Mobile HealthCare Application

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***Abstract*— We know the mental health importance for all ages. But, a comparatively tiny percentage of people with mental disorders receive proper guidance and advice for mental health care because mental health services are costlier not everyone can afford them. Fear, anxiety, concern, and tension are natural reactions to potential or actual risks, as well as moments when we are confronted with confusion or the unexpected in today's era of COVID-19 Pandemic. As a result, anxiety is obvious and regular in the sense of the COVID-19 pandemic. In addition to the frustration of contracting the virus in a pandemic like COVID-19, we face drastic changes in our daily lives as our tasks are restricted in order to manage and pause the virus's spread. With modern conditions such as staying at home, short term inflation, residential children, and a lack of physical engagement with other relatives, peers, and coworkers, it is critical that we take care of both our emotional and physical well-being. We can provide some contribution to this problem through so many ways like mobile application create a system which community can utilize for solving their issues and receive proper guidance from experts and professional. The combination of mobile application features and community is like Krishna and Arjun of Holy book Mahabharata [2]. Mobile application features guides and help like Krishna and community finishes and following guidance like Arjun. Application are more efficient compare to website. Efficient and effective system makes outcomes higher.**

Keywords—Agile software development, Creativity, Scrum (Software development), Model-driven development, Collaboration, Discussion forums, Collaborative tools, Global communication, Database, SW engineering, Sustainable development, Mental health, Scheduling.

I. INTRODUCTION

Mental health problems account for one-third of all psychiatric disorder, hindering people of all ages and occurring in all nations, along with the United States, Canada, and other emerging countries. Income inequality, battles, and other major hazards are all closely associated with mental illness. The pandemic of the twenty-first century is mental health, and it will be the next significant global health hurdle [3].

Mental HealthCare concept can provide some contribution towards this problem and help community to overcome this issue.

A. *Objective*:

The objective of this system is to help communities around the globe to take care of their mental health with the help of other peoples' experience, other resources, natural remedies suggest by people around the world, talking experience with other professionals. As well as, Features like a section for daily energizer, quotes, exercise and motivation video which can help the community to improve their mental health on a daily basis.

B. *Scope*:

The scope of this system is to provide smooth and easy experience to user. This article divide scope into five main sections: Information Gathering, Finding Technology requirement, Learning Technology to create system, Preparaing proper Documents to start developement, Decidingg Features. By following this methods devloper able to create system which can help community aroud the world who facing mental health problem. Community also get proper guidance with saving their money.

C. *Targeted Customer & System Constraints*:

This article targeting people around the globe who are techno savvy are first choice then it try to motivate other people who are not fan of technology because this problem is common problem for everyone. And, every person views matters for this system. By this system, I want to share all important detail with every community who are facing this kind of problem. In my system, community across the globe get information through digital. They can also get other person reviewed and opinion by asking or reading question in forums page.

We know that every new system have constraits. Same as for my system attracting more people to join this application is main concern. Learning new technology (flutter,dart) and implementing this technology to develop mobile application second concern. As well as, Making user-friendly design by deciding proper location for features and tools another constraint.

D. *My System*:

To increase mental health support, I developed a Minimum viable product smartphone app called the 'Mental HealthCare Appplication', which was designed by focusing on Two goal for Sustainable development (Goal3: Ensure helathy lives and promote well-being for all at all ages, Goal 17: revitalize the global partnership for sustainable development), This user-centered designed app had three main features: Daily Energizier, Upcoming Events, Discussion Forums for start-up system. The rest of paper is organized as follows. Section II addresses applied research method, while Section III presents the results and

discussion. Section IV presents the conclusions and future work.

II. METHOD

A. Requirement Analysis

Requirement analysis is first phase of any system development. This article requirement analysis divides into following documents:

- Community Orientation Document:

  In this document I research the community according to my interest and explore using the UN Sustainable Goals website [6] and others. From this I found following answers:

  Community life-cycle: According to my research most of the community member stable and adapting in their life-cycle. Technology is growing nowadays. They will accept and adapting new technology faster just they need proper guidance. I am trying to include one new feature discussion forums which is not new but I rarely found in any application. This platform provides virtual conversation within community around the world.

  Diversity: My users have all ages (youngster, adult). In these members, some are lurkers and some contributors depend on their mindset. They are located globally. As well as, all have different time zone according to their place. For example, Canadian members have night same time Indian members have day and the time difference is 30 min ahead of Canada. They speak English, Spanish, Arabic, Hindi, etc. But, as for research I did every person mostly knows the English language. Technology and culture are interrelated to each other. As technology is introduced culture reacts in positive and negative ways is thus changed forever. Consequently, as culture changes so does the technology they develop.

  Openness: In my point of view, the community needs both space public and private. Because some members did not feel good sharing their problems with other people so they just look for a solution from another's experience. Whereas, some members are open-minded. They do not feel shy. They just need another's opinion so they share their problems easily with another person.

  Technology savvy, tolerance, & constraints: In my community both types of people. Some people are techno-savvy and some are less fascinated by technology. And, Young members of the community can learn new technology in less time. But People who are not like technology and have less experience with a technology need support and more practice (more time compare to young people) to learn new technology. At last, everything depends on their capturing power. By research, I learn that, if they are comfortable with normal social networking sites then they can easily able to use this application. They just need to learn some click and posting skills for using this application. They can easily cross the boundaries of using various browsers because everyone has a different platform for using a mobile application. Some people do not like to sign in or making an account in any mobile application that time they can sign as a guest and hide their identity. Some people do not want to give up on old technology but every application has constraints but what I do is try to give them similar functionality or give them user-friendly design. In addition, members should have at least an android or IOS platform. And, they just need a normal browser that can run a mobile application. Members can be online at any time when they are free. As well as, they can use it from every place where they are comfortable. And, regarding their specific time and specific location, there is nothing to worry about they can still see other people's posts and give their opinion or read their post. Yes, one constraint is that they cannot talk with people if they are offline.

  Community orientation: In my system community can learn from online asynchronous through online videos and daily quotes, daily exercise. Another variant is a multi-topic conversation, in this application end-user generate queries in forums and multiple users can give their feedback. In this application, materials are self-design by the user there is not any pre-format or restriction on uploading any kind of information. This variant is called structured self-publish. Shared problem solving and questions/requests are also variants which use in my system. Interacting informally, Individual development, strong core group these three are also variant which provides community orientation in my system.

- Technology Inventory Document:

  In my system technology configuration inventory, I research all the platforms and stand-alone tools which can help the community's configuration.

  Platform:

  In this system, I research on two platforms: Broadcast room, Daily Energizer. Broadcast room use for chat purpose. This feature is used commonly. Members used these features to connect with other members through chat. This platform is not yet built in my system but in the future, I worked on this platform. Now, the Daily Energizer platform use for motivating members by few exercises and positive thoughts. This feature is used commonly. Because getting a reminder in this device so they can see these updates and follow if they want. Both platforms also used by individual members.

  Stand-alone tool:

  In this system, I research two tools Forum and Event page. Discussion Forum used for creating new queries or questions regarding their doubts. This tool is used commonly by community members. Because many peoples have doubts and queries and they need suggestions from professional or other community members to solve their doubts. Used by smaller groups and individuals both. Event page tool members can see the latest event and interact with each other by online synchronous. This tool is used commonly by community members. Because many people prefer online videos and seminars compare to reading blogs and articles. Users are smaller groups for this tool.

- Emerging Picture Document:

From my research, I found the following information for the current state of the art for this new system and how it can bring innovations to the community. Below topics are found from research.

Covering the orientation: From the technology inventory, we found that Community wants a common platform to discuss their doubts and references to solve their mental health issues. So from this, I decided to create broadcast rooms and forum facilities to support their needs. And, if their interest and skills are diverse it cannot cause conflict because for this application they do not need specific skills or interests. So, different skill does not create a distraction. This application served as resource material or use as a discussion board to solve their issues.

Achieving integration: In this system users need android or IOS device to use this application. As well as, they need internet pack in their device to get updates. By broadcast rooms and forums they can easily conversation with each other.

Balancing the polarities (current state): As per my research and finding somehow balance fit is okay and useful for community at starting level.

Moreover, I divided my system into 3 Minimum viable products. So I can balance workload and complete my system development on time.

- Business Case Document:

In this document, I worked on a business proposal for my system. For this system, users do not need any specific background. And, we know the lives of people living with mental disorders in all countries so through this application we can help this type of community for a better future.

In addition, I work on the business requirements for my system. These types of mental health apps are simple and easy to use; they can be a valuable service for people who may have difficulty accessing other alternatives. Furthermore, most mental health apps include features that allow individuals to search information and access therapy in a private and secure manner. Due to various mental illnesses, they start imposing a world-wide burden of diseases that causes early death and impairs ability to function and life quality. With this application, we can change that.

And, for cost analysis, I will choose the Flutter platform for my application because budget and time are limited and I need to make a simple application quickly. we can get the IOS version and desk version free on this platform. Moreover, some risks on the user side like few members are not techno-savvy. They do not know how to use this application this can be constraints.

Through Benefit Analysis I found that in the flutter platform I can perform my idea faster and quickly with less time. So I can help many communities to overcome the mental health problem.

- Stakeholder Analysis:

In this document, I make a list of all stakeholders as follows: Community around the world who need mental health help divide into two-part. One who is passively interested in my mental health like lurkers. One who needs to cope like a contributor. These both have Application user roles. They have high power in the system. But interest is low or high consecutively. The level of support is Neutral for both types. Another stakeholder is Dr. Timothy making who is my instructor for my system evaluation and he has high power and high interest in my system and he is supportive throughout this process. Now last but not least, I as a developer role in this system. And, I am highly interested and higher supportive level because I try to help my community through my ability.

- Project Scope Document:

In this document I follow work breakdown structure. WBS divide into five main nodes. First is Information gathering. This is divided into: deciding goals to be focused, finding idea for project, deciding north star customer, target community need. Second is technology requirement. In this node I try to find easy technology to deliver my idea and finding technical requirement. Third node is learning technology new technology to implement my system.

Forth node is preparing system documents. And, fifth node in my WBS is features. Here I make list of features then I decide on workflow for my minimum viable product.

- Requirements document:

Requirement divide into two part: functional requirement and technical requirements.

Functional Requirements:

First is when user open application. Application give them sign-in and sign-up page for registration. Application send them email when a new user signs up. Authentication of user registration. Admin Functionality. Resolve query button. Refresh screen facility. Every new post, event gives notification to user.

Technical Requirements:

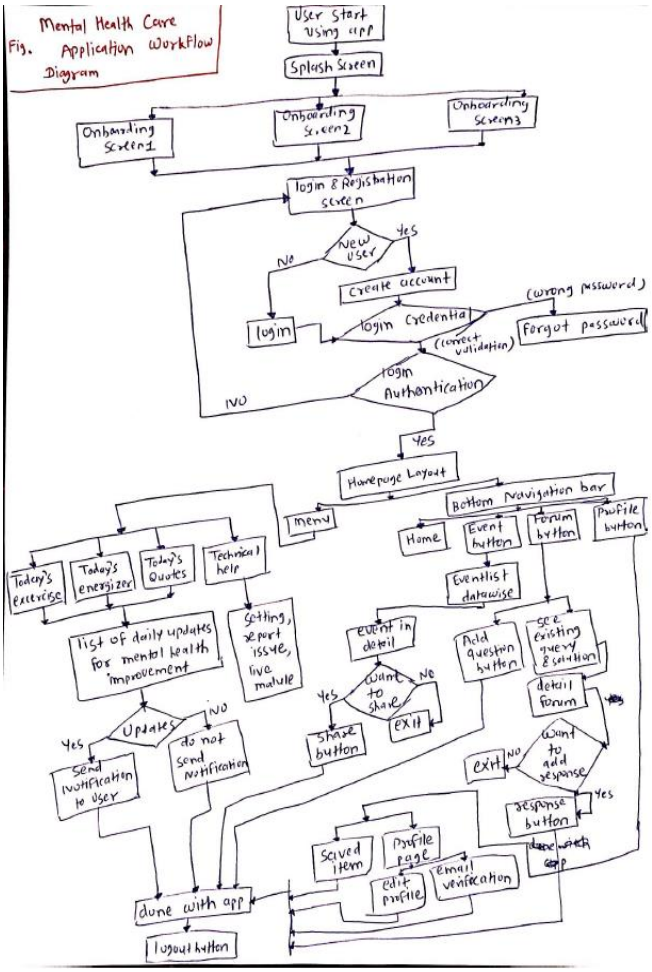
Android setup, Android emulator (Vscode – Visual Studio) to run code, Android Studio, Firebase database (backend), Terminal, Flutter SDK, GitHub Account, PC with a recent Windows version.

- Activity-based scheduled:

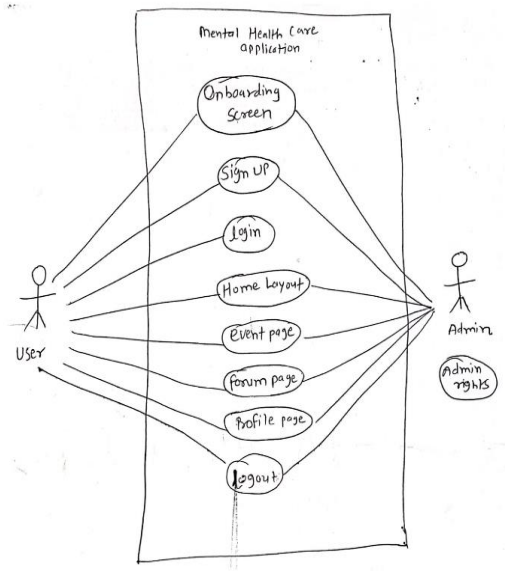
For this document, I used the Kanban board [7] and also use the professor-given format for documentation. In Brief, MVP1 have splash screen, Onboarding screen for my application, authentication process for a user to control malicious user and manage misinformation. Homepage UI is also part of this MVP. MVP2 has Broadcast rooms (post, notification and like/share, bookmark), an Event page (upcoming events, notification, and details), profile page (Edit). MVP3 have Discussion Forum (Adding question, responding query of other users) and Admin App (Adding and deleting post, event, broadcast rooms), bookmark page.

B. System Design & architecture

Below is my workflow diagram for my mental health care application. And, this diagram showing whole process works in my application.



Below is class diagram which is use for my mental health care application.



C. Minimum Viable Product of my System

Below are a few of my system layouts. Through this design, I am trying to provide a user-friendly design.

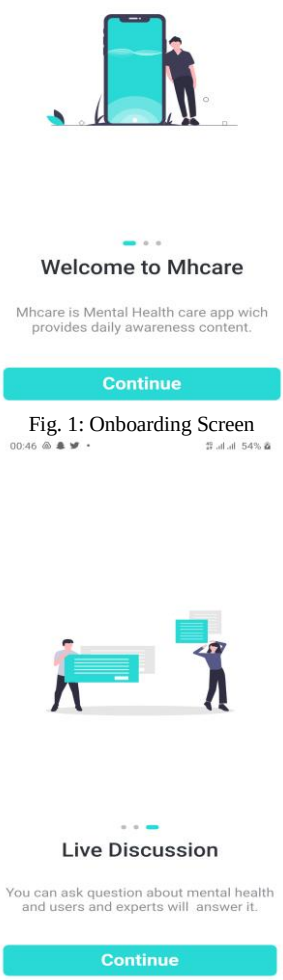


Fig. 1: Onboarding Screen

Fig. 2: Onboarding Screen

Fig. 3: Onboarding Screen

Fig. 4: Login Page

The above Figure 1 to 3 shows the UI for my three-slider onboarding screen. On this screen, the user gets a basic introduction to the features of my application. Figure 4 shows the Login page for users. I have also sign up page for new user and if a user forgot their password they can use forgot password page.

Below is Figure 5 is home screen of my application. In this I have broadcast rooms to help community with daily exercise, quotes, technical help. Below I have navigation bar with three more button for event page, discussion forum and profile page.

Figure 6 shows Eventpage layout with list of all upcoming and past events with detail.

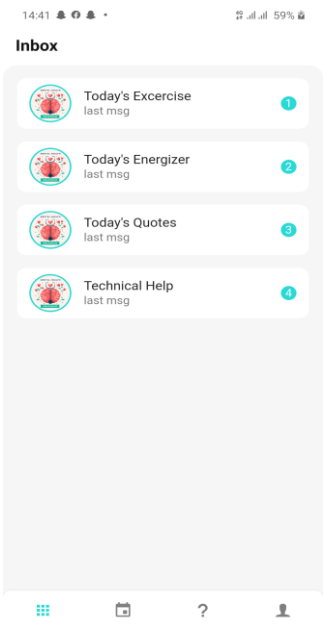


Fig. 5: Homepage Layout

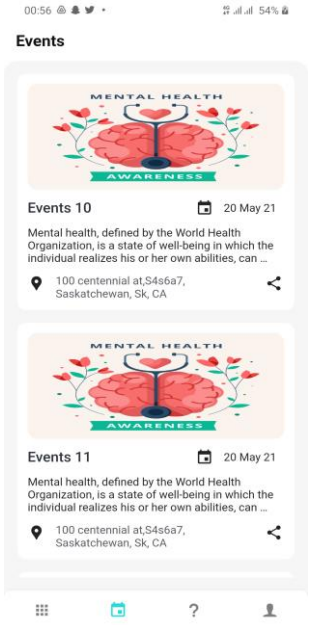


Fig. 6: Event Page Layout

Figure 7 shows the discusssion forum module for all the users to ask their question to other members and get proper solution for their problem.

Figure 8 shows profile page of user. Here user can edit their profile, verify their email address to access pages and access to bookmark page.

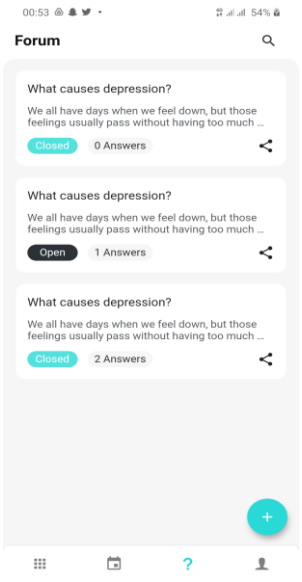


Fig. 7: Discussion Forum

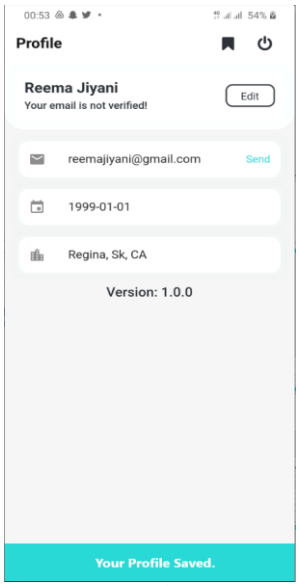


Fig. 8: Profile Page

III. Result & Discussion

As a result, I able to develop minimum viable product application which provides user help to overcome their mental health issue somehow with saving money. In my system, there is not that much developed but as a startup, it is ready to use. In this system users get notifications of a new update and for user engagement, there is a discussion forum in my system. As well, the Event page helps users attend virtual events in their convenient environment. I also work on the admin side application where the admin can add a new post and delete irrelevant accounts and post to handle misinformation. In this system, I use few concepts to develop my design for sustainable development and fulfill my goal of good well-being and collaboration around the world.

Discussion: Here I am discussing few concepts used in my system

- Digital habitats: For my system, I am using this concept to help people through community interaction.

- Online gathering and global interaction: Using technology, I want to grow online gathering in the community from place-based gathering so people can get help from global interaction (From local to global perspectives/interactions).

- New leverage for old behaviors: Technology can build new kinds of collaboration between communities and we can reach our goal faster.

- Dimensions of a CoP: In this system, we can see technology through community and how technology supports the togetherness experience of social learning.

- Domain Types:

  Domain inside: This can focus on specific things for example, in my system people can suggest their own natural remedies and ask for other people's opinions kind of online discussion.

  Domain outside: Here people who are professionals they can join this application and give their opinion and suggestion.

- Practice & learning:

  From/with learning: In my system, I am using from and with learning for the community. For example, using from method people can learn through stories, experience, tips, and using with method people can learn through discussion and opinions.

  Formal learning && Informal learning: In this system, I want to add a FAQ section for better information exchange so that's why I am using formal learning. In my project, I am also adding a comment section for the opinion of other people so this can be count as spontaneous information exchange, and this type of learning called informal learning.

  Inside && outside Learning: In my system community can share their knowledge through forums and blog this is called inside learning. As well as, they can click on a specific problem like stress they can find more detail like articles, books, journal links for their reference this

called outside learning. This functionality I will add in future development.

- The community dimension: In my system, a community can get diversity and engagement through interaction from global citizens and wide variety of skill and knowledge gathering pages.

- Constructing habitants: In my system, I am considering scale-back tools, platforms, features for building digital habitats through MVP so we can get better outcomes.

- Configuration: In my system, I am trying to make an application layout by focusing on community and individual user experience.

- Features: As I learned in the lecture my focus for the system is trying to develop few features which are needed for a community to interact for better visualization. As well as, I am adding dynamic icons for better design.

- Platforms: As a developer, I try to build an application for higher usability and adaptability by knowing the community.

- Technology stewardship: As technology stewards, I am trying to understand technology needs and try to implement them from the community. And, make a system which not harmful to community.

- PDSA: In my system, I am following Plan (Planning system), Do (work on system), Study (observe and examine my system), Act (If something is not working or people are not accepting change work on improvement) Cycle for developing, testing and implementing change to improve my system.

- Participation: In my system community is divided into two-part. Some members are a lurker and some members are a contributor.

- Cathedral Approach: In my application, I followed this approach for now because coding is developing by me according to my idea and understanding. Source code is visible but for only see.

- License model: In my system, I used CC BY-SA 4.0 license. This stands for creative commons attribution-ShareAlike license. We can use this license for a creative common project.

- Misinformation Handling: To handle malicious user in my system email verification process is add. If email is not verifying by user, then he/she not able to user post any query in discussion forum. As well as, admin have right to delete any post which is irrelevant.

So these are some concepts I used in my system to make a better design to fulfill my role as a technology steward.

IV. Conclusion & future work

Mobile application have a lot of potential for delivering high-effectiveness mental health services. Due to a global shortage of mental health professionals and a lack of mental health care services in rural areas, applications have emerged as a viable tool for bridging the mental health care gap. Technology has the potential to reshape how mental health care is presented and retrieved, but this change will necessitate the involvement of science, legislation, and design.

Future implementation:

- Multi language support
- AI based Chat Bot
- Online Appointment
- Live Channel of users own
- User health checkup using machine learning
- Integration of doctor in app for quick help
- Search box for find specific problem and detail
- Filter button to save time and compressed our search
- Include some metadata in search tool for easy search
- Auto populate subject when user share post
- Add some security to handle misinformation
- Adding gamification to activate user mind

V. References

[1] https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0239592 *(references)*

[2] https://www.worldhistory.org/Mahabharata/

[3] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5593510/

[4] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5897664/

[5] https://www.researchgate.net/publication/318019805_Mobile_applicaappl_development_process_A_practical_experience

[6] https://www.un.org/sustainabledevelopment/

[7] https://github.com/RMJ916/ense805-UN-goals-based-project/projects