COMP3423

Human Computer Interaction

Group Project Report

Project Title: Revamp the "My Library" App

Group 08

Figma Link

Workload declaration table

Name	SID	Role(s)	Corresponding tasks
*Lee Kwok Hin	24075904d	1. UX Designer 2. Visual Designer 3. Prototyper	1. Designed the Home and Search flow in Figma 2. Critique and redesign strategy sections 3. Finalize the report
Cheok Chi Chon	24134206d	1. UI Designer 2. User Researcher 3. Interaction Designer	1. Designed the Book Details and Setting interface in Figma 2. Set up the Maze test scenarios and analyzed the heatmap data

1 Introduction & Case Study

1.1 App Overview

"My Library" is the official mobile application from the Hong Kong Public Libraries (HKPL). The application is designed to provide the public with mobile access to library service, including but not limited to searching library materials, reserving items, and locating nearest libraries.

Hong Kong Public Libraries, as an essential part of the education and cultural infrastructures, are a crucial utility for millions of citizens. It serves as the primary access point for both physical and digital knowledge resources.

1.2 Project Goal and Objective

This project will analyze the current "My Library" application to identify interface design flaws that damage user satisfaction and performance. Based on the identified problem and critiques, the project proposes possible solutions and implements a redesign. The ultimate goal is to produce a high-quality prototype that resolves the identified issues.

2 App Analysis & Redesign Strategy

In this section, we conduct a detailed evaluation of the existing "My library" application to identify critical design problems. We focus on five key design aspects that violate the core HCI principles. For each aspect, we first document the usability flaw, then analyze the underlying HCI violations, and propose a concrete design solution to resolve the problem and implement it in our prototype.

2.1 Aspect 1: Home Screen Layout & Navigation

2.1.1 Observation & Critique

The application's home screen features a bottom row icon, including "e-reading", "YouTube", "Facebook", etc., which visually mimics a standard bottom navigation bar. This design violates the user's mental model, as mobile users expect the bottom icons to represent internal navigation due to the pattern of modern applications. By using this primary space for external links that unexpectedly open a web browser, the user gets confused by the sudden shift away from the application.

Furthermore, the interface fails to strive for consistency, violating Shneiderman’s first rule. For example, the "e-reading" button serves as an internal navigation button, while the other social media button triggers an external redirection. This inconsistency prevents users from recognizing the system’s logic and pattern, leading to unpredictable behavior and an increased chance of errors in the application.

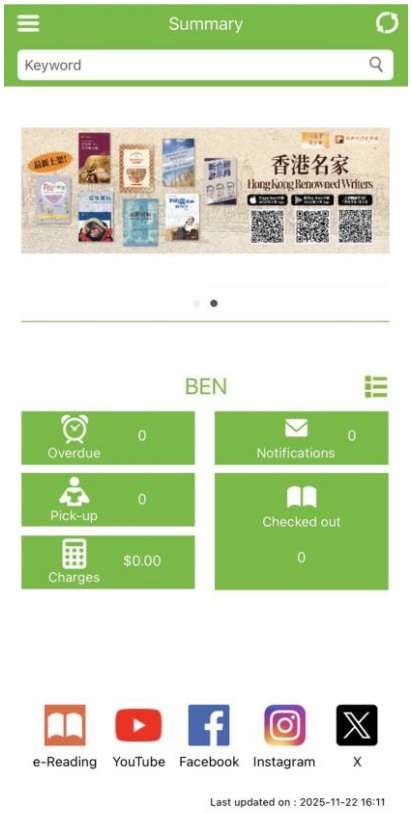

Figure 2.1: Home Screen of "My Library "

2.1.2 Proposed Redesign

To resolve these issues, we will implement a persistent bottom navigation bar with four standard internal navigation items: "Home", "Search", "My Account", and "More", replacing the current bottom row icons. External social media links will be relocated to a secondary section within the "More" tab. This approach ensures a predictable and stable pattern of interfaces and interaction that does not confuse users.

2.2 Aspect 2: Side Menu Complexity

2.2.1 Observation & Critique

The primary navigation system of "My Library" relies on a "Hamburger Menu" that reveals a long, flat list with over 20 items, ranging from critical features like "Search" to administrative links like "About this App." This structure violates Miller's Law, which states that human working memory is generally limited to processing 7 ± 2 chunks of information. Displaying over 20 items simultaneously exceeds the capacity and forces users to scan the list accordingly, rather than recognizing the options at first glance, which increases the cognitive load required to locate a specific feature.

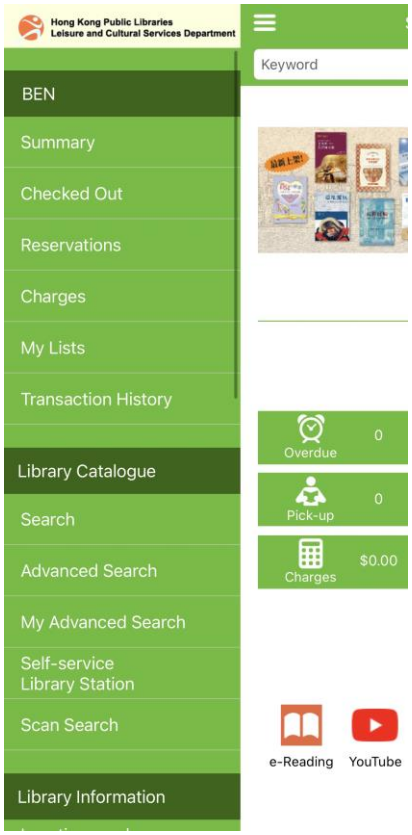

Figure 2.2: The side menu of the application

2.2.2 Proposed Redesign

We will simplify the complex side menu and distribute its content into the navigation tab. Primary features, such as accessing the "Library Catalogue", will be moved to the "Search" tab, while "Reservations", "My Books", and other similar features will be relocated within the "My Account" tab. Uncategorized and secondary items, such as "News" and "Library Stations", will be moved to the "More" tab. This ensures that high-priority and most used features are accessible with a single tap, while secondary items are still available but neatly hidden from the main screen, strictly aligning with Miller's Law.

2.3 Aspect 3: Search Interaction Flow

2.3.1 Observation & Critique

In "Advanced Search", users are presented with a vertical stack of generic bars labeled as "Please Select." To apply filters to a search, the user must tap on the bar, scroll through a list, and confirm their selection. This design heavily relies on recall rather than recognition. By hiding the options behind labels, the system forces users to retrieve information from long-term memory without visual cues, which significantly increases cognitive load.

Moreover, this multi-step filtering also fails to provide dialog closure. The interaction feels fragmented and tedious when compared to the interaction used in modern interfaces. The user must constantly switch context between the static form and the selection list without immediate feedback on how their choices affect the search result.

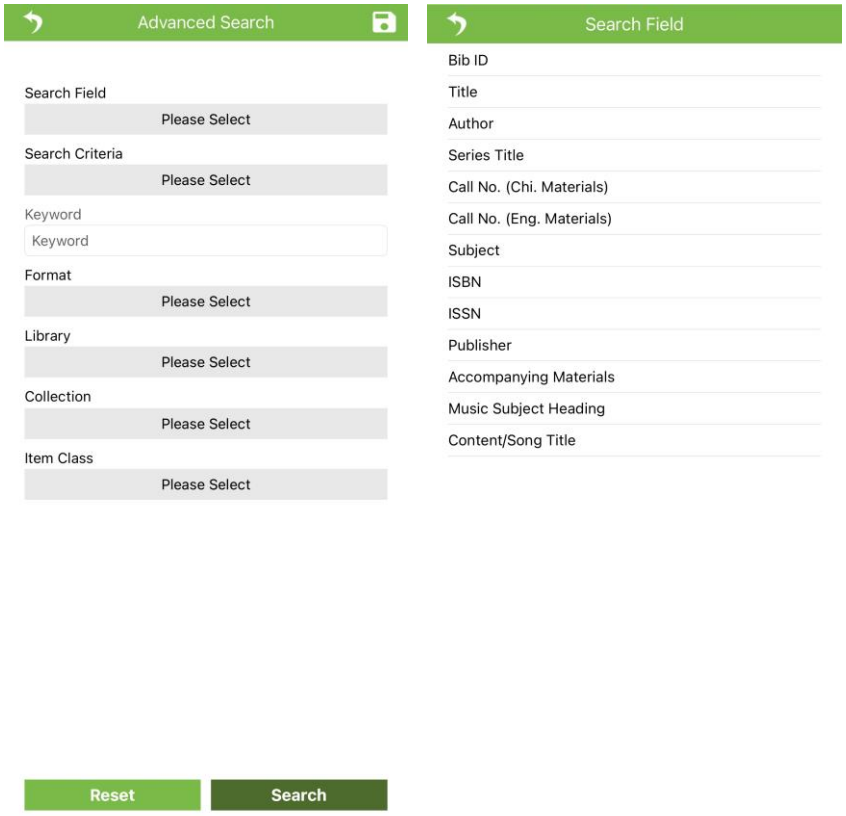

Figure 2.3 (left) & 2.4 (right): The procedure of selecting a filter in advanced search

2.3.2 Proposed Redesign

To resolve the issues, we suggest replacing the static search with dynamic smart filters that utilize chips that are displayed directly on the search result page within the new search tab. This allows users to recognize possible filters and toggle them instantly with a single press. After any changes to the filters, the application immediately retrieves the new search result and replaces the outdated result. This approach supports direct manipulation, reducing interaction cost, and providing immediate feedback to users.

2.4 Aspect 4: Search Results

2.4.1 Problem Analysis & Critique

The search result layout violates the principle of visual hierarchy. As shown in the screenshot below, every element in the table is displayed with a similar font size and

weight, creating a flat hierarchy. This forces the user to read line by line to filter out the administrative metadata from the content before obtaining the content they actually need.

Furthermore, the layout also violates the match between the system and the real world. The information displayed on the result page is more like a database structure, rather than a digital version of a book record.

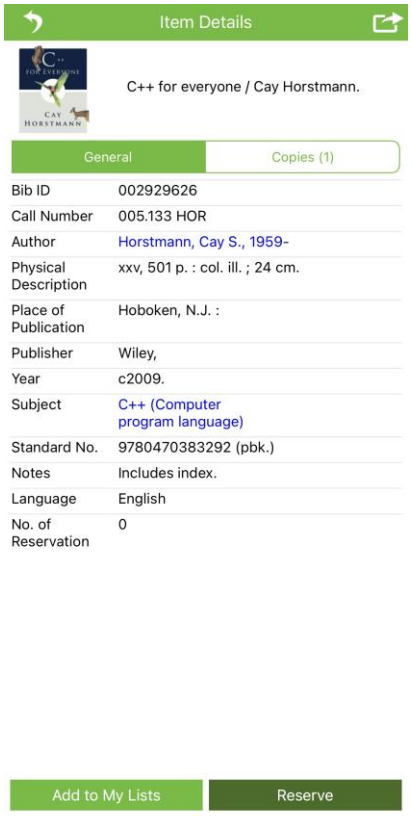

Figure 2.5: Book Detail page

2.4.2 Proposed Redesign

To resolve the issues, we propose redesigning the search result and detail view into a modern product page layout. The book cover will be enlarged and placed at the top to serve as a visual anchor. The title and author will be displayed in large and bold text. The less important information will be moved to the very bottom and will not be emphasized, ensuring the interface prioritizes the content users actually need.

2.5 Aspect 5: Fragmentation of Settings

2.5.1 Problem Analysis & Critique

The application's settings menu violates the principles of flexibility and efficiency of use. As demonstrated in the screenshots, options such as "Font Size", "Color", and "Language"

are presented as separate navigation items. To change a preference, the user must tap the item, wait for a new page to load, which contains a single slider or selector, make an adjustment, and then navigate back to the main menu. By fragmenting these controls into separate tabs, it forces users to repeat their work, which increases the time and effort required to configure the application. Furthermore, the fragmentation also violates the Gestalt Principle of Common region, as related controls should be grouped.

Figure 2.6 (left) & 2.7 (middle) & 2.8 (right): Fragmented settings pages

2.5.2 Proposed Redesign

To resolve the issues, we suggest consolidating these fragmented options into an “Appearance & settings” page within the “More” tab. This page will feature inline controls, as users can adjust multiple preferences simultaneously without leaving the page. This reduces the interaction depth from navigating various layers to a single control, effectively eliminating inefficiency.

3 Prototype Showcase

This section presents our prototype of the redesigned “My Library” application. The design was created using Figma and only includes the improvements that resolve the problem of violation of HCI principles proposed in Section 2. The following subsections show the details of the implementation.

3.1 Home Screen and Global Navigation

The redesigned Home Screen has provided a more precise and stable navigation through the implementation of the persistent bottom navigation. The navigation defined four primary pages, replacing the inconsistent icon button and side menu. The layout of the home pages utilized a widget-style approach to prioritize information. As Figure 3.1 shows, "My Loans" widget is positioned at the top of the view, using large text to indicate the due dates and loan status, providing the user with immediate information.

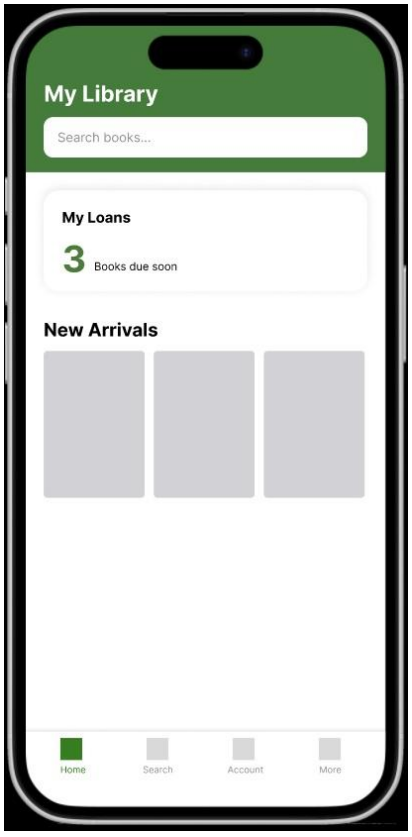

Figure 3.1: Redesigned home page with persistent navigation

3.2 Integrated Search and Filtering

The search interface consolidates the query input and filtering into a single functional view, eliminating the need for multi-page navigation. The design features a filter row below the

search bar, implemented as horizontally scrollable "chips". These "chips" allow users to apply parameters such as "Year", "Language", and "Library" with a single tap. The search results area has been reformatted for higher readability. The book covers are displayed larger, and the primary information is aligned vertically to support quick scanning.

Figure 3.2: Redesigned search result page with chips filtering

3.3 Book Details Page

The book details page has been rebuilt and adopts a modern application layout to prioritize primary content. The visual hierarchy is anchored by the book cover, which occupies the upper central portion of the screen. Crucial metadata, such as title and author, is rendered in a higher-weight heading to ensure users spend almost no effort locating the information. Additionally, a full-width "Confirm Reservation" button is added and fixed at the bottom of the screen, regardless of the book's content length.

Figure 3.3: Redesigned book details page

3.4 Centralized Settings Interface

The "More & Settings" tab consolidates the application's secondary features and user preferences into a unified control center. For example, the settings controls for "Font Size", "Theme Color", and "Dark Mode" are embedded directly into the interface using sliders, radio buttons, and switches, respectively. This enables users to modify their preferences without multiple navigations and receive immediate visual feedback. Additionally, the design utilizes grouped list items to separate general information from system preferences, successfully hiding less practical actions from users.

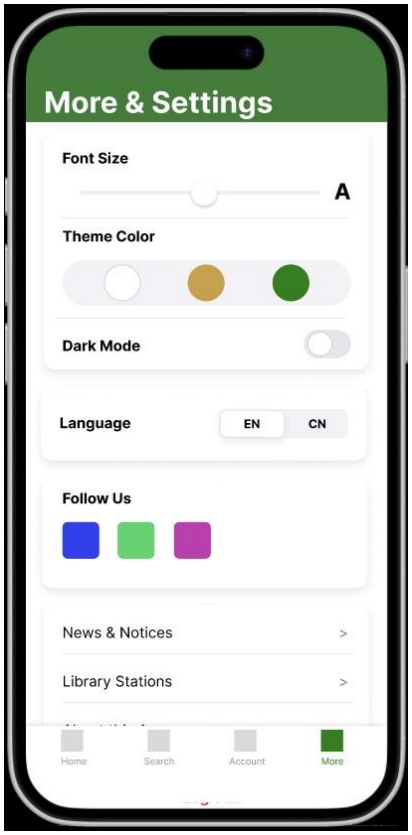

Figure 3.4: Redesigned Settings page

4 User Testing

4.1 Methodology

To validate the effectiveness of the redesign, we conducted a usability test using the Maze testing platform. The testing pool consisted of five participants who were familiar with mobile applications. The primary objective was to measure the efficiency and learnability of the new interface compared to the original application. Participants were asked to complete multiple tasks on the prototype. We calculated the success rates and misclick rate to quantify the improvements.

4.2 Test Paths

We designed multiple specific scenarios to test the major design improvements proposed in Section 2 and verify the redesign aligns better with HCI principles.

1. The user will navigate to the account page and try to change their password.
2. The user will navigate to the search page and search for a book, select the book “Python Programming” from the list and make a reservation request.

3. The user will navigate to the “More” tab and adjust the application’s text size to large.
4. The user will navigate back to the account page and identify their current outstanding balance.
5. The user will navigate back to the home page and identify the number of books currently marked as due soon using the dashboard widget.

4.3 Results & Analysis

The user testing results indicate a significant improvement in usability and efficiency across all the tasks. All five participants achieved a 100% success rate, with no critical errors reported. The results highlight two key areas of improvement.

The most significant effeciency gain was observed in making a reservation task. In the original application, the reservation button was difficult for users to find, while in the redesign, users easily spotted the "Make a reservation" button. The heatmap data confirms that the user intuitively recognized the button. The heatmaps show a strong positive correlation between the button placement and users' attention.

The heatmaps also show that the users did not have many misclicks during the tests, indicating that users can quickly understand the design and identify the correct button to click, rather than randomly clicking buttons. Therefore, the redesign also demonstrates good usability and is able to improve users’ satisfaction.

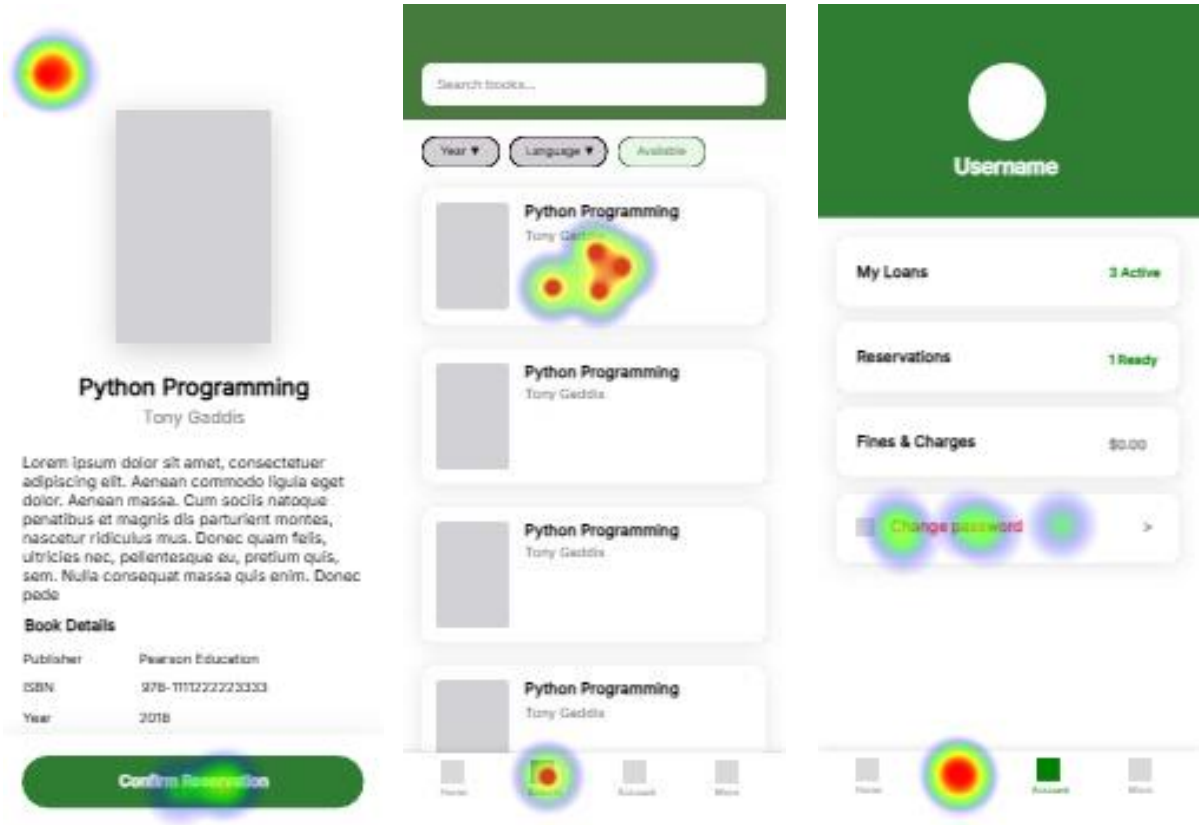

Figure 4.1 (left) & 4.2 (middle) & 4.3 (right): Maze heatmaps on tests

5 Conclusion

This project redesigned the “My Library” application to address critical usability flaws in navigation and information architecture. By applying HCI principles, we developed a high-quality prototype that features persistent navigation and dynamic filtering with an immediate response. User testing confirmed that these changes could significantly enhance usability and efficiency.