



**Implementing Usability in a Patient Feedback Management System**

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A proposal submitted to the Department of Information Technology in the School of Computing and Information Technology in partial fulfillment of the requirement for the award of the degree of Bachelor of Science in Information Technology at Jomo Kenyatta University of Agriculture and Technology.

2024

# DECLARATION

**Candidate’s Declaration**

This proposal is my original work and has not been presented for the award of a degree or diploma in any other institution.

**Signature:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  
**Date:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

VICTOR KIPKEMEI

**Supervisor’s Declaration**

This proposal has been submitted with my approval as the candidate’s supervisor.

**Signature:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  
**Date:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  
CHARLES WAMUTI

# ABSTRACT

Usability is a critical factor in the effectiveness of patient feedback management systems, as it directly impacts user engagement and the quality of feedback collected. Many existing systems face challenges related to complex interfaces, lack of accessibility, and insufficient user-centered design, resulting in limited patient participation. This project focuses on developing a patient feedback management system with usability as its core priority. By emphasizing intuitive design, accessibility, and user inclusivity, the system seeks to enhance the ease and efficiency of feedback collection. The research will examine how user interface design, accessibility features, and user engagement strategies influence the system’s usability. The findings will provide actionable recommendations for designing feedback systems that better meet the needs of diverse patient populations.

# CHAPTER 1: INTRODUCTION

## 1.1 Background

## Patient feedback plays a crucial role in enhancing healthcare services. However, many feedback systems are not user-friendly, resulting in underutilization and limited insights. A system that prioritizes usability and accessibility could significantly improve patient engagement, resulting in better data collection and, consequently, better healthcare service improvement. Usability in a patient feedback management system is fundamental to making it accessible for patients of different demographics and ensuring privacy, which is critical in healthcare.

## 1.2 Statement of the Problem

Current feedback systems are often poorly designed, resulting in low user engagement. For instance, a study by the National Health Service (NHS) reported that only 30% of patients engage with online feedback systems, mainly due to concerns over usability and trust. Similarly, a survey by the World Health Organization found that 40% of patients in developing regions lack access to user-friendly feedback channels. These statistics highlight the need for a more accessible, trustworthy, and user-centered approach to feedback systems.

## 1.3 Proposed Solution

To address the challenges of usability in patient feedback systems, a new system will be designed with a strong focus on accessibility and simplicity. The solution will emphasize the following key aspects:

1. **User-Centered Design:** The system interface will be intuitive and visually clear, catering to patients from diverse demographics. This ensures ease of navigation and reduces cognitive load during feedback submission.
2. **Multi-Platform Accessibility:** The system will support multiple platforms, including smartphones, tablets, and computers. This allows patients to provide feedback through their preferred device.
3. **Streamlined Feedback Process:** Feedback submission will be simplified using step-by-step prompts, predefined feedback categories, and minimal input requirements. Options for quick responses, such as ratings and checkboxes, will also be provided.
4. **Inclusive Design Features:** To ensure accessibility, the system will support features such as multiple languages, adjustable font sizes, and compatibility with assistive technologies like screen readers.
5. **Visual Feedback Summaries:** Patients will have access to summaries of previous feedback trends and actions taken, fostering transparency and encouraging continued engagement.
6. **Scalable and Adaptive Features:** The system will accommodate different healthcare environments, from small clinics to large hospitals, and will adapt to diverse patient needs over time based on usability feedback and analytics.

## 1.4 Objectives

**General Objective**:   
To design and implement a patient feedback management system that prioritizes usability, ensuring a user-friendly, accessible, and intuitive experience that enhances patient engagement and facilitates the collection of high-quality feedback.

**Specific Objectives**:

## To design an intuitive and visually clear mobile interface that caters to patients from diverse demographics.

## To develop a mobile app that supports both Android and iOS platforms.

## To implement step-by-step prompts, predefined feedback categories, and options for quick responses like ratings and checkboxes within the mobile app.

## To incorporate features such as multiple languages, adjustable font sizes, compatibility with mobile accessibility features, and scalability to accommodate various healthcare settings.

## 1.5 Research Questions

1. How can the usability of mobile-based patient feedback systems be improved to ensure better user experience and engagement?
2. How can mobile patient feedback systems be made more accessible across various smartphone models and operating systems?
3. What methods can be used to simplify the feedback submission process for patients using mobile devices?
4. How can mobile patient feedback systems be made inclusive and adaptable to different healthcare environments?

## 1.6 Justification

Effective patient feedback systems are critical for improving healthcare services. By focusing on usability and inclusivity, this project seeks to design a system that not only meets the needs of diverse patient groups but also ensures their trust in the feedback process. The outcomes of this research will provide healthcare organizations with actionable insights to enhance their services, leading to better patient satisfaction and care quality.

## 1.7 Proposed Methodology

The patient feedback management system will be developed using an Agile development approach, characterized by iterative design, continuous feedback, and regular testing cycles. This methodology allows for flexibility and adaptability, enabling the system to evolve based on user feedback at every stage. Each development sprint will result in a functional version of the system that will undergo testing and refinement to meet the needs and expectations of users.

For the development of the system, Flutter has been chosen due to its cross-platform capabilities, allowing the system to run smoothly on both Android and iOS devices using a single codebase. This ensures consistent user experiences across different platforms.

The backend will be powered by Firebase, offering real-time data storage, secure authentication, and scalable cloud services. This combination of Flutter and Firebase, along with the Agile methodology, ensures that the project remains flexible, user-friendly, and robust throughout its development.

## 1.8 Scope

The scope of the project includes the design, development, and testing of the patient feedback management system. The research will focus on the impact of usability, accessibility, and privacy on patient engagement. The project will involve testing the system with a representative sample of patients from different demographics.

# CHAPTER 2: LITERATURE REVIEW

## 2.1 Introduction

The implementation of usability in patient feedback management systems is a critical factor in improving healthcare services. A successful feedback system not only collects valuable insights from patients but also ensures that patients find the process easy to use and engaging (Kuniavsky, 2003). This chapter reviews existing literature on the design, usability, and privacy concerns in patient feedback systems, highlighting key factors that influence patient participation and satisfaction. It also examines case studies of existing feedback systems to identify best practices and areas for improvement (Schoenfelder et al., 2017).

## 2.2 Theoretical Review

The usability of a system is often evaluated based on a few key principles, including efficiency, effectiveness, satisfaction, and accessibility (Miller & Palen, 2000). Several theoretical frameworks guide the design of user-friendly systems, particularly in healthcare settings. These frameworks include:

1. **User-Centered Design (UCD)**

User-Centered Design (UCD) is a methodology that emphasizes involving the user at every stage of the design process, from initial research to final implementation. It stresses the importance of understanding user needs, behaviors, and limitations to create systems that meet those needs effectively. In the context of patient feedback systems, UCD ensures that feedback collection processes are designed in a way that is easy to navigate, inclusive, and engaging for all patients (Kuniavsky, 2003).

1. **The Technology Acceptance Model (TAM)**

The Technology Acceptance Model (TAM) suggests that the perceived ease of use and perceived usefulness of a system influence users' intention to adopt it (Davis, 1989). This model is particularly relevant when considering how patients may react to a feedback system. If patients perceive the system as easy to use and beneficial for improving their healthcare experience, they are more likely to participate (Davis, 1989).

1. **The Health Belief Model (HBM)**

The Health Belief Model (HBM) helps explain why people engage in health behaviors, including participating in feedback systems. According to HBM, an individual's perception of the severity of health issues, perceived benefits of action, and perceived barriers to taking action influence their behavior (Rosenstock, 1974). Applying this model to patient feedback systems could shed light on why some patients may avoid providing feedback, particularly if they feel that their feedback won't make a difference or if the system is difficult to use (Janz & Becker, 1984).

1. **Accessibility Guidelines**

The system will comply with the Web Content Accessibility Guidelines (WCAG) 2.1, ensuring it is usable by individuals with disabilities (Gómez et al., 2020). Key features include high-contrast themes for visually impaired users, text-to-speech for those with low literacy, and simplified navigation for elderly users. Additionally, the system will support voice feedback and include options for large font sizes and screen reader compatibility to ensure inclusivity (Gómez et al., 2020).

## 2.3 Case Study Review

## Several studies and implementations of patient feedback systems have demonstrated the challenges and successes of designing such systems. Some key case studies include:

## **Patient Feedback at NHS (UK) and MyChart Patient Portal**

The UK’s NHS patient feedback system faced challenges with user engagement, especially among elderly patients. However, through design iterations, including simpler language and improved accessibility features, participation increased by 15% (Vasilenko et al., 2019). In contrast, the MyChart system in the US successfully integrated patient feedback with EHRs, leading to actionable improvements in care (Schneider & Leung, 2020). However, it still struggles with reaching low-income patients. This project intends to integrate these best practices while also focusing on enhancing the inclusivity of feedback channels, ensuring access for patients with low literacy and disabilities (Schneider & Leung, 2020).

## **Experience Survey in a Kenyan Hospital**

In a study conducted at a Kenyan hospital, patients were invited to fill out feedback surveys after their appointments. The system used was web-based and required patients to access it via email. The feedback rate was low, and many patients reported difficulty using the system due to limited internet access and low digital literacy (Wells et al., 2019). The study recommended that feedback systems should include offline options, such as paper forms, and ensure that the system is accessible through mobile devices, as mobile phone usage is widespread in the region (Wells et al., 2019).

## 2.4 Integration and Architecture

The architecture of the patient feedback management system will be designed to ensure scalability, security, and seamless integration between different components of the system. The overall architecture follows a client-server model, with a mobile client application interacting with a cloud-based backend powered by Firebase. This architecture ensures that the system can efficiently handle real-time data and provide a responsive user experience across multiple platforms (Hussein et al., 2017).

1. **Frontend (Client Side)**

The frontend of the system will be developed using Flutter, which allows for building cross-platform applications with a single codebase. The Flutter framework will provide the system with a smooth and responsive user interface, designed to be intuitive for patients with varying levels of tech literacy. The application will support multiple feedback channels, including mobile app forms, voice feedback, and surveys. These will be integrated into the system to ensure ease of use for all patients, including those with accessibility needs (Hussein et al., 2017).

1. **Backend (Server Side)**

The backend of the system will be powered by Firebase, a scalable and secure cloud platform that provides several essential services. Firebase will handle real-time data storage, user authentication, and data synchronization across different devices. The database will store feedback submissions, user profiles, and administrative data in a structured manner, ensuring easy retrieval and analysis. Firebase’s security features will protect sensitive patient information through encrypted data storage and authentication mechanisms (Hodgkinson et al., 2018).

1. **Integration of Feedback Channels**

The system will integrate multiple feedback channels to maximize data collection. The mobile app will be the primary channel, with an intuitive interface for users to submit their feedback. Web forms will be available for users who prefer accessing the system via browsers, ensuring that the feedback collection is not limited to mobile devices. Additionally, voice feedback capabilities will be integrated into the Flutter app, allowing patients to submit feedback through speech, especially for those with limited literacy. These multiple channels will be unified under the Firebase backend, which will handle data processing and storage (Hussein et al., 2017).

1. **Data Flow and Communication**

Communication between the frontend and backend will be facilitated by RESTful APIs and Firebase's real-time database. Data entered by the user via the mobile app will be immediately sent to Firebase, where it will be processed and stored. The system will also include real-time updates for patients and healthcare providers, allowing for instant notification of new feedback or changes to existing entries. The architecture will ensure that all feedback is securely stored and accessible for analysis by healthcare providers, administrators, and other authorized personnel (Hodgkinson et al., 2018).

## 2.5 Summary

This chapter has examined the key theoretical frameworks and case studies relevant to the design and usability of patient feedback management systems. Theoretical models like User-Centered Design, the Technology Acceptance Model (TAM), and the Health Belief Model (HBM) provide a foundation for understanding how users engage with feedback systems. Case studies have highlighted the successes and challenges faced by existing systems, emphasizing the importance of intuitive design and accessibility. Ensuring an easy-to-use interface is critical in building a user-friendly system (Schoenfelder et al., 2017).

## 2.6 Research Gaps

Although significant progress has been made in the design and implementation of patient feedback management systems, several gaps remain that present opportunities for further exploration and improvement:

# **Limited Research on Demographic-Specific Usability**

While general usability principles are well explored, there is limited research on how different patient demographics (such as age, literacy levels, and health status) specifically influence the usability of patient feedback systems. Understanding these demographic-specific challenges can lead to more tailored and effective design solutions (Gómez et al., 2020).

# **Trust and Privacy Concerns**

The perceived trustworthiness and privacy of patient feedback systems remain a significant barrier to participation. Though several systems implement security measures, little research has been conducted into how privacy concerns influence user participation. Further investigation into the factors that build trust and ensure privacy in these systems is needed, especially in the context of sensitive patient data (Hodgkinson et al., 2018).

1. **Impact of Iterative Design on Usability**

While iterative design processes are common in agile development, there is limited research on how feedback from actual users impacts the final usability of healthcare systems, particularly in patient feedback management. Understanding the effectiveness of continuous feedback loops and their role in improving system usability could provide valuable insights for future developments (Hussein et al., 2017).

# **Accessibility for Patients with Disabilities**

Although accessibility guidelines exist (such as WCAG), there is a gap in research focusing specifically on how these guidelines are applied in patient feedback systems. Many systems fail to fully support patients with disabilities or those with limited digital literacy. Further studies could explore how to design inclusive feedback mechanisms that meet diverse patient needs, including those with cognitive impairments or hearing and vision challenges (Gómez et al., 2020).

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# APPENDICES

## BUDGET

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **ITEM** | **PURPOSE** | **COST PER UNIT** | **UNITS** | **TOTAL** |
| Laptop (Intel Core i5, 8GB RAM, 256 SSD) | For development and testing | 30,000 | 1 | 30,000 |
| Flash disk (16GB) | For data storage during the development process. | 1,000 | 1 | 1,000 |
| Internet and Hosting | For the deployment and maintenance of the Firebase backend. | 8,000 | 1 | 8,000 |
| UI/UX Design (Subscription to Figma) | Subscription to Figma to design intuitive and accessible interfaces. | 2000 |  | 2,000 |
| Miscellaneous | This includes unexpected costs. | 10,000 |  | 10,000 |
| **TOTAL** |  |  |  | **51,000** |

## PROJECT SCHEDULE

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ACTIVITIES | DURATION | EXPECTED START DATE | EXPECTED END DATE | DELIVERABLES |
| Problem identification | 2 weeks | 15/10/2024 | 29/10/2024 | Problem analysis report. |
| Proposal writing | 1 weeks | 2/11/2024 | 9/11/2024 | Project proposal document. |
| Literature review | 3 weeks | 11/11/2024 | 1/12/2024 | Literature review report. |
| Data understanding | 1 week | 3/12/2024 | 10/12/2024 | Collecting and analyzing datasets. |
| Data preparation | 1 week | 11/12/2024 | 19/12/2024 | Prepare the final datasets. |
| Modelling  And Evaluation | 6 weeks | 23/12/2024 | 5/2/2025 | Building models based on the datasets and Choosing the best model. |
| Development | 4 weeks | 5/2/2025 | 4/3/2025 | Final System |
| Testing | 2 weeks | 5/3/2025 | 19/3/2025 | System testing |
| Documentation | 2 weeks | 21/3/2025 | 4/4/2025 | Final project report. |

## GANTT CHART