

# Lessons Learned Document

**Project Title:** Enhancing Customer Authentication with Time-Based One-Time Password (TOTP) Security

This document shares what we learned while working on the project. The project used Agile methods, and the lessons are grouped by each stage — from planning to testing.

---

## 1. Understanding the Problem and Planning

- Our first team discussions took time because everyone had different ideas about the problem and solution.
  - The original problem statement already included a solution, which made it unclear.
  - We didn't use the "Five Whys" method at first, so the issue wasn't fully explored.
  - After feedback from our instructor, we fixed the problem statement using the "Five Whys" and removed any solutions from it.
  - Writing a proper project charter helped guide us throughout the work.
  - Creating a heat map and keeping within the word limit took more time than expected.
  - Following Agile helped us make changes step-by-step and stay flexible.
- 

## 2. Gathering Requirements and Mapping the Process

- We created a process map to better understand how TOTP fits in.
  - We collected needs and expectations through lectures and survey questions.
  - Some of the early requirements were too detailed and expanded our workload.
  - Using Agile user stories made the requirements clearer and more organized.
  - We updated our requirements as we made changes to the OS, database, and web server.
- 

## 3. Database Design and ER Diagram

- At first, our app didn't connect well with the database, so we used XAMPP and phpMyAdmin.
  - It was confusing to decide if some tables should be one-to-one or one-to-many.
  - After team calls, we fixed the design and made it work.
  - We used MariaDB for the final database.
  - We added security like access control and encryption to protect data.
-

## 4. Architecture and Technical Diagrams

- We were confused about the difference between process and architecture diagrams.
  - After our instructor explained, we created the correct version.
  - The first version of the architecture was too complex.
  - We simplified the diagram, so it was easy to understand.
  - The architecture was updated as we built the application.
- 

## 5. Wireframe and UI Design

- We started with a simple design so users could easily use the website.
  - Our first wireframe didn't show enough details, which caused confusion.
  - We improved the design after getting feedback from user testing.
- 

## 6. Development and Testing

- We found some security issues in the TOTP setup and fixed them with help from peers.
  - We made scripts to quickly add test users to the database.
  - We built backend scripts to check if everything was working as planned.
  - We used Flask to run the website and added some clean styling.
  - We didn't have enough time to launch the site fully into production.
  - We started by testing a Facebook login case to learn how testing works.
  - We tested each page of the website to make sure everything worked well.
  - We plan to improve the site later by adding biometric login and better design.
  - Manual testing was done for all main features.
-