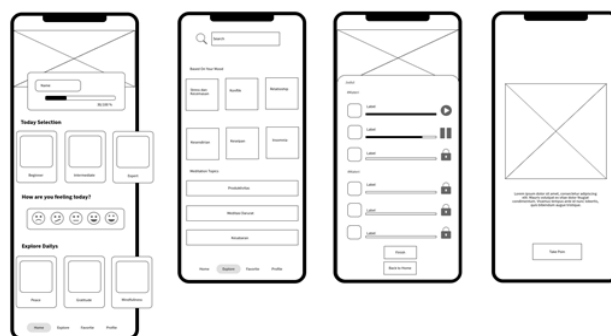


Image 4. The basic outline of the page for layout, navigation, and content organization

This is the process of combining pre-existing ideas that are written at the time of the Define and User Journey process through the building of a wireframe.

High Fidelity

After the wireframe creation process is complete, continue with the high-fidelity creation to show more detail and give a better feel to the user interface elements.



Image 5. high fidelity on all application pages

4.4. Prototype

After the interface has been completed, then prototyping is carried out so that the user interface can be used interactively to see the usefulness of the design as expected by testing at a later stage.

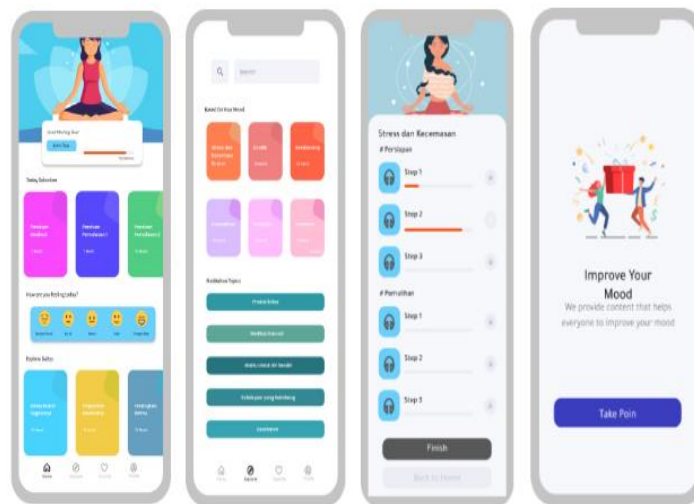


Image 6. the entire application page on the prototype mobile device

4.5. Test

Usability Testing

Testing the app design is done remotely and using the Maze app to help get heatmap and click. The challenge here is that we do not get the live data and therefore cannot receive the expected user's empathy in a person. The participant consists of students and any shareholders affected by the Covid-19 plague pandemic.

Assignment 1 - Doing Meditation Guide

To explore how visitors find the first feature of the meditation guide.

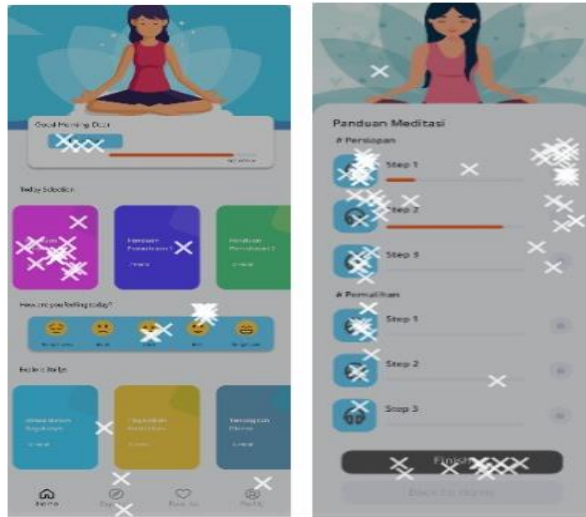


Image 7. clicks outside hotspots in the mission



Image 8. user activity within the application

84.6% of The user successfully used this idea and completed the mission as expected. But some users feel some difficulties with an average of 15.4% and do some misclicks with the total 54% and the average user to complete this task is 9.6s. The total usability score is up to 56 points.

Assignment 2 - Practicing Meditation Based On Mood

To understand how the user tries to use this idea and tries to use it.

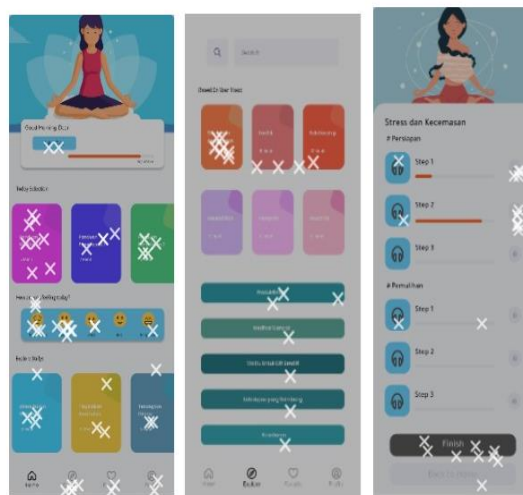


Image 9. clicks outside hotspots in the mission



Image 10. user activity within the application

87.5% of The users successfully used this idea and completed the mission as expected., but some users feel the need to make a lengthy process to do meditation because of having to reselect the topic of meditation according to their moods with an average of 12.5% users who found it difficult. But all users feel satisfied with the idea. There are 49.7% of the users who misclick, well as the average user completing the task is 10,1s. The total usability score is 62 points.

5.0 CONCLUSION

This study discusses designing a scalable, effective and accessible application to solve problems related to general mental health problems that occurred during the Covid-19 outbreak. The design of this application is in the form of a user journey, wireframes interface design, high-fidelity design, and interactive prototypes. The results of the design evaluation using the usability testing method show usability score details of 59 points with 13 participants, which means that the usability level is at a moderate level, the usability score measures the usability design based on key performance indicators such as the level of success, difficulty, duration, and user click errors in understanding ideas in application design. For further research, usability testing can be carried out with more participants and can be done face to face directly. With so many participants, there will be more suggestions and deficiencies found in testing the application and there are still errors in information when testing is done online. In this study, the problem is that it only arrives in the form of a prototype. By continuing this research to the direct implementation stage, it will have more impact and become a solution for users, especially those who have problems with mental health in general such as stress or depression.

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