

FULL-COLOR WISA HUB PROTOTYPE

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Date	5 / 13 / 2020

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I. FULL-COLOR DESIGN

The aim of this WISA Hub UX design project is to build a one-stop, all-around mobile application prototype that satisfies both fundamental and personalized needs of target users. After shaping user personas and conducting user requirements analysis, initial storyboards have been developed in the form of wireframes. In this report, a full-color design, built on usability testing of initial wireframes and data collecting strategies which will be covered in Section II and Section III respectively, is presented.

All work is done on the **Proto.io** website¹. Project Html files and screenshots have been exported from the website, and then uploaded along with this report to the Moodle Turn-it-in drop box.

1.1. Design Strategies and Principles

In general, there are three strategies (史文雅 2016) that this project follows throughout:

- **prioritizing the design of the most important features;**

(For example, this project starts with the **Home** page since it is the central place where every other page has its root of navigational footprint, and proceeds to the **Side-navigation** page, followed by pages embedded in the **Home Tab Bar**.

Meanwhile, contents on the same page are ranked from top to bottom, with the topmost content being the most important.)

- **building pages from the overall to specifics;**

(The layout of a page is divided into clearly defined sections. Elements in a single section have the same logical functionality, and they are put together in a group or container for integrity and

¹ <https://proto.io/>

reusability. This helps users decide which areas they would like to pay closer attention to and which to ignore instead.

A hierarchy in layout is also created using variations of such properties as font size, font weight, font color, text indentation, size of shadow and etc. The differences in these aspects among elements also help show an obvious focus of a page.)

- **creating static pages first, followed by adding dynamic features among them.**

(Basic UI elements such as buttons, labels, lines, texts, and images are dragged onto the canvas before interactions (hide or show items, go to screens, change properties of items, bring items to the front or send them to the back of a screen, and etc.) are created to enable page motion.)

With regards to UX design principles, simplicity and clarity are always taken into consideration during designing(Colborne 2017). Here efforts have been put into streamlining user operations and showing clearly what a screen is designed for, what information users are able to obtain, which controls they can click, and how they can achieve their goals. In other words, each page should be self-evident or at least self-explanatory(Krug 2013).

Since pages that are composed of pure texts or pure images could cause confusion and thus hinder user cognition, a more reasonable approach is to combine and arrange them accordingly(刘津 2014). More design thinking will be explained in detail by representative examples in Section 1.2.

1.2. Main Pages in Detail

In total, four set of pages will be discussed: 1) **Home, Side-navigation** and **All Apps**; 2) **Calendar**; 3) **Cafeteria**; and 4) **My Account**. In the majority of cases, screens adopt a warm-color daylight theme, and sections shaped like cards or table rows are spaced apart from each other in a consistent way to facilitate smooth information acquisition.

First of all, let us look at the **Home** page shown in *Figure 1. The Home Page*. Entries points to different embedded features within this page are color-coded, some of which are illustrated individually in the

following figures. The idea is to keep only the most requested apps (among which are **Email**, **Library** and **My Student Record**) as a group of buttons in a rectangular grid, leaving other apps temporarily hidden, and to symbolize several other handy features using texts/icons in the top navigation bar and the bottom tab bar. When users need access to hidden features, they can simply click the **Left** button on the **Navbar** and view all the apps available. Users are also able to group a part of the apps into **My Favorites** which always appear at the top of the navigation page in a highlighted background (as is shown in Figure 2. The Navigation Page and The All Apps Page), with which the buttons group (ideally customizable by Drag-and-Drop) in the central section of **Home** is synchronized.

Figure 1. The Home Page

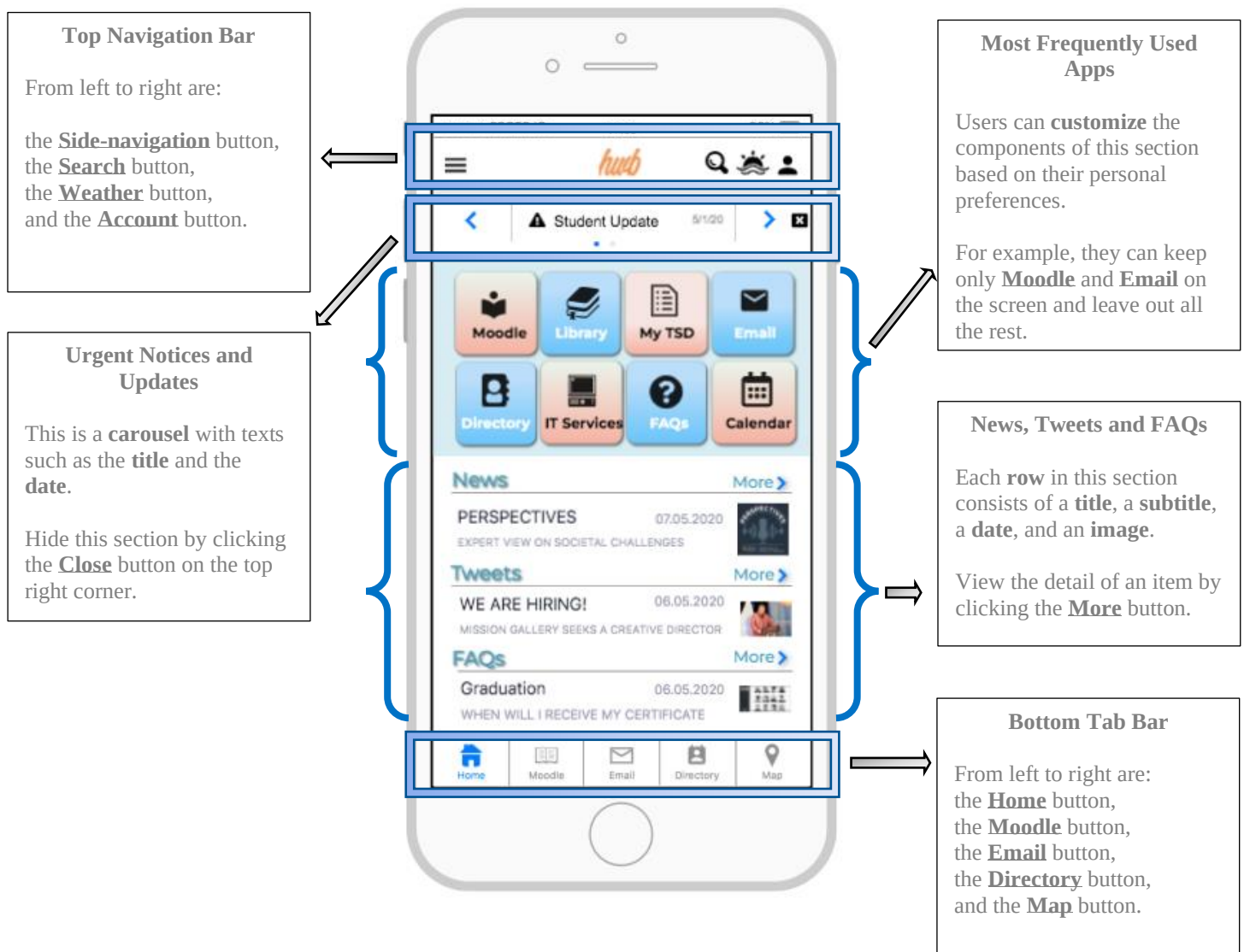
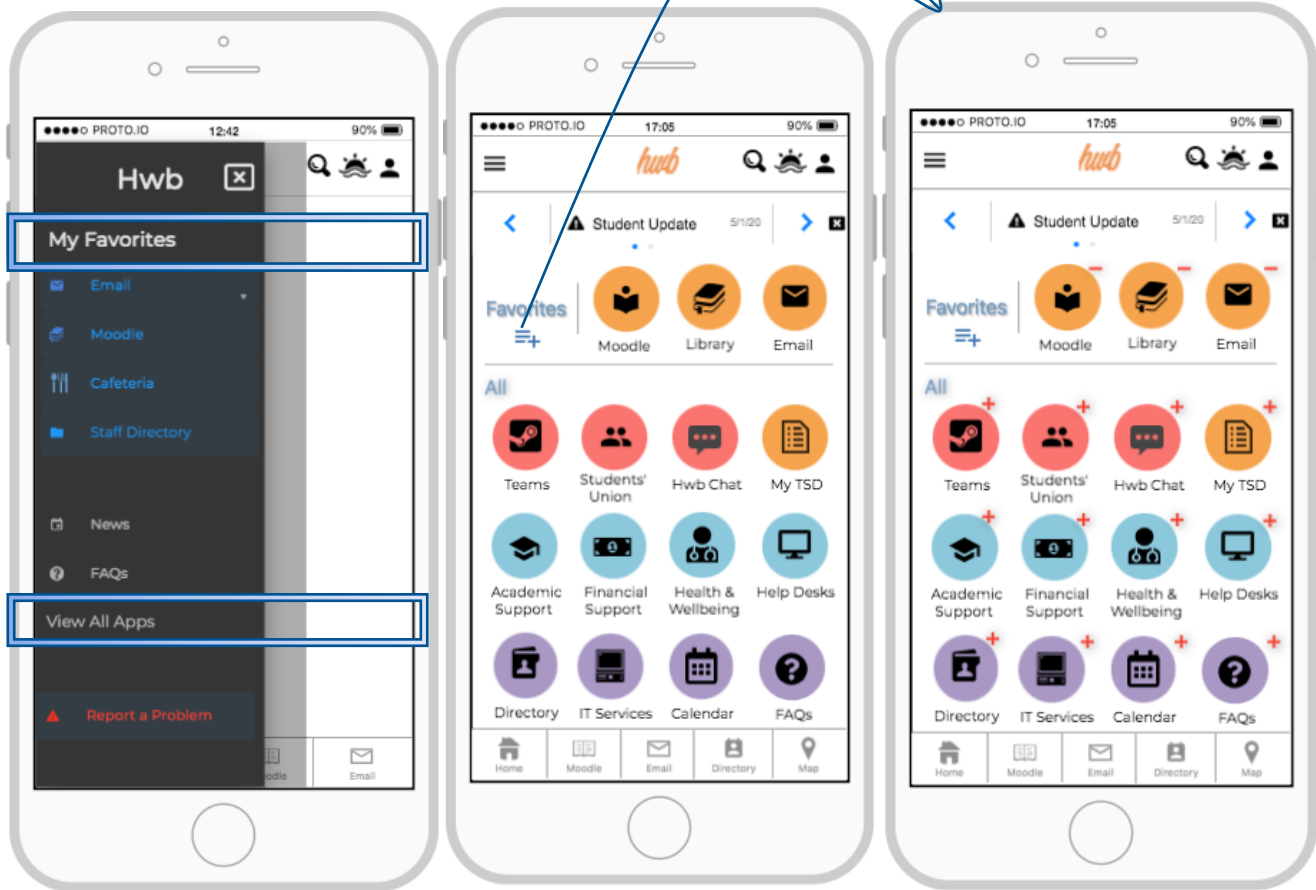


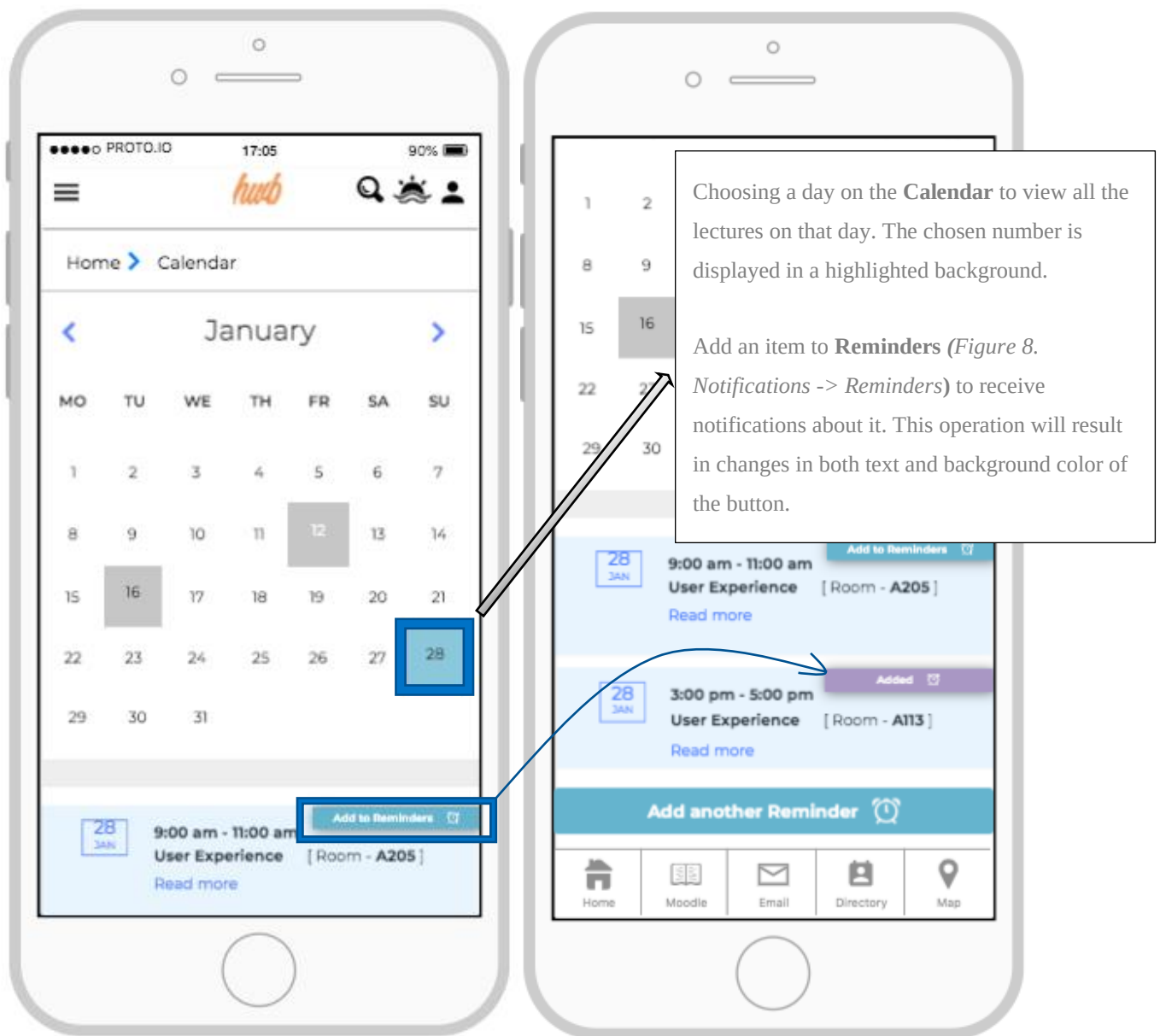
Figure 2. The Navigation Page and The All Apps Page



Another useful app is the **Calendar** (Figure 3. *The Calendar*) where users can not only browse information of lectures (name, time, and location) on a certain day, but they can also add personalized memos about other activities on the same day.

Next, the **Cafeteria** app (Figure 4. *The Cafeteria*) can be viewed as a value innovation (Rosenzweig 2015) compared to the current UWTSD Hwb app. A typical chain of operation goes from choosing a **campus**, and then a **Café**, to the **type** of dishes, and eventually to a certain dish on the menu. Additional details like ingredients, meal deals, the number of upvotes and downvotes can be found below the name and price of the dish. The **Save to Bookmarks** (for Read Later or Share) button is located on the bottom on the screen, and it is available in various types of **Detail** pages.

Figure 3. The Calendar



Finally, a set of pages in **My Account** are dedicated to personal information retrieval (**My Profile**, **My Balances**, **Bookmarks**, **Notifications**, and **Contact** books) and personalized **settings** (

Figure 5. My Account). These pages have a consistent iOS/Android **labeling system** (from the left to the right there are: a **thumbnail**, a black **title**, a grey **subtitle**, and a **control**).

To summarize:

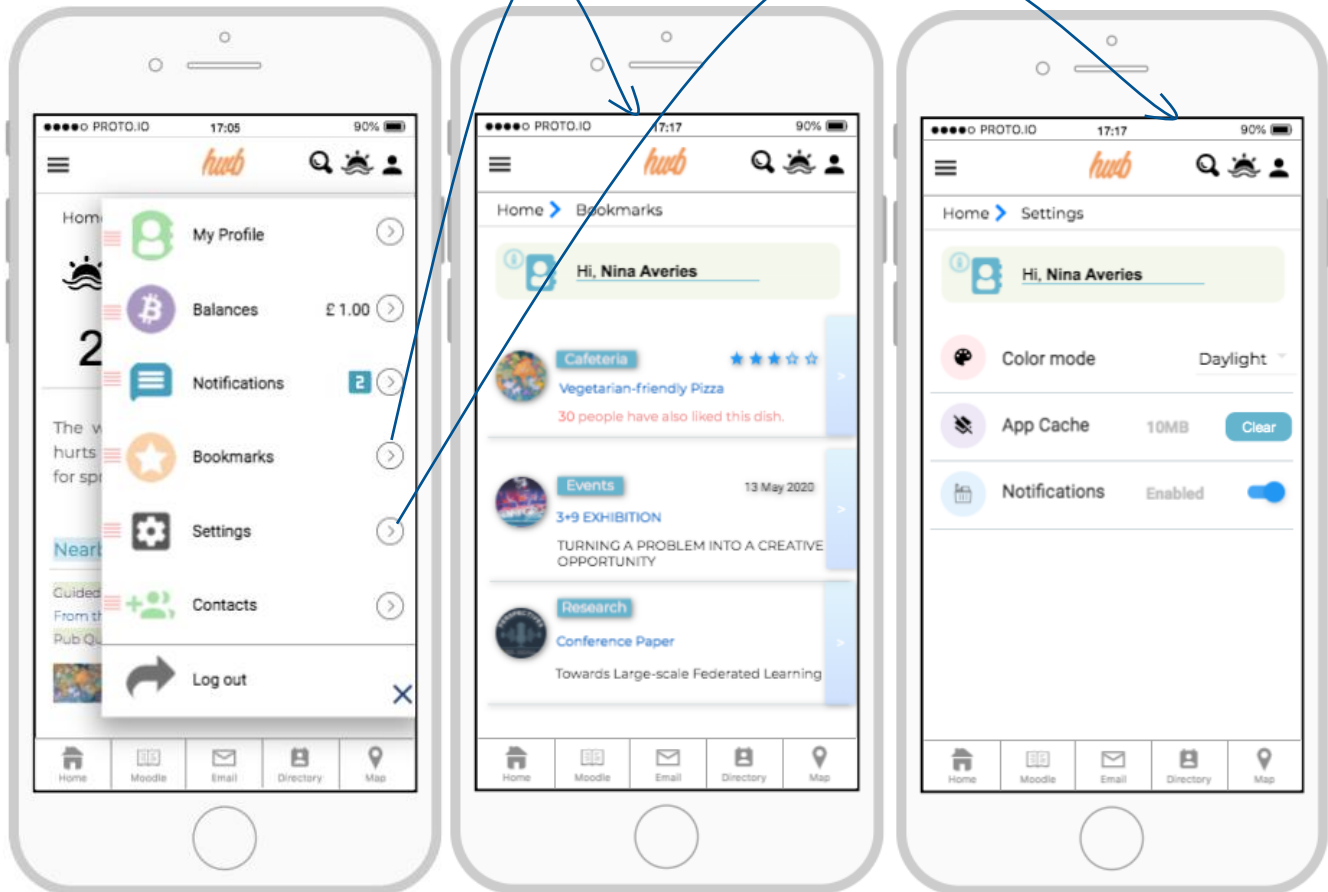
1. For **simplicity** and **clarity**, on each screen there is just enough essential information displayed for effective eye-tracking. Color and font variations are used to help user differentiate between data and identify the changes in states that they have made by manipulating certain controls.
2. For **efficiency**, most screens are less than 6 clicks away from the **Home** page which makes unlikely an overload of users' cognitive cost or negative emotions. **Breadcrumbs** and **Back** buttons are introduced for navigation between screens and through the hierarchical information architecture.

Figure 4. The Cafeteria



On the detail page of a dish, users can either **upvote** or **downvote** it, and numbers beside the hand gesture symbols will change accordingly.

Figure 5. My Account



In the next section, there will be a discussion on how usability tests are performed.

II. USABILITY TESTING

Before designers present their prototypes to users, it is preferable that a test plan is built first as a foundation for real-life tests. A test plan addresses questions like who, what, and how of usability tests (Rubin J 2008). It can include the **Task List (2.1)**, **Participants (2.2)**, and **Results Analysis (2.3)**.

In the test plan, 3 general pre-test questions regarding users' previous experiences are developed:

- 1) "What are the most frequently used features for you?";

- 2) “How often do you use the Hwb mobile app, and on which occasions do you prefer it to the web version?”;
- 3) “What improvements do you suggest it can make and what extra features would you like to add?”

All tests are carried out in **Zoom** meetings, a part of which are recorded with the permission of the participant. Overall, there are three testing stages:

- **Before** the tests, user demographics (age, gender & major) are collected and documented.
- **During** the tests, the online **Proto.io** mock-up prototype is made available to users, whose operations are monitored via screen sharing in Zoom, and who are encouraged to describe their thought process and voice their opinions. Relevant data are noted down and sorted out in the end.
- **After** the tests, participants are invited to rate the app and give their thoughts to which aspects of the prototype could be refined and which they honestly enjoy.

2.1. The Task List

In total, there are 10 tasks developed in an order of increasing difficulty:

- 1) Locate multiple entries to **Moodle** and **Email**;
- 2) View the overall assessment result for UX Design (through **MyTSD**);
- 3) Find out where the 2nd UX lecture on 28th of January will be held (through **Calendar**), and add it to **Reminders**;
- 4) Add the **Financial Support** app to **My Favorites**;
- 5) Find out what temperature might be around 13:30pm and what event will take place at 9:00pm;
- 6) Find out how much printing fees is left (though **Balances**);
- 7) Change the color theme to Sepia, clear app cache and disable app notifications;
- 8) Find out where the IQ building is (through **Map**) and its postal code;
- 9) View today’s **Meal Deals** in the Cardiff College café and upvote Pizza;
- 10) View all the reminder memos and find out how long before and where the 1st event will take place.

2.2. Test Participants

Although a previous study has shown that 5 users are enough to help track down 85% of usability issues (King, Churchill et al. 2017), considering that in my case both the number of tasks (**10**) and the number of users (**12**) are relatively small, this project adopts the within-subjects design approach where

each participant perform all tasks, instead of between-subjects where each part of a product get tested by a unique set of users.

The characteristics of end users are summarized in the table below(Rubin J 2008):

Table 1. Characteristics of Participants

Characteristics	Number of Participants		
Total	12		
Age	(18-21) - 7	(22-24) - 5	
Gender	Female - 6	Male - 6	
Hwb Mobile App Experiences	Regular - 2	Occasional - 9	Never: 1
School (Department)	Arts - 3		Engineering - 2
	Computing - 3		Business - 4
Top 2 Most Frequently Used Features	Email, Library		

2.3. Test Results Assessment

In this project both quantitative and qualitative measures are used to assess test results (Rubin J 2008):

- **Quantitative** Performance Criteria:
 1. Time required to complete a task;
 2. Time actually spent on performing a task;
 3. Number/Percentage of tasks completely without assistance;
 4. Number/Percentage of tasks completely with assistance;
 5. Number/Percentage of tasks uncompleted within the pre-defined benchmark timing;
 6. Number of incorrect controls clicked for a task;
 7. Number of all controls clicked for a task.
- **Qualitative** Preference Criteria:
 1. Overall comments on the prototype (ease of use, layout, color combination and etc.);
 2. Which aspects has been improved or compromised compared to the current Hwb app;
 3. Percentage of functionality regarded to be useful;
 4. How well users take advantage of shortcut controls;

5. How easily users obtain relevant information on a single page;
6. How well users understand what a page is created for;
7. User ratings and advices.

To counterbalance the effects of transfer of learning, for users with zero UWTSD Hwb experience, a brief cognitive walk-through is carried out. Major results are recorded in *Table 2. Test Results – Summary*:

Table 2. Test Results – Summary

Modules	Results
Average time of completion (required) (per task)	20s
Average time of completion (per user and task)	30s
Average number of incorrect controls clicked per task	1
Average number of total controls required per task	3
Average number of total controls clicked per task	4
Average number/percentage of tasks completely without assistance	7
Average number/percentage of tasks completely with assistance	2
Average number/percentage of tasks uncompleted	1
Top 2 Most Appreciated New Features	Cafeteria, Contacts
Average user ratings (Overall – 3.79)	Color & Layout – 3.75
	Ease of Use – 3.83

Among the hot spots (worst problems) commonly encountered during testing is controls which have a low contrast/discoverability. This problem can be mitigated by adding around texts: 1) a proper padding 2) a two-dimensional shadow or 3) a hand gesture icon. Similarly, issues caused by controls with a limited clickable area can be well resolved by making the whole row tappable.

The majority of participants prefer the customizable buttons group (which holds up to a maximum of 8 buttons) on the **Home** page to the dashboard design (all-apps-in-one-page) in the current Hwb mobile app.

By conforming to the Hick-Hyman Law², this type of design keeps users engaged by preventing them from being overwhelming by too many choices.

A more comprehensive definition of usability is “the extent to which a product is used by users in an effective, efficient, error-tolerant, easy-to-learn and engaging way”³. While the first four adjectives are task-oriented and focuses on a smooth flow of controls, moving beyond them and encompassing interface design are important to keep users coming back. Desirable/pleasurable content is more about forming an emotional bond between users and products⁴.

Occasionally there may exist conflicts of interest between usability and user interface design. In the example of this project, the font style has been changed to a sans-serif Montserrat from an artistic serif font, in order to create a sense of being modern and approachable. Besides, for international students who are not familiar with traditional English handwriting styles, san-serif fonts can also be easier to understand than classic serif fonts (as illustrated below in *Figure 6 5*).

Figure 6. Serif vs. Sans-serif



² <https://www.interaction-design.org/literature/topics/hick-s-law>

³ <https://www.wqusability.com/articles/more-than-ease-of-use.html>

⁴ <https://www.interaction-design.org/literature/article/usability-a-part-of-the-user-experience>

⁵ <https://cgfrog.com/serif-vs-sans-serif-final-battle/>

III. COLLECTING DATA

Upon the completion of all tests, there should be a wealth of data which, through compilation, summarization and analysis, can be transformed to insightful knowledge(Rubin J 2008). Knowledge enables a higher level of intelligence concerning: 1) how the mode of usage and impressions of the app evolve over time; 2) difficulties people have in usage that result in an interruption in action, either due to dissatisfaction or technical issues; 3) high points of joy in usage whose sources have potentials for contributing to an even more excellent experience (Hartson R 2018).

Google Analytics⁶ can provide exhaustive real-time reports containing key metrics such as:

- ***Session Duration*** (total duration of all sessions / number of sessions);
- ***Page Views, Unique Page Views per minute & Top Active Pages*** (useful for mining relations between certain time of day/month/year and app usage);
- ***Bounce Rate*** (the percentage of single-page sessions divided by all sessions⁷; a measure of “stickiness” that determine how well the landing page generate interests of visitors⁸);
- and ***Behavior Flow*** (a report that visualizes users’ traveling path; useful for discovering what content keeps users engaged and potential content issues).

Compared to wireframes, high-fidelity prototypes capture much richer emotional data. Therefore, in addition to utilization of automatic commercial data collection services like Google Analytics, there are also modules through which we can better understand user requirements and behaviors. For example:

- ***Search*** (the history of which can be fed into machine learning models for next-word prediction);
- ***Upvotes, Downvotes & Bookmarks*** (the statistics of which can also be processed by machine learning models for precise personal recommendations);

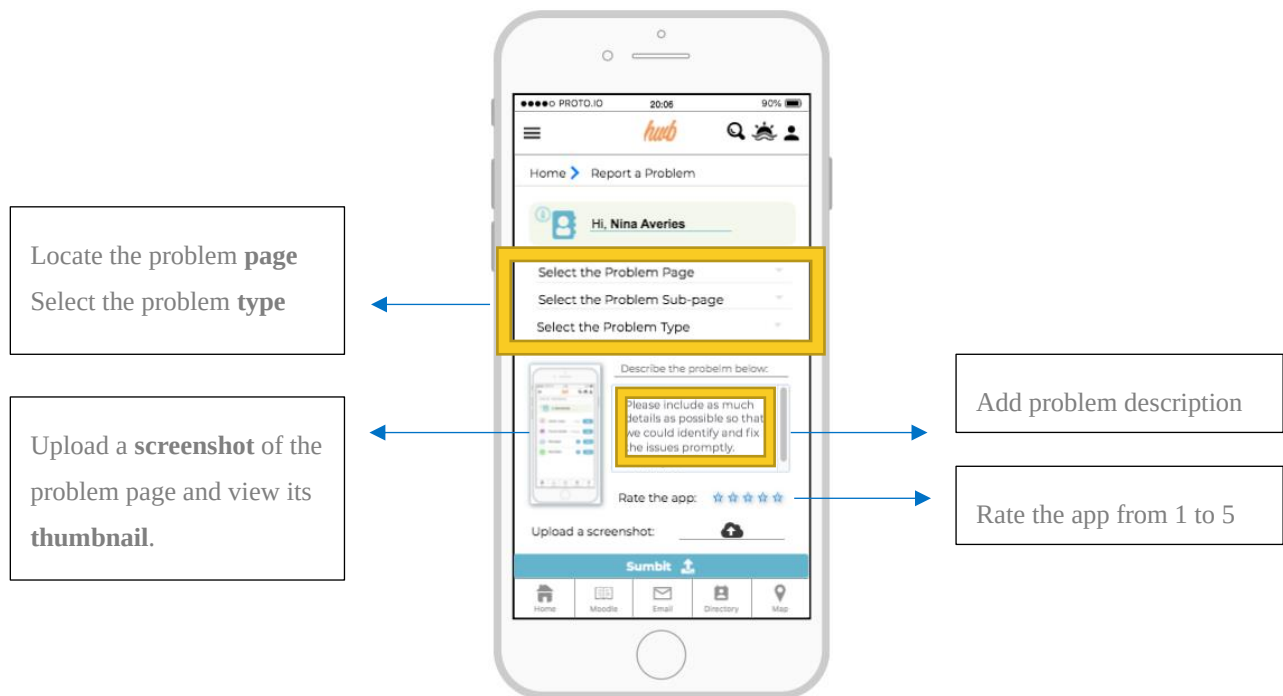
⁶ <https://analytics.google.com/>

⁷ <https://support.google.com/analytics/answer/1009409?hl=en>

⁸ https://en.wikipedia.org/wiki/Bounce_rate

- **Hwb Chat & Report a Problem** (as shown in *Figure 7*) (can be very useful for efficiently and effectively collecting user feedbacks and further sentiment analysis).

Figure 7. Report a Problem



IV. SUMMARY

Any high-quality user experience must be a product of seamless merging of knowledge from multiple angles, including user requirements analysis, information architecture design, graphical interface design, and interaction design.⁹

The first two areas have been discussed in the previous report. In this report, a full-color Hwb mobile prototype tailored for WISA students is presented. The design itself, along with its design thinking, usability testing, and data collecting methods is also covered. Some areas are clarified in a relatively fine-grained way, such as the layout and functionality of the **Home** page.

The remaining set of pages not yet discussed are displayed in the *APPENDIX*. An online version is also available from 9th May to 9th June): <https://pr.to/WJ4LPH/>.

⁹ <https://www.nngroup.com/articles/definition-user-experience/>

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APPENDIX

Figure 8. Notifications -> Reminders

