**Usability Document**

### 1. Introduction

#### Purpose of the Document

This usability document is prepared to outline the strategies, evaluations, and recommendations aimed at enhancing the user experience for the Smart Hospital System. The system is designed as a comprehensive digital platform to optimize hospital operations, improve patient care, and streamline the management processes. This document serves as a foundational tool for developers, designers, and stakeholders to understand and address the usability aspects of the system throughout its lifecycle.

#### System Overview

The Smart Hospital System is an innovative solution intended to transform how hospitals manage their operations and engage with patients, doctors, nurses, and administrative staff. By integrating real-time access to essential information, the system ensures that all stakeholders are informed and capable of performing their duties effectively.

- \*\*For Patients:\*\* The system provides a user-friendly interface to manage personal and medical information, book appointments, and review medical history.

- \*\*For Doctors and Nurses:\*\* It offers tools to view and manage appointments, access patient vitals and records, and utilize hospital equipment efficiently.

- \*\*For Administrators:\*\* The platform supports overseeing scheduling, managing user accounts, and ensuring the availability and functionality of medical equipment.

The system aims to achieve high levels of user satisfaction by focusing on ease of use, accessibility, and performance. The ultimate goal is to create a seamless and responsive experience that meets the needs of all users, contributing to improved healthcare outcomes and operational efficiency.

### 2. User Profiles

This section provides detailed profiles for each user type interacting with the Smart Hospital System. These profiles help understand the specific needs, behaviors, and goals of different users, which are critical for tailoring the system's design and functionality to enhance usability.

#### Admin

- \*\*Role Description:\*\* Admins are responsible for the overall management of the hospital's digital operations. This includes overseeing scheduling, resource allocation, and user account management.

- \*\*Primary Goals:\*\*

- Ensure efficient operation and scheduling.

- Maintain accurate and secure data on users and hospital resources.

- \*\*Typical Tasks:\*\* Viewing and creating appointments, editing user accounts, and managing equipment status.

#### Doctor

- \*\*Role Description:\*\* Doctors use the system to manage their appointments, access patient information, and utilize medical equipment effectively.

- \*\*Primary Goals:\*\*

- Provide high-quality patient care.

- Efficiently manage their schedule and availability of medical tools.

- \*\*Typical Tasks:\*\* Viewing pending and completed appointments, updating patient diagnoses, and booking necessary equipment.

#### Nurse

- \*\*Role Description:\*\* Nurses assist doctors and play a key role in patient care management. They are pivotal in updating patient vitals and managing appointments.

- \*\*Primary Goals:\*\*

- Support doctors and ensure smooth operational flow in patient care.

- Keep accurate records of patient vitals and equipment status.

- \*\*Typical Tasks:\*\* Setting appointment statuses, managing equipment bookings, and updating patient information.

#### Patient

- \*\*Role Description:\*\* Patients interact with the system to manage their health care journey, including booking appointments and maintaining their personal and medical information.

- \*\*Primary Goals:\*\*

- Keep track of medical consultations and manage personal health data.

- Schedule appointments easily and access their medical history.

- \*\*Typical Tasks:\*\* Editing account details, viewing appointment history, and booking new appointments.

Each user profile includes specific system interactions and expectations which inform the usability requirements and testing procedures to ensure the system meets all user needs effectively and efficiently.

### 3. Usability Goals

Usability goals are critical benchmarks that guide the design and development of the Smart Hospital System to ensure it is effective, efficient, and satisfying for all users. These goals are aligned with the broader objectives of enhancing hospital operations and improving patient care. This section outlines the key usability goals that the system aims to achieve.

#### Effectiveness

- \*\*Goal Description:\*\* Ensure that all users can achieve their intended tasks successfully using the system.

- \*\*Measures of Success:\*\*

- Task completion rate by user type (Admins, Doctors, Nurses, Patients).

- Accuracy of task execution, such as correct data entry and retrieval.

- User ability to achieve tasks without assistance after initial training.

#### Efficiency

- \*\*Goal Description:\*\* Minimize the time and effort required for users to complete tasks, facilitating a smooth workflow.

- \*\*Measures of Success:\*\*

- Reduction in time to complete common tasks such as booking an appointment or updating patient vitals.

- Number of steps required to complete each task.

- System responsiveness and speed of loading data.

#### Satisfaction

- \*\*Goal Description:\*\* Ensure that the system is pleasurable to use and meets or exceeds user expectations.

- \*\*Measures of Success:\*\*

- User satisfaction ratings through regular surveys and feedback mechanisms.

- Frequency of use and user retention rates.

- User reports of discomfort or problems during interactions with the system.

#### Learnability

- \*\*Goal Description:\*\* Ensure that new users can rapidly learn to navigate and use the system effectively.

- \*\*Measures of Success:\*\*

- Time taken by new users to perform basic functions without guidance.

- Ease of learning for critical tasks as reported by new users.

- Reduction in help desk calls related to usability issues.

#### Accessibility

- \*\*Goal Description:\*\* Make the system accessible to users of all abilities, including those with disabilities.

- \*\*Measures of Success:\*\*

- Compliance with international accessibility standards (e.g., WCAG 2.1).

- User feedback from accessibility-focused usability testing.

- Ease of use with assistive technologies.

These goals are designed to create a user-friendly interface that not only meets the functional needs of the hospital's staff and patients but also promotes a high degree of usability across diverse user groups. Monitoring and measuring these goals through continuous user feedback and system testing will be critical in refining the system to better serve its users.

### 4. User Tasks and Scenarios

This section details the key tasks that different user groups will perform using the Smart Hospital System, accompanied by scenario-based examples to illustrate real-world applications of the system's features. These scenarios help in visualizing how users interact with the system and the contexts in which these interactions occur.

#### Admin Tasks and Scenarios

- \*\*Task:\*\* View all appointments.

- \*\*Scenario:\*\* An admin logs into the system every morning to check the schedule for all doctors and facilities to anticipate and manage any overlaps or conflicts.

- \*\*Task:\*\* Create an appointment.

- \*\*Scenario:\*\* An admin receives a call from a doctor requesting a last-minute appointment slot for a critical patient. The admin uses the system to quickly allocate the necessary resources.

- \*\*Task:\*\* Edit user accounts.

- \*\*Scenario:\*\* An admin updates the account of a doctor who has recently received a promotion, adjusting access permissions to reflect their new role.

#### Doctor Tasks and Scenarios

- \*\*Task:\*\* View pending appointments.

- \*\*Scenario:\*\* A doctor starts their day by reviewing the list of pending appointments to prepare for the cases and organize necessary medical records and tools.

- \*\*Task:\*\* Accept or decline appointments.

- \*\*Scenario:\*\* A doctor receives a notification for a proposed appointment and checks their schedule and patient priority before accepting or declining the appointment via the system.

- \*\*Task:\*\* Edit patient diagnoses.

- \*\*Scenario:\*\* After a consultation, a doctor uses the system to update a patient’s medical record with new diagnostic information to ensure continuity of care.

#### Nurse Tasks and Scenarios

- \*\*Task:\*\* Update patient vitals.

- \*\*Scenario:\*\* A nurse measures a patient's vitals upon arrival and enters the data into the system, ensuring that the information is up-to-date before the doctor’s examination.

- \*\*Task:\*\* Set appointment status to OnTime.

- \*\*Scenario:\*\* As patients check in, a nurse updates the status of their appointments in the system to 'OnTime', helping doctors stay on schedule throughout the day.

#### Patient Tasks and Scenarios

- \*\*Task:\*\* Book an appointment.

- \*\*Scenario:\*\* A patient experiences unexpected symptoms and uses the system to find and book the earliest available appointment with their primary care doctor.

- \*\*Task:\*\* View appointment records.

- \*\*Scenario:\*\* A patient accesses the system to review their past and upcoming appointments to prepare questions and follow-ups for their next consultation.

Each scenario illustrates typical interactions with the system, showcasing how it supports daily operations and enhances user experience across different roles within the healthcare environment.

### 5. User Interface Design

This section outlines the design principles, layout, and interaction strategies for the Smart Hospital System. The interface design is crucial for ensuring that the system is intuitive, user-friendly, and accessible to all users, including those with disabilities. This part of the document will guide the visual and interactive aspects of the system to meet the usability goals identified earlier.

#### Design Principles

- \*\*Consistency:\*\* Ensure that the interface remains consistent across all modules of the system to reduce learning time and confusion.

- \*\*Simplicity:\*\* Design screens with clarity and minimalism to avoid overwhelming users with excessive information or options.

- \*\*Feedback:\*\* Provide clear, immediate feedback for user actions to confirm successful operations or explain errors.

- \*\*Visibility:\*\* Keep all necessary options and information visible without cluttering the interface, enabling users to navigate easily and complete tasks efficiently.

#### Layout and Navigation

- \*\*General Layout:\*\* Use a grid-based layout to organize information clearly and logically. Key information should be easily scanable and primary actions prominently displayed.

- \*\*Navigation:\*\* Implement a primary navigation menu that is accessible from all parts of the system, with clearly labeled sections based on user roles (e.g., Admin, Doctor, Nurse, Patient).

- \*\*Accessibility Features:\*\* Include high contrast modes, text resizing options, and keyboard navigable interfaces to support users with visual or motor impairments.

#### Interaction Design

- \*\*Input Controls:\*\* Design input controls (buttons, dropdowns, text fields) to be large enough to interact with easily on both desktop and mobile devices.

- \*\*Forms Design:\*\* Structure forms to collect information in a logical order, minimizing the user’s cognitive load and increasing form completion rates.

- \*\*Error Handling:\*\* Design error messages to be contextually placed and constructive, guiding users towards correcting mistakes before proceeding.

#### Visual Design

- \*\*Color Scheme:\*\* Use a color scheme that reflects the healthcare industry's standards for professionalism and calm, such as soothing blues and clean whites.

- \*\*Typography:\*\* Select fonts that are easy to read across devices and sizes, ensuring legibility and accessibility.

- \*\*Icons and Images:\*\* Use intuitive icons and images that are culturally appropriate across diverse user bases to aid in recognition and understanding.

#### Responsive Design

- \*\*Adaptability:\*\* Ensure the interface scales smoothly across different devices, including desktops, tablets, and smartphones, maintaining functionality and aesthetics.

- \*\*Performance:\*\* Optimize images and assets to ensure that the interface loads quickly and performs well on all devices, especially on mobile networks.

This section sets the foundation for the user interface development of the Smart Hospital System, focusing on making the system intuitive, efficient, and accessible to enhance the user experience for all stakeholders.

### 6. Usability Testing

Usability testing is crucial to identify usability issues and validate design decisions with real users in real scenarios. This section outlines the methodology, participant profiles, and test scenarios for conducting effective usability tests on the Smart Hospital System.

#### Methodology

- \*\*Testing Approach:\*\* Use a combination of qualitative and quantitative methods, including task-based usability testing, interviews, and surveys.

- \*\*Environment:\*\* Conduct tests in a controlled environment that mimics the real-world usage settings, as well as in the field to observe actual usage conditions.

- \*\*Tools:\*\* Utilize screen recording, eye-tracking, and analytic tools to gather data on user interactions, errors, and efficiency.

- \*\*Iterations:\*\* Plan multiple rounds of testing throughout the development process to continuously refine the interface and interactions based on user feedback.

#### Participant Profiles

- \*\*Diversity:\*\* Include a diverse group of participants that matches the range of end-users, including doctors, nurses, administrative staff, and patients of various ages and tech-savviness.

- \*\*Special Needs:\*\* Ensure that participants also include people with disabilities to test accessibility features.

- \*\*Recruitment:\*\* Participants should be recruited from among actual users of the system where possible, or from similar environments.

#### Test Scenarios

- \*\*Admin Tasks:\*\* Admins are asked to create and manage user accounts, view and schedule appointments, and manage equipment inventory.

- Example Scenario: An admin must correct a double-booked appointment and notify the affected parties through the system.

- \*\*Doctor Tasks:\*\* Doctors interact with the system to view their schedules, access patient information, and update treatment records.

- Example Scenario: A doctor needs to reschedule several appointments due to an emergency and must access patient records to prioritize rescheduling based on health needs.

- \*\*Nurse Tasks:\*\* Nurses use the system to update patient vitals, manage appointment statuses, and assist in resource management.

- Example Scenario: A nurse updates the vital signs of multiple patients and coordinates with doctors to adjust care plans accordingly.

- \*\*Patient Tasks:\*\* Patients engage with the system to book appointments, update personal information, and access their medical history.

- Example Scenario: A patient attempts to book an appointment with a specific doctor and needs to navigate the system to find the earliest available slot.

#### Documentation and Reporting

- \*\*Findings Report:\*\* Document all usability issues identified during testing, with severity ratings and suggested fixes.

- \*\*Feedback Loops:\*\* Establish mechanisms to ensure that feedback from usability testing is integrated into the development process.

This section ensures that the system undergoes rigorous testing to validate its usability across all intended user groups. By closely involving users in the testing process, the system can be refined to better meet their needs and expectations, ultimately leading to a more successful implementation.

### 7. Results and Findings from Usability Evaluation

This section summarizes the key findings from the usability evaluation of the Smart Hospital System. The results include user feedback, observed usability issues, and specific bugs identified during testing. These findings will help guide further development and refinements to enhance system usability and user satisfaction.

#### Summary of Key Findings

- \*\*User Interface Issues:\*\* Many users reported that the user interface could be more intuitive and visually appealing. Suggestions include better use of color, typography, and layout to enhance readability and ease of use.

- \*\*Complexity in Task Completion:\*\* Users experienced difficulties with tasks that required multiple steps or inputs, such as creating appointments or managing user accounts. There is a need for simplifying these processes to improve efficiency.

#### Issues and Challenges

1. \*\*UI Improvement Needed:\*\*

- \*\*Problem:\*\* The general user interface lacks cohesion and modern design principles, which affects user satisfaction and engagement.

- \*\*Recommendation:\*\* Redesign the interface with a focus on simplicity and modern usability standards.

2. \*\*Appointment Creation Process:\*\*

- \*\*Problem:\*\* Users find the appointment creation process cumbersome due to the lack of dropdown menus for selecting departments and doctors.

- \*\*Recommendation:\*\* Implement dropdown menus for department and doctor selection to streamline the process.

3. \*\*User Account Editing:\*\*

- \*\*Problem:\*\* Admins face difficulties in editing user accounts due to the requirement of entering full names without search assistance.

- \*\*Recommendation:\*\* Introduce an autocomplete feature that displays matching user accounts based on the entered letters.

4. \*\*Equipment Management Interface:\*\*

- \*\*Problem:\*\* The equipment addition interface is confusing, with overlapping elements and unclear status selection.

- \*\*Recommendation:\*\* Redesign the equipment management page for better clarity and include dropdowns for room selection.

5. \*\*Management Features for Admin:\*\*

- \*\*Problem:\*\* Admins lack specific management options for overseeing doctors, rooms, and departments efficiently.

- \*\*Recommendation:\*\* Extend the admin panel functionalities to include comprehensive management options for these areas.

6. \*\*Filtering Appointments:\*\*

- \*\*Problem:\*\* Appointment filters do not function as expected, preventing effective sorting and viewing of appointments.

- \*\*Recommendation:\*\* Debug and enhance the filtering logic to ensure accurate and responsive filtering.

7. \*\*Equipment Booking Clarity:\*\*

- \*\*Problem:\*\* Doctors report confusion over the process of booking equipment, citing a lack of clear instructions and interface cues.

- \*\*Recommendation:\*\* Redesign the equipment booking interface to include clear steps and visual guides.

8. \*\*Filtering Completed Appointments:\*\*

- \*\*Problem:\*\* Doctors find that filters for viewing completed appointments do not work, hindering their ability to review past activities.

- \*\*Recommendation:\*\* Fix the filtering feature and ensure it is tested for reliability.

9. \*\*Edit Equipment Status by Nurses:\*\*

- \*\*Problem:\*\* Nurses find the options available for editing equipment status unclear and often irrelevant.

- \*\*Recommendation:\*\* Tailor the equipment status editing options to better suit the nurses' needs and workflow.

#### Recommendations for Future Development

The system should undergo a comprehensive review and redesign focusing on user-centered design principles. Future development cycles must prioritize iterative testing and feedback integration to address these usability concerns effectively.

### 8. Recommendations and Improvements

This section outlines actionable recommendations and suggested improvements based on the findings from the usability evaluation. These recommendations aim to address identified usability issues and enhance the overall user experience of the Smart Hospital System.

#### User Interface Redesign

- \*\*Redesign the UI:\*\* Implement a modern and intuitive user interface design that prioritizes clarity, consistency, and ease of use. This includes improvements to layout, color scheme, typography, and visual hierarchy.

#### Streamlined Task Flows

- \*\*Simplify Appointment Creation:\*\* Introduce dropdown menus for selecting departments and doctors during the appointment creation process to streamline and simplify the user flow.

- \*\*Enhance User Account Editing:\*\* Implement an autocomplete feature for user account editing to facilitate quicker and more accurate updates.

#### Enhanced Functionality

- \*\*Improvements to Equipment Management:\*\* Redesign the equipment management interface to provide clearer options for adding new equipment and selecting equipment status. Include dropdown menus for room selection.

- \*\*Expanded Admin Panel:\*\* Extend the admin panel functionalities to include comprehensive management options for doctors, rooms, and departments.

#### Bug Fixes and Error Handling

- \*\*Fix Appointment Filtering:\*\* Debug and enhance the filtering logic to ensure accurate and responsive filtering of appointments.

- \*\*Clarify Equipment Booking Process:\*\* Redesign the equipment booking interface to include clear instructions and visual cues for users.

- \*\*Ensure Filter Functionality:\*\* Fix the filtering feature for completed appointments to enable doctors to review past activities effectively.

- \*\*Tailored Equipment Status Editing:\*\* Customize the equipment status editing options for nurses to better suit their workflow and needs.

#### Usability Testing Iterations

- \*\*Continued Usability Testing:\*\* Conduct regular usability testing cycles throughout the development process to validate design changes and ensure ongoing usability improvements.

- \*\*User Feedback Integration:\*\* Establish mechanisms for collecting and integrating user feedback into future iterations of the system to address evolving user needs and preferences.

#### Training and Documentation

- \*\*User Training Materials:\*\* Develop comprehensive training materials and documentation to help users familiarize themselves with the system's features and functionalities.

- \*\*In-App Guidance:\*\* Implement contextual tooltips or help overlays within the system to provide guidance to users as they navigate through different tasks and features.

#### Accessibility Enhancements

- \*\*Accessibility Compliance:\*\* Ensure that the system adheres to international accessibility standards (e.g., WCAG 2.1) to accommodate users with disabilities. This includes providing support for assistive technologies and keyboard navigation.

#### Iterative Development Approach

- \*\*Iterative Development:\*\* Adopt an iterative development approach that prioritizes continuous user feedback and incremental improvements to the system's usability and functionality.

These recommendations are aimed at addressing the identified usability issues and improving the overall user experience of the Smart Hospital System. By implementing these improvements, the system can better meet the needs of its users and contribute to improved efficiency and effectiveness in hospital operations.