

Final Year Project Proposal

TU856

MyTherapyPal: A therapy progress and goal tracking application

**Shane Buckley**

**C20703429**

School of Computer Science

TU Dublin – City Campus

**01/10/2023**

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Declaration

I hereby declare that the work described in this dissertation is, except where otherwise stated, entirely my own work and has not been submitted as an exercise for a degree at this or any other university.

Signed:

Shane Buckley\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Shane Buckley

01/10/2023

# *Summary*

**Overview**

This project, “MyTherapyPal” is an ambitious cross-platform mobile and rich web application aimed at providing psychotherapists, counsellors and their clients with a platform and tools to facilitate tracking therapy progress as its primary focus. In addition to tracking progress, the application will also offer user profiles, the ability for clients to connect with their therapists, a feature to allow therapists review their clients notes & progress and to assign tasks & provide suggestions. The app will be developed using Flutter, an open source framework developed by Google for building multi-platform native applications.

**Why is MyTherapyPal a good idea?**

MyTherapyPal addresses the need for therapists and their clients to have a single platform for tracking, recording, and managing progress in therapy and MyTherapyPal will provide them with a comprehensive, user-friendly application for this. The goal of this project is to not only develop and build the application but to also prioritize DevOps principles to provide a robust, reliable, and continuously improving application. The end deliverable will be a fully functional cross-platform application that fosters improved mental health outcomes and will aim to simplify the therapy experience for both therapists and their clients.

# *Background (and References)*

The concept of MyTherapyPal originated from conversations I have had with my mother, who is a qualified psychotherapist, and my partner who is qualified in the area of psychology, about the need for clients to better track their progress and goals in and outside of therapy. Although traditional therapy has its benefits, it can sometimes struggle to keep clients engaged outside of appointments. MyTherapyPal seeks to bridge that gap by facilitating an ongoing, interactive experience that enables clients to take charge of their mental health progress and feel a sense of responsibility for their journey.

The timeliness and significance of this project is emphasized by the increasing demand for accessible mental health care and the prevalence of mental health challenges. Contemporary lifestyles have created an environment conducive to developing a therapy app as the integration of technology into various aspects of daily life is ubiquitous and smartphones are ever-present.

Existing Solutions

**Quenza** - A digital health solution that helps therapists administer assessments and track patient progress over time.

Pros: Integrated telehealth features. Interactive and engaging tools for clients. Secure communication channels.

Cons: Monthly subscription required. Learning curve for some features.

Possible Improvements: Creating a more user-friendly and accessible design to reduce the learning curve, implement features such as mood tracking. Providing free access to the application and all of its features.

*Reference:* [*https://quenza.com/blog/knowledge-base/therapy-tool-apps/*](https://quenza.com/blog/knowledge-base/therapy-tool-apps/)

Existing Research

According to Diano, Sica, and Ponticorvo, mobile apps play a pivotal role in enhancing mental health by improving access to self-help resources such as mood tracking and emotional support assistants, as demonstrated in their study on the emotion regulation application "Safer".

Diano, F.; Sica, L.S.; Ponticorvo, M. Empower Psychotherapy with mHealth Apps: The Design of “Safer”, an Emotion Regulation Application. Information **2023**, 14, 308. <https://doi.org/10.3390/info14060308>

In the paper “Potential and Pitfalls of Mobile Mental Health Apps in Traditional Treatment: An Umbrella Review”, a total of 36 reviews published between 2014 and 2022 were identified by Cochrane library as a basis for their review. Some key findings were that mobile mental health apps can potentially circumvent barriers to traditional mental healthcare to provide timely, cost-effective, and discreet support which facilitates the various stages of treatment and improves outcomes. Some pitfalls surrounding the usage of these apps involve engagement challenges, safety issues and confidentiality breaches.

Koh, J., Tng, G. Y. Q., & Hartanto, A. (2022). Potential and Pitfalls of Mobile Mental Health Apps in Traditional Treatment: An Umbrella Review. Journal of personalized medicine, 12(9), 1376. <https://doi.org/10.3390/jpm12091376>

Another research paper I have reviewed, aimed to determine if mental health mobile apps actually work. In “Do mental health mobile apps work: evidence and recommendations for designing high-efficacy mental health mobile apps”, the researchers found that smartphone-based apps may expand the availability and quality of mental health treatment, and that they have significant potential to deliver high-efficacy mental health interventions by transforming how mental health treatment is delivered and accessed.

Chandrashekar P. (2018). Do mental health mobile apps work: evidence and recommendations for designing high-efficacy mental health mobile apps. mHealth, 4, 6. <https://doi.org/10.21037/mhealth.2018.03.02>

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# *Proposed Approach*

***Design and Research***

The first stage of this project will start with researching the various types of therapy, therapy techniques and their popularity here in Ireland. I will also conduct further research into existing mental health application solutions. This will be followed by a design stage where I will make use of wireframes to create an initial rough UI design, I will choose appropriate design patterns for the frontend/backend and will use flowcharts and graphs to illustrate the desired structure of the application and its features.

***Implementation***

The next stage of this project will be the implementation phase were the development of the MyTherapyPal application will commence. This will involve setting up the backend infrastructure using cloud services, selecting an appropriate database, and implementing secure user authentication mechanisms.

A continuous integration/continuous deployment (CI/CD) pipeline will be implemented at the beginning of this phase and will incorporate automated building, testing and deployment processes. This will ensure that any code changes pushed to the development or main branches of the codebase are seamlessly integrated and any potential issues are identified and addressed in real-time.

***Testing & Maintenance***

This phase will focus on testing and maintenance which will be integral to delivering a robust and reliable application. Automated testing frameworks are readily available off the shelf for use in Flutter and will be employed to rigorously test the different aspects of the application, some of which include functionality, security, and performance. It will be at this stage that monitoring and logging tools will be implemented to monitor infrastructure and application stability.

***Evaluation***

In the final phase of this project, we'll delve into a comprehensive evaluation process. This involves a multifaceted assessment, covering the spectrum from functional intricacies to overall user experience and application quality. Our methodology encompasses a blend of meticulous functional testing, both manual and automated, ensuring every aspect of the application's performance is scrutinized.

For a holistic perspective, we're not just stopping at technical evaluations. We're enlisting the expertise of qualified therapists and psychologists to conduct UX and UI surveys. Their insights will provide invaluable feedback on the user experience, helping us fine-tune the interface to meet the specific needs of our users.

Security is paramount, and thus, we're implementing rigorous security testing protocols. This ensures that our application is robust and resilient against potential vulnerabilities, and most importantly, maintaining strict confidentiality. Compatibility testing will verify seamless operation across different environments, while accessibility testing ensures that the application is inclusive and usable by individuals with diverse needs.

To quantify performance, we're not merely relying on subjective assessments. Performance metrics will be rigorously measured using known performance tracking tools such as Grafana, providing quantifiable data on speed, responsiveness, and overall efficiency. This exhaustive evaluation process aims to guarantee that our project not only meets but exceeds the highest standards across functionality, user experience, security, compatibility, accessibility, and performance.

# *Deliverables*

1. **MyTherapyPal Application:**
   * Develop a user-friendly and intuitive multi-platform application using Flutter for seamless access on both Android and iOS devices.
   * Implement a comprehensive progress tracking system, allowing users to log and visualize their therapy journey, goals, and insights.
   * Therapist Listings (Detailed therapist profiles).
   * Mapping function to find therapists in locality.
   * Secure Text Chat.
   * Secure Video Call/Session.
   * Payment options for therapy sessions through the application.
   * Journal summary/highlighting feature.
   * Therapist accounts can review client notes, assign tasks, and provide suggestions.
2. **Secure Communication Module:**
   * Implement security protocols and appropriate end-to-end encryption to facilitate confidential communication between clients and therapists within the MyTherapyPal application through chat and video features.
3. **Resource Hub:**
   * Establish a curated resource hub within the app, offering articles, exercises, and multimedia content to support users in their mental health journey.
4. **Continuous Integration/Continuous Deployment (CI/CD):**
   * Implement CI/CD pipelines using DevOps principles to automate the building, testing, and deployment processes, ensuring efficient and error-free updates.
5. **Automated Testing Framework:**
   * Develop a robust automated testing framework to validate the functionality, security, and performance of the MyTherapyPal application.
6. **User Authentication and Data Security:**
   * Implement a secure user authentication system to safeguard user data and ensure compliance with privacy regulations.
7. **Cross-Platform Compatibility:**
   * Ensure seamless functionality and aesthetics across different devices and operating systems, maintaining a consistent user experience.
8. **Goal Setting and Tracking:**
   * Integrate a goal-setting feature that allows users to set, track, and celebrate milestones in their therapeutic journey.
9. **Reminder and Notification System:**
   * Develop a reminder system to prompt users about therapy sessions, goal deadlines, and encourage consistent engagement with the app.
10. **User Analytics Dashboard:**
    * Implement a user analytics dashboard for both clients and therapists, providing insights into usage patterns, progress trends, and areas for improvement.
11. **Documentation and User Guides:**
    * Prepare comprehensive documentation and user guides for both end-users and developers, ensuring clarity on app functionality and maintenance procedures.
12. **Scalability and Performance Optimization:**
    * Design the application architecture with scalability in mind, optimizing performance for a growing user base and evolving requirements.
13. **Feedback and Iteration Mechanism:**
    * Integrate a user feedback mechanism to collect input on user experience and app functionality, enabling iterative improvements and updates.
14. **Accessibility Features:**
    * Incorporate accessibility features to ensure inclusivity and usability for users with diverse needs and abilities.
15. **App Store and Play Store Submission:**
    * Prepare and submit the MyTherapyPal application for approval on Google Play Store and Apple App Store, following their respective guidelines and standards.

# *Technical Requirements*

**Hardware:**

***Server Infrastructure:***

* Cloud servers (e.g., AWS, Azure) for hosting the backend services.
* Database servers for storing user data securely.

***Continuous Integration/Continuous Deployment (CI/CD) Pipeline:***

* Build server for automated compilation and packaging of the application.
* Testing servers for running automated tests.
* Jenkins/Github Actions

***Development Devices:***

* Development machines with necessary hardware specifications for software development using Flutter.

**Software:**

***Frontend Technology:***

Over the course of my time at TU Dublin I have learned about many frameworks and software development tools that have become popular in recent times, and one such framework that has struck me as interesting is Flutter, an open source software development toolkit created by google to build natively compiled applications for web, mobile and desktop applications from a single codebase using Dart programming language (a relatively new object-oriented, class-based, garbage-collected programming language with a C-styled syntax also developed by Google).

One of the main features of Flutter that really stood out to me is it’s hot reload feature, which works by injecting updated source code files into the running development machine and automatically rebuilds the application so you can quickly view the effects of your changes in real-time. Flutter also has an abundance of customizable widgets which provide a native-like experience for users.

Other solutions that I have considered include:

1. React Native: An open-source UI framework developed by Meta based in JavaScript for natively rendering mobile applications for iOS and android.
   * Pros: Cross-platform development, reusable components, hot reload.
   * Cons: Performance, limited access to native modules, large application size.
2. Vue Native: An open-source framework to build cross platform native mobile applications using JavaScript which makes use of the APIs of React Native.
   * Pros: Cross-platform development, single file components, access to native APIs
   * Cons: Smaller community compared to React Native, poor documentation quality.

***Backend Technology:***

I began researching backend technologies with the frontend technology already selected, for which I have decided to go with Flutter which is an open-source software development toolkit created by Google and is used to build natively compiled applications for mobile, web and desktop from a single codebase.

With the below solutions and their pros and cons in mind, along with my choice of frontend I have concluded that Googles Firebase will be best suited to my usecase as it integrates seamlessly with Flutter, is lightweight and provides simple out of the box solutions to multiple features within the application such as real-time secure chat & video and user accounts.

Here are some of the solutions I found that appear suited to my use case, along with some pros and cons of each:

1. Django (Django Rest Framework):
   * Pros: Robust, well-established, follows the Model-View-Controller pattern, integrates seamlessly with Flutter.
   * Cons: Learning curve for beginners, may have more boilerplate code.
2. Firebase:
   * Pros: Real-time database, easy integration with Flutter, serverless architecture, authentication and hosting out of the box.
   * Cons: Vendor lock-in, limited customization compared to some other backends.
3. Node.js with Express:
   * Pros: Fast and lightweight, great for building scalable APIs, large ecosystem of packages.
   * Cons: Requires more manual configuration compared to some all-in-one frameworks.
4. Spring Boot (Java):
   * Pros: Java-based, widely used for enterprise-level applications, good support for microservices.
   * Cons: Heavier than some other frameworks, may be overkill for smaller projects.
5. Ruby on Rails:
   * Pros: Developer-friendly, follows convention over configuration, rapid development.
   * Cons: May not be as performant as some alternatives, less common in Flutter projects.
6. Flask (Python):
   * Pros: Lightweight, easy to learn, good for small to medium-sized projects.
   * Cons: Less built-in functionality compared to Django, may require additional packages.
7. ASP.NET Core (C#):
   * Pros: Powerful, especially if you're in a Microsoft-centric environment, good for enterprise applications.
   * Cons: Learning curve for beginners, may be seen as less cross-platform compared to some alternatives.

***Authentication and Authorization:***

* Firebase provides an authentication SDK with many options for managing user authentication.
* The Firebase Authentication SDK provides options to implement email & password based authentication, federated identity provider integration (sign-in with Google, Apple, Facebook, Twitter, etc.), and phone number authentication.

***Secure Video Call***

* Secure video calling/sessions will be implemented using Agora plugin for Flutter, an open-source video conference solution with end-to-end encryption and a plethora of extra features such as video call recording.

***CI/CD Tools:***

* CI/CD tools such as Jenkins, GitLab CI, or GitHub Actions for automating building, testing, and deployment processes.

***Automated Testing Framework:***

* Testing frameworks for Flutter (e.g., Flutter Test, Mockito) to automate unit, integration, and UI testing.

***Version Control:***

* Git for version control, hosted on platforms like GitHub or GitLab.

***Containerization:***

* Docker for containerization, allowing consistent deployment across different environments.

***Monitoring and Logging:***

* Tools for monitoring server performance and logging (e.g., ELK Stack, Prometheus, Grafana).

***Notification Services:***

* Integration with notification services (e.g., Firebase Cloud Messaging) for push notifications.

***Security Measures:***

* Encryption protocols (e.g., HTTPS) for secure data transmission.
* Regular security audits and updates to address vulnerabilities.

**Infrastructure:**

***Scalable Cloud Architecture:***

* Utilize cloud infrastructure to ensure scalability and flexibility in handling varying workloads.

***Load Balancing:***

* Implement load balancing to distribute incoming traffic across multiple servers for optimal performance.

***Backup and Recovery:***

* Regular automated backup procedures and a robust recovery plan in case of data loss or system failures.

***Content Delivery Network (CDN):***

* Implement a CDN to optimize content delivery and reduce latency.

# *Conclusion*

In conclusion, "MyTherapyPal" may emerge as a valuable enhancement in the landscape of mental health applications. While it may not be groundbreaking, it will represent a thoughtful improvement on existing solutions aiming to address the evolving needs of psychotherapists and their clients. By providing features such as progress tracking, user profiles and a secure communication solution, the application seeks to simplify the therapy experience and improve client engagement and consistency.

Built on the Flutter framework, known for its versatility and efficiency, "MyTherapyPal" ensures a user-friendly and accessible cross-platform interface. In this way, the project recognizes the importance of leveraging existing technologies to elevate the standard of mental health support rather than reinventing the wheel.

As we move forward, "MyTherapyPal" aspires to contribute to the ongoing evolution of digital mental health solutions. Through incremental improvements and a commitment to user experience, the application endeavours to make therapeutic progress more manageable and transparent for both therapists and clients. In doing so, it becomes not just an app, but a reliable ally in the journey toward improved mental well-being.

# *References*

* Quenza - <https://quenza.com/blog/knowledge-base/therapy-tool-apps/>
* Diano, F.; Sica, L.S.; Ponticorvo, M. Empower Psychotherapy with mHealth Apps: The Design of “Safer”, an Emotion Regulation Application. Information **2023**, 14, 308. <https://doi.org/10.3390/info14060308>
* Koh, J., Tng, G. Y. Q., & Hartanto, A. (2022). Potential and Pitfalls of Mobile Mental Health Apps in Traditional Treatment: An Umbrella Review. Journal of personalized medicine, 12(9), 1376. <https://doi.org/10.3390/jpm12091376>
* Chandrashekar P. (2018). Do mental health mobile apps work: evidence and recommendations for designing high-efficacy mental health mobile apps. mHealth, 4, 6. <https://doi.org/10.21037/mhealth.2018.03.02>

# *Appendix A: First Project Review*

Title: Anxiety Manager (incorporating Wearable Technology)

Student: Katie Fitzgerald

Description (brief): This project aims to design and develop a mobile solution to give individuals with anxiety an innovative way to track their anxiety attacks and learn about their own anxiety.

What is complex in this project: The background research and development stages.

What technical architecture was used: The technical architecture of this system was a three-tier model with a front-end, back-end and middle layers and was developed in this order. Development work included creating user interface elements, the configuration of sensors, Arduino, and databases, as well as the construction of Java objects and Firebase queries.

Key Strengths/Weaknesses:

Some of the key strengths of this project include the background research, requirements gathering, design and development. A weakness of this project as I see it is the evaluation of the system which seemed to have been an afterthought with very little focus on this important step.

# *Appendix B: Second Project Review*

Title: Event Management Mobile App with Location Sharing and Cloud-based Recommender System

Student: Neil Pelow

Description (brief): The aim of this paper is to investigate the possibility of an intelligent system that can analyse the Facebook event preferences a user and, using location specific data, give relevant recommendations to the user. This project utilizes cloud hosting technology in order to achieve scaling for its Recommender System.

What is complex in this project: The development of the application.

What technical architecture was used: The student provided diagrams of the architecture of the project to explain how the android app maintains a local SQLite database for storing user information and that the app makes calls to Facebook’s login and graph APIs to access the users’ Facebook information.

Key Strengths/Weaknesses:

Some key strength of this project in my opinion include the simplicity of the code which lends to its efficiency and makes it highly extendable. A weakness of this project in my opinion would be the research and planning phase was not very comprehensive as suggested by the student in a section titled “Issues to Address if the Project was Repeated”