



DECO 7250

Human-Computer Interaction

Report3: High Fidelity Prototype & Expert Evaluations

Team: Space Pirate

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Table of content

1.0 Introduction	4
1.1 <i>Background statement of the problem</i>	4
1.2 <i>Teamwork Processing</i>	5
1.2.1 <i>Processing Description (Week log Demonstrate)</i>	6
1.3 <i>Overview of response Feedback from Report 2</i>	8
2.0 Step1 Design Alternatives	10
2.1 <i>Overview:</i>	10
2.2 <i>One sentence problem statement.</i>	10
2.3 <i>Design guidelines</i>	12
2.4 <i>System requirements statement</i>	14
3.0 Step 2: High Fidelity Prototype	16
3.1 <i>Overview</i>	16
3.2 <i>Change Log</i>	17
3.3 <i>New Features</i>	19
3.4 <i>Personal Profile Edit</i>	20
3.5 <i>Scenario to demonstrate the usage flow</i>	22
3.6 <i>High Fidelity Prototype Presentation</i>	28
3.7 <i>Interaction Diagrams</i>	45
3.8 <i>Prototype Downloads on testing purpose</i>	49
4.0 Step 3: Evaluation	50
4.1 <i>Overview</i>	50
4.2 <i>Evaluation method</i>	51
4.2.1 <i>Heuristic Evaluation</i>	51
4.2.2 <i>Pluralistic walkthrough</i>	51
4.2.3 <i>TAM</i>	51
4.3 <i>Evaluation protocol</i>	52
4.4 <i>Outcomes of evaluation</i>	59
4.4.1 <i>The main results of heuristic evaluation:</i>	59
4.4.2 <i>TAM survey results</i>	60
4.5 <i>Key findings</i>	61
5.0 Step 4:Establishing Requirements	62

<i>5.1 Overview</i>	62
<i>5.2 Analysis</i>	62
6.0 Conclusion	67
7.0 Appendix	68
<i>7.1 Heuristic Evaluation Forms</i>	68
<i>7.2 Appendix 3 Consent forms</i>	71
<i>7.3 Appendix 2 TAM survey</i>	74

1.0 Introduction

1.1 Background statement of the problem

Mobile applications quickly infect every smartphone user in the world like a virus, affecting human lives. Until 2015, the apparently growing trend of mobile apps has been seen, as the number of visits to personalised apps surged by 332% during the year (Khalaf, 2015). The reason for the rapid growth of mobile applications is that mobile applications have indeed enriched human lives and increased productivity. For example, Facebook and Twitter have changed the way of communications and access information.

On the other hand, according to a survey report by Ellucian (2017), 87% of university students will consider the technology level of the target university before applying to the university, because they believe that the technical facilities provided by the university are conducive to adapting them to campus life. Therefore, higher education institutions have joined the team of developing mobile apps one after another. They want to use mobile apps to improve learning efficiency and optimise the campus life of students.

However, Cortez (2017) pointed out that in the Ellucian survey, 42% of respondents still said that they must log in three or four mobile application platforms to get enough campus information to meet their needs. This is the first sign of the problems with mobile apps that universities offer to students.

In Australia, almost all universities have mobile apps for students. For example, the QUT app of the Queensland University of Technology, Uni-verse app of the University of New South Wales. However, under some scenarios, these mobile applications have not only failed to provide convenience but have caused problems for students. The University of Queensland offers eight applications for students with a single function and a poor user experience. For example, a student driving to the St Lucia campus, the user needs to use Parking at UQ app to reserve a parking space, then open UQ Time Planner to determine his classroom and time, at last, open UQ Nav to find the building where the classroom is located. Students must switch between these applications to meet their needs, and the cumbersome operating experience makes these applications contrary to the original purpose of the University of Queensland.

Hence, the project will focus on designing a mobile app that integrates all university services and functions, providing students with efficient use of on-campus facilities and smooth user experience.

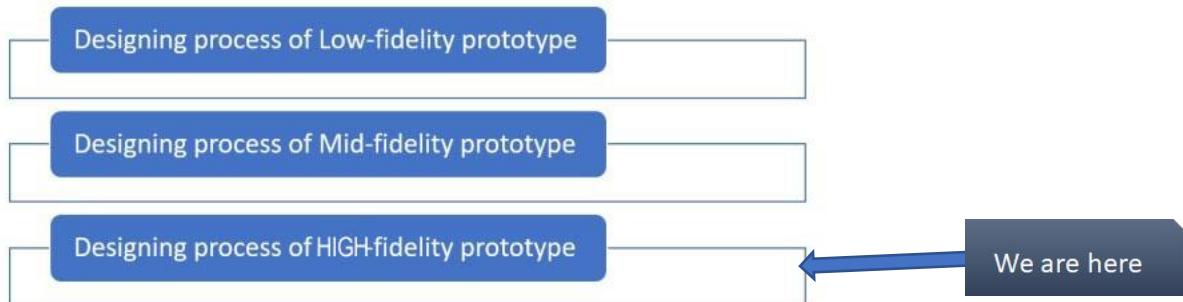
1.2 Teamwork Processing

Team Space Pirate consists of four members, Changyuan ZHANG(the team leader), Yifan WU, Nan XIAO and Wei CUI.

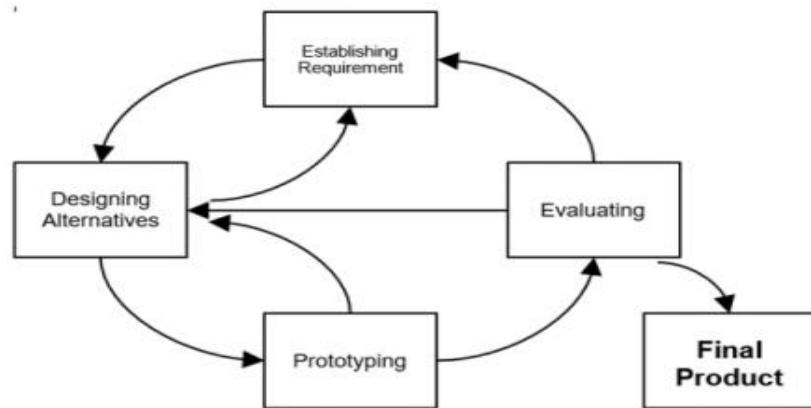
In the writing of Report 3, we are respectively responsible for:

Members	Responsible parts
Changyuan ZHANG	Introduction + High - fidelity Prototype
Yifan WU	Design Alternatives + Conclusion
Nan XIAO	Establishing Requirements +
Wei CUI	Evaluation

The whole Linked Project is divided into three steps:



Since the design process of the medium-fidelity prototype has been done, the team expands the design process through interaction design lifecycle, which same as design stage 1&2, it consists of the following four steps:



In the process of designing software or application system, these execution steps will make the design principles more accurate. Moreover, if a designer does not make covert their design concepts into physical form and just keep having testers read piles of design documents to understand the application, the designer will not get real feedback and design flaws from testers. Therefore, it is necessary for a project to follow the interaction design cycle; Designers needs to continuously evaluate their design concepts and prototypes to produce a relatively perfect product (Sun&Yang,2018).

Currently, the team members have completed the final stage (the Designing process of the high-fidelity prototype) through, Design alternatives, Prototyping, Evaluation and Further Establishment requirements. This report will detail the team works at this design stage through Process Description(weeklong)section.

1.2.1 Processing Description (Week log Demonstrate)

In this section, a workflow of the teamwork process based on week log has been given to make the reader understand what the team has been done and how the process meets the design life cycle:

Steps	Components	Members	Date	Comments
Step1: Designing Alternatives	Revise Conceptual Design	System concept statement	Wei CUI	12 th May
		Design guidelines	Yifan WU & Changyuan ZHANG	
		System requirements statement	Nan XIAO	
		Create UX profile	Whole Team	13 th May
Step2: Prototyping	Creating High-fidelity prototype	Sign in/Sign up	Wei CUI	17 th May
		Main function page		
		Email page		
		Events	Nan XIAO	21th May
		Timetable		
		Personal profile Editor		
		Navigation	Yifan WU	
		Parking at Campus		
		Personal profile	Changyuan ZHANG	
		Settings		
		Bicycle Spot		

		Page operation logic	Whole Team		Interaction flow diagram and provided three downloads link offers reader download the Digital Campus.
Step 3: Evaluations	Empirical evaluations	Time to complete Pluralistic Walkthrough heuristic walkthrough TAM Interview	Whole team	24 th May	Evaluation is crucial for exploring the shortcomings of the current product. Compared with the evaluation step of Report 3, we still adopt the way of Interview to get the data, but we have adopted some evaluation methods different with previous stages which including Pluralistic Walkthrough, Heuristic Walkthrough and TAM. Those methods provide us to a more accurate picture of user requirements and product defects
Step 4: Establishing Requirements	Analysis of data from the evaluation of the current stage.		Whole team	26th May	Unlike Report 1&Report 2. In Report 3, after completing the high - fidelity prototype, we immediately created some requirements based on evaluation data. It requires more changes and functional optimization in future but before the production process.

1.3 Overview of response Feedback from Report 2

With such a close reading of the feedback from the Board for the previous report, we have a good sense of our shortcomings. In addition to optimising the working process of the team, we also supplemented and optimised the writing of report 3 through the feedback. This includes the optimisation of the structure of the article, the proof-reading of the language, diction and grammar in the report, and the supplement of the academic content. Specific details include the following:

Report Components	Sections	Changelog	Comments
Introduction	1.2 Teamwork Processing	Introduce Team Space Pirate as a group. Moreover, described how the team meet the design cycle requirements.	None
	1.3 Overview of response feedback from report 2	We understood the scenario in Linked Project, removing words such as "tutor" and changing them to board.	It is important to understand the scenario of Linked Project. In report 1 and report 2, Linked Project is considered as a vary formed academic writing by the team. That situation was limiting the creativity of the team.
Step 1: Design Alternatives	1.3 Design guideline	1. We lack the reference of the guidelines and observation. 2. In the last design guidelines, we mix up a design guideline with the system requirement.	1. We will add them to this report. 2. We will differentiate them this time and write more detailedly based on the last report and the theory from studio and UX book. We will give an overview of how we tied our user findings to the goals for our high-fidelity prototype.
Step 2: High-fidelity Prototyping	3.2 Changelog	Use theories and scenario to explain the changes. Also, pictures added to demonstrate how the changes make medium fidelity prototype and High-fidelity prototype look different.	Theories and scenarios are the best methods that will help illustrate our motivations for making changes to the mobile app. The picture comparison between High fidelity prototype and medium fidelity prototype is more conducive to helping readers understand these changes visually.

	3.6 High-fidelity prototype presentation	Used Theories such as Hick's Law, Fitt's Law and Gestalt theory to explain the reason and our consideration when we design the prototype.	Let the board and readers understand what theories are applied to the design concept of the Digital Campus facilitate them to understand and evaluate the rationality of Digital Campus and page layout.
	3.8 Prototype Downloads on Testing Purpose	Provided a page that consists three links which provide board and readers to download the prototype of Digital Campus.	The high-fidelity prototype is the closest one to a real phone app and the most interactive of the three prototypes. In the final stages of Linked Project, the Space Pirate team needed to present the prototype to the board and readers. Digital Campus can only enter the final production stage if it fully meets the requirements of the board of directors.
Step 3: Evaluation	4.2 Evaluation Methods	Formative rapid evaluations were conducted to measure user experience, as well as the metrics and measures that the team have identified as part of the conceptual design.	I am referring back to the UX Honeycomb by Peter Morville. Heuristic evaluation and pluralistic walkthrough were used for evaluating "usable" and "findable" in the honeycomb. For evaluating "useful" and "desirable" in the honeycomb, the team has decided to use TAM with interviews after to understand the responses from users.
Report Style	<p>Simplify the structure of this article.</p> <p>Uniform text size: The first level title: font size –14; colour – sky blue Second level title: font size – 14; colour – sky blue Paragraph context: font size – 12; color – black Font style: Times New Roma</p> <p>Proof-reading session: The team was divided into two groups: Group one: Yifan WU and Changyuan ZHANG Group two: Wei CUI and Nan Xiao.</p> <p>Action description: Once the team has completed the whole report, the group one members will organise the structure of report 2 and check the writing errors (spelling, grammar and wording). Then they will send this report to group two for another proof-reading process.</p>		

2.0 Step1 Design Alternatives

2.1 Overview:

This step contains version 1.3 of system concept statement, design guidelines and system requirements statement updated from the version in report 1 and report 2.

The system concept statement in the former versions stated the problem, describe the workflow briefly, show interaction paradigm, interaction mode and key interface metaphors. In version 3, we will delete several unsuitable details and add some reasonable item based on the information the team have obtained from the contextual inquiry and the analysis of that data, especially the evaluation data in version 2.

Purpose:

The part of the design is aimed at helping students in the UQ campus by improving their life quality and the efficiency of events.

2.2 One sentence problem statement

Design an application on a mobile device that helps students in the UQ campus and give people a comfortable UQ experience by way of integrating and optimizing all university apps of the campus.

High-level description of how the system works:

The system aims to provide an integrated and optimised application to UQ students to combine existing UQ apps which can help people work more efficiently in the campus.

It will show navigation, blackboard, e-mail, parking, events, timetable and setting on the page after users logging in to let them access these functions quickly.

It will extract commonly used functions such as navigation, blackboard, E-mail, parking, events and timetable from existing UQ apps.

It will show customised timetable based on the original academic timetable and events timetable.

It will apply recent events by a timeline to let users receive information timely.

It will provide a simplified and transparent navigation function, such as the best routine.

It will recommend the location of the closest class automatically as a default to guide users to the most needed locations.

It will set the system by the parking sites' plan that users can select the premium and specific parking spot which contains both bicycle and car.

It will provide information on the building such as function, service time and equipment contained in the building to give users more references when making a choice.

It will show recent events and link it to the timetable so that users can get notification of their preferred events by timetable.

Interaction paradigm:

Graphical user interfaces

WIMP (window; icon; menu; pointing device)

Gestures: drag or slide to check more images in “Events”, “Navigation” and “Parking” item

Interaction mode:

Instructing (select options via menus, e.g., select parking space in “Parking”; select restaurant through thumbnails in navigation.)

Exploring and browsing

Key interface metaphors:

Icon: personal profile; 7 function in function page;

Virtual button:

slider in choosing parking space, personal profile, site category, thumbnails of the restaurant;

“sign in”; “sign up”; “choose”, “book and start navigation”, “Restaurant”, “Coffee”, “More” in navigation;

“2018 Semester1”, “2018 Semester 2”, “2019 Semester1”, “2019 Semester 2” in Blackboard;

Three categories of the timetable in timetable;

“add to my timetable” in Event; “log out”, “notification”, “general”, “storage”, “language”, “about” and “feedback” in settings.

2.3 Design guidelines

Finely crafted

The system is accessible and refined enough for you to use fluently and happily.

Explanation:

Users reflect that they want to get detail about each building. However, the UQ nav not only does not contain this kind of content. It contains redundant and useless items instead. Also, it took much time for some of the users to find out the correct route to find the GPA in the personal profile. The user in evaluation reflects that some back button in some of the interfaces missed. Therefore, it should be more attractive. Also, the UQ checklist has insufficient information, so the team should reduce the redundant items and provide reasonable and specific information such as detailed information of buildings to bring users pleasant user experience. The essential buttons should not be considered as redundant items because they can help users to find where they are.

Reference:

SUS survey scale, question 6&9;

The scale of Time on tasks and Numbers of clicks (1)

user's need 2; interview 2 question 2; interview 3 question 1; interview 3 question 2; interview 5 question 1; interview 5 question 4; interview 7 question 4.

Consider for you

Digital campus considers for you. It will respect your time and effort.

Explanation:

Users reflect that downloading the app should serve for them, and UQ nav cannot give the user an exact way to go to their destination. Therefore, the team will achieve the goals by providing the best routine to save time and effort.

Reference: interview 1 question 1, interview 1 question 2; interview 3 question 2; interview 4 question 2; interview 5 question 1; interview 7 question 4; user's need 6.

Be involved

The system provides good user experience, but it happens only when you get involved and customise by yourself.

Explanation:

Users reflect that they want to customise timetable by themselves and add a favourite for lecture recording. Also, they want to find some particular sites when they use the function of parking.

Also, a large number of users reflect that they need a site to park. The users often cannot find the way of the target. Therefore, the team should set customised options such as customized timetable and link them to default options. The system should provide customised parking sites such as bicycle parking to take care of individual feelings and match their mental model.

Reference:

Tester 2 in evaluation;

user's need 5; user's need 7; interview 1 question 1; interview 1 question 4; interview 2 question 4; interview 3 question 4; interview 5 question 1;

Balance richness and simplicity

The simplicity is a means rather than the result. The simple surface is designed to make it easier for users to find information in a wealth of information.

Explanation:

The users reflect that UQ nav always cannot provide an exact routine. By contrast, the google map can provide the nearest way. The checklist is not convenient because it has too many words. They also reflect that fussy operation gives them awful user experience. To solve these problems, the team will optimise their information acquisition process and help users understand by setting customised timetable under timetable and lecture recording in blackboard.

Reference:

interview 1 question 1; interview 1 question 2; interview 2 question 2; interview 3 question 2; interview 4 question 2; interview 5 question 1; interview 5 question 2; user's need 5; user's need 7.

Reference for 2.3 Design Guidelines:

Firefox Design Values

Retrieved from <https://design.firefox.com/values/>

2.4 System requirements statement

Accurate information
Type keywords of buildings to get their information
<p>Requirement statement:</p> <p>Users should be able to acquire enough information about destinations to make decisions</p> <p>Users should be clear about the information and acquire the information they needed efficiently.</p>
<p>Rationale:</p> <p>Moderate information helps users to compare information and eliminate strangeness to destinations</p> <p>Human Memory Limitations: small amount of information held for a short period.</p> <p>Hicks Law: The more choice that is presented to a user, the longer it takes them to make a decision.</p>
Note: Detailed dining information is essential for the user's meal arrangement

Prioritised information
Customised timetable and information about parking site according to their needs
<p>Requirement statement:</p> <p>Users should be able to access them easily.</p> <p>Users should be able to set their timetable by their preference in events.</p> <p>Users should be able to get the information about bicycle parking sites which they use most frequently.</p>
<p>Rationale:</p> <p>Fitts Law: The distance between the user's task/attention area and the task-related button should be kept as short as possible</p> <p>Important for users to get their favourite items efficiently</p> <p>Important for users who are used to scheduling activities in advance</p> <p>Users should have a way to filter notification information according to their importance</p> <p>The requirement of the vehicles which most students choose should be considered seriously.</p>
Note: In design, consider eliminating the strangeness between the user and the system

Timely choice
Recommendations for parking and timetable
Requirement statement:
Users should be able to get the latest information about events
Users should be able to choose the information they are interested in and link them to the timetable
Rationale: Timely communication is the key to keeping users focused
Note: In design, consider the amount of information displayed at one time to avoid overloading information

Events notice
Show users upcoming events on campus
Requirement statement:
Users should be able to get the latest information about events
Users should be able to choose the information they are interested in and link them to the timetable
Rationale: Timely communication is the key to keeping users focused
Note: In design, consider the amount of information displayed at one time to avoid overloading information

Reference: Hick's law

3.0 Step 2: High Fidelity Prototype

3.1 Overview

In Linked project. The paper-based low fidelity prototype of the first design stage explained the initial basic functions and design concepts of this system. In the second stage, graphic medium fidelity prototype introduced design theories (such as Gestalt Theory) and optimised the design concepts and functions of digital campus according to the evaluation Test data. In the final stage of this project, the team of Space Pirate completed the production of High-fidelity prototype using Marvel APP, which was based on medium fidelity prototype and our evaluation of medium fidelity prototype test data.

Although these three prototypes are inherited, there are apparent differences between them. For the first two generations of prototypes, High fidelity prototypes are the closest to real mobile applications and provide the best interaction effect. In addition to data input and output, as well as location exceptions, the prototype allows testers to experience almost all the features of digital campus, which means that the Space Pirate team will get more realistic user feedback.

Also, Changyuan ZHANG and Yifan WU used Gestalt principle in designing medium fidelity prototype. Through the tests in the last stage, they re-optimised high-fidelity prototype by evaluating test data and using Hick's Law and Fitt's Law.

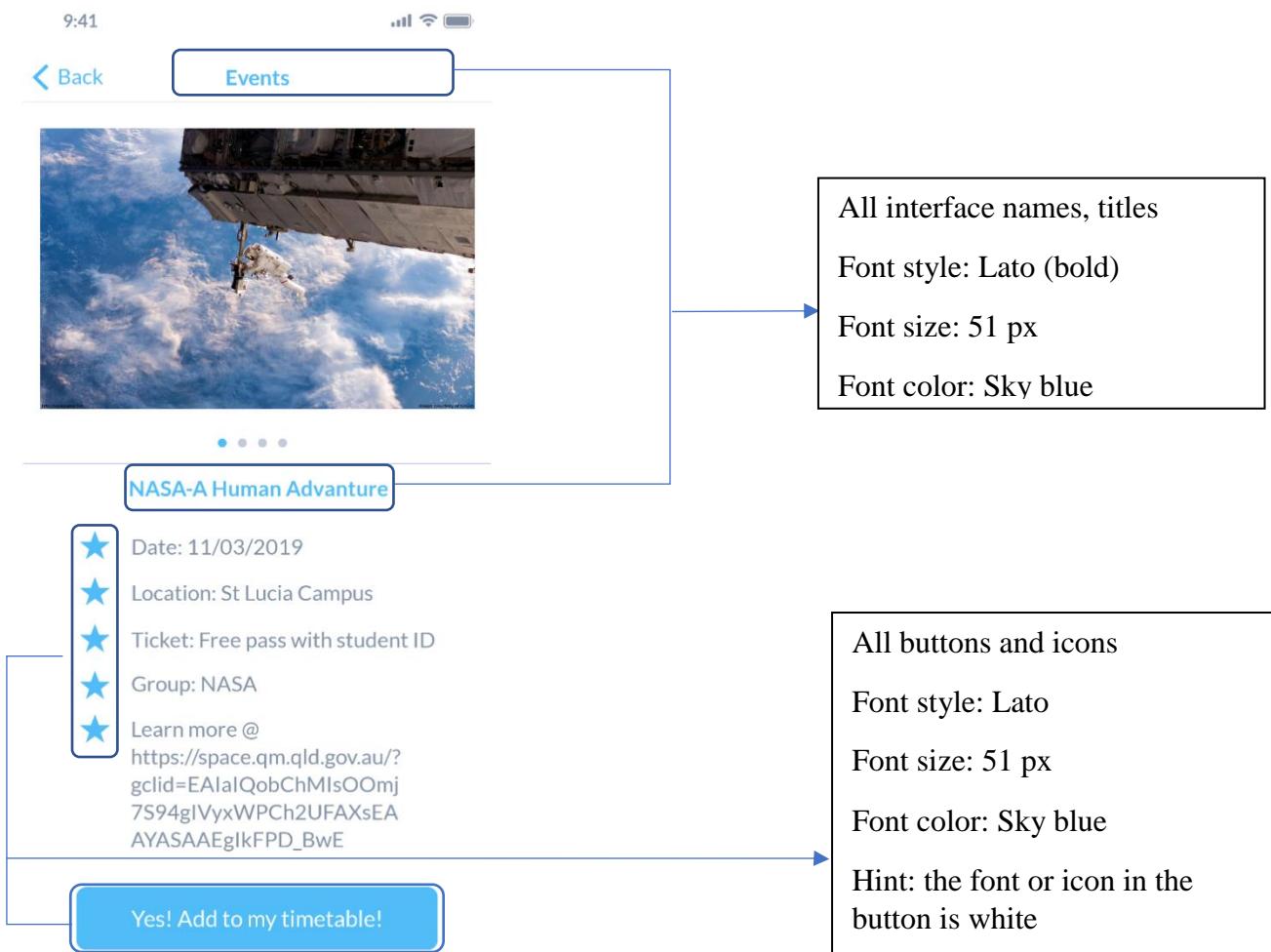
Currently, all prototypes of Digital Campus have been completed, and the Space Pirate team will test the High fidelity prototype and make the final evaluation using the test data. This section is divided into five parts. First, the Changelog will show the readers what new features and changes high fidelity prototype has through pictures and text. Second, this section will demonstrate the use of Digital Campus through a scenario. Third, Interaction Diagrams will be used to show how each page in the system is connected. The fourth section will show all the main functions of Digital Campus to the readers, but the new interfaces and functions in the change log will not be repeated in this section. Finally, the Space Pirate team provides readers with download links to three interactive prototypes (IOS, Android and computer platform) for testing and experience.

3.2 Change Log

This section focuses on the changes and new features of the high-fidelity prototype. Also, this section makes the following two changes through the Feedback of Report 2:

1. Use theories to explain the reasons for the changes to help readers better understand.
2. Show pictures of Medium fidelity prototype and high-fidelity prototype to show what specific parts have been changed.

For the entire Digital Campus application, Space Pirate group regulates its font size, font style, button colour, button icon and theme colour.

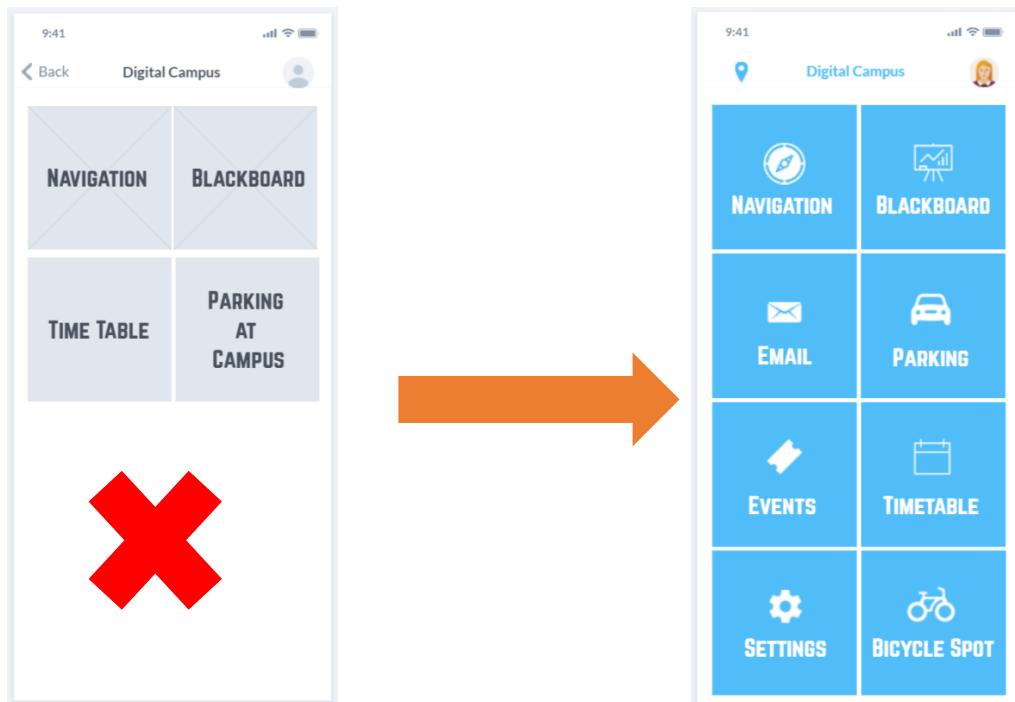


The medium fidelity prototype of Digital Campus has only black and white theme colours, and the Space Pirate team thought that what we wanted to present to users was a minimalist application. In later tests of the medium fidelity prototype, several participants said that a minimalist style did not mean that the entire theme of the app was just black

and white. Because during the interaction process, the participants confused the icons with the text.

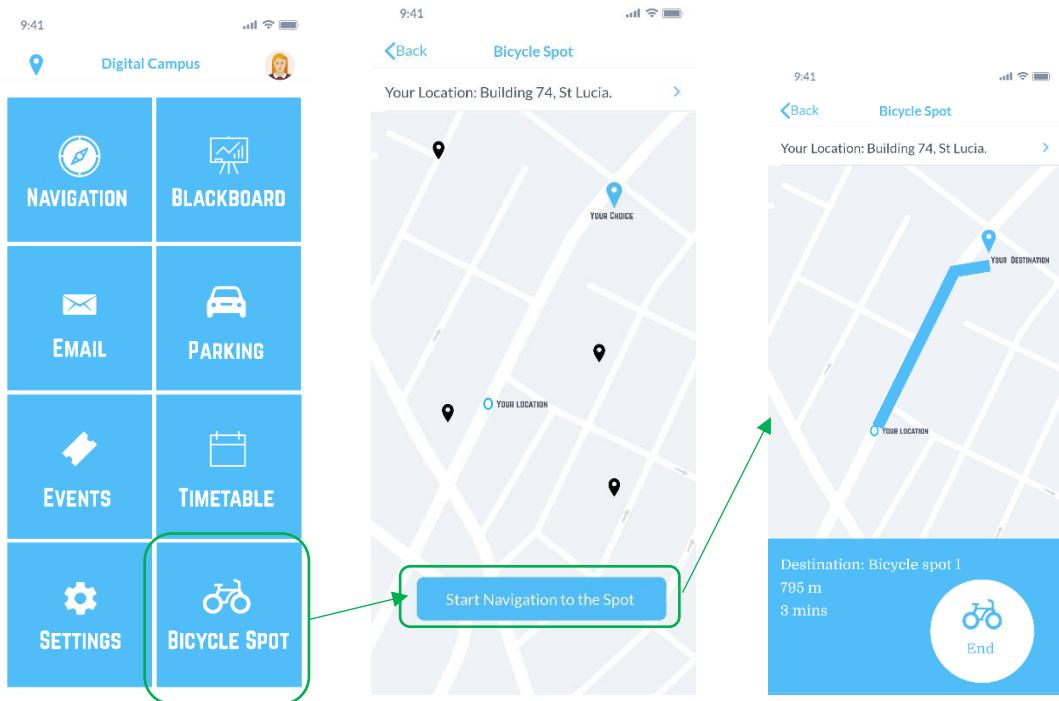
Hence, the Space Pirate team defined Digital campus themes as white and sky blue and used sky blue to decorate buttons, titles, icons and feature page names to help users identify elements within the page. There is another consideration in our group about the use of theme colours. That is, the Figure-Ground principle in Gestalt Theory reveals that our brain divides visual areas into subjects and backgrounds. The main body consists of all the elements of a scene that occupy our primary attention, with the rest being the background (Fraher & Boyd-Bent, 2010). In Digital Campus, the background is set to white, and all function elements and buttons are set to conspicuous Sky blue. This will ensure that the user can easily distinguish the elements from the background and focus on the functional elements.

On the other hand, in the second stage of Linked project, this team tried to use Hick's Law in the prototype of Digital Campus. In interaction design, it meant that designers could conduct homogeneous grouping and multi-hierarchical distribution of the options in navigation or page, which could improve users' working efficiency and reduce cognitive overload (Knight, 2018). In medium fidelity prototype of Digital Campus, we changed the seven options in the main interface into four options and planned the deleted options into the sub-options of those four options. Because we thought it would be easier for users to find the functionality they wanted, based on Hick's Law, with fewer options and multiple feature pages. However, the test results were unexpected. Hick's Law did not help us optimize the user experience. Instead, participants felt that changing the main screen's feature options from seven to four caused them to spend more time looking for the feature they wanted. Thus, we decided to maintain the original main interface layout.



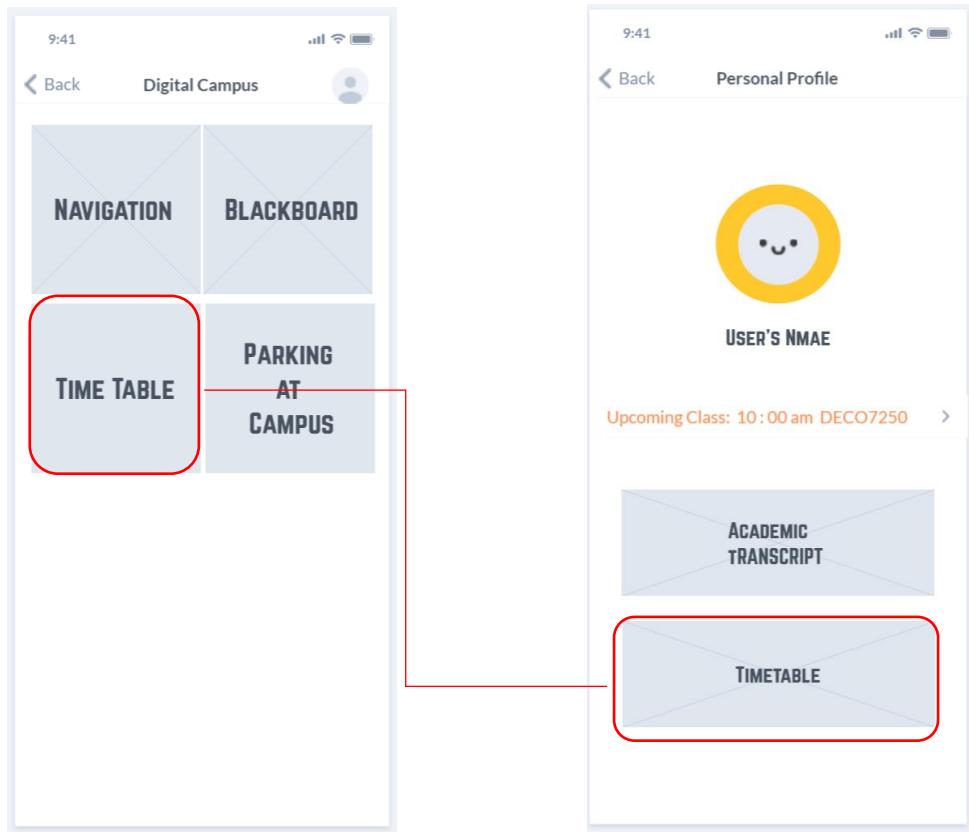
3.3 New Features: Bicycle Spot

Bicycle Spot: In the test of Medium fidelity prototype, several testers believed that a large number of students in the University of Queensland were using bicycles instead of cars. For the convenience of these students, the University of Queensland has built several bicycle spots for students to park their bike. Since the Navigation function in Digital Campus cannot query bicycle spots on Campus, they believe that a Navigation system that can query the parking location of bicycles is more useful for students who are use bicycles. Finally, in order to meet the needs of these students, we added a new function Bicycle Spot.

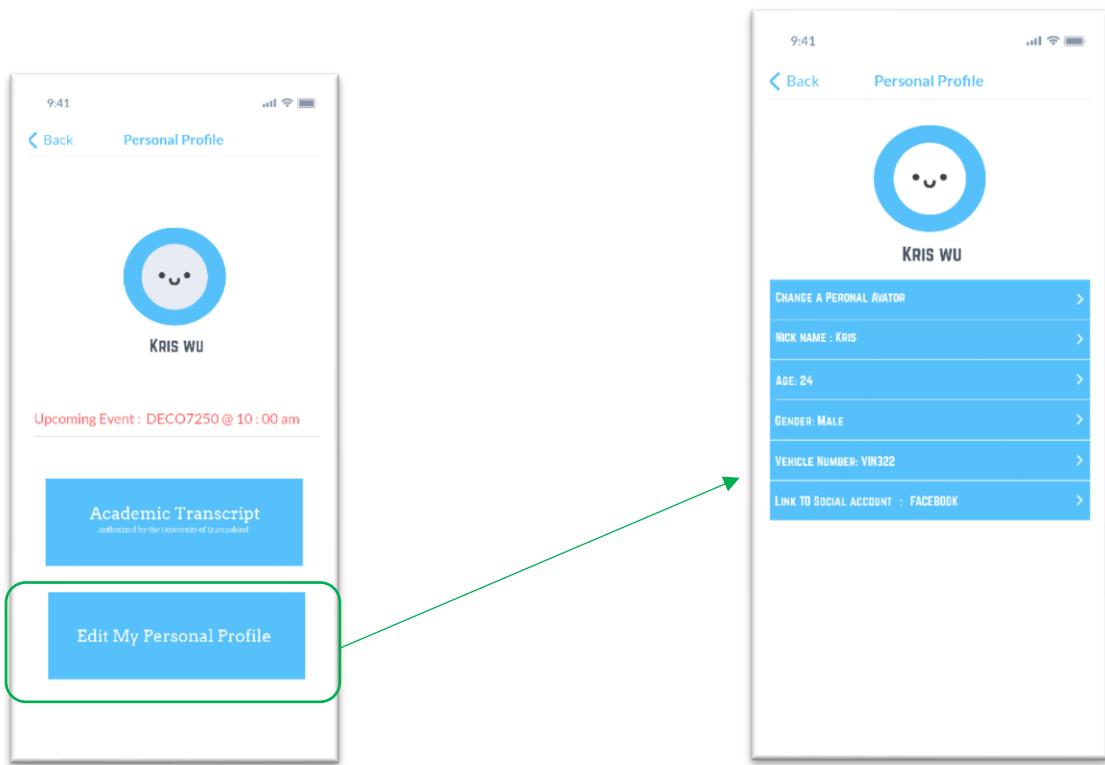


3.4 New Features: Personal Profile Edit

In the prototype test of the previous stage, the subjects reflected a design flaw to us. The Timetable appeared twice in the Personal Profile interface and the Timetable function in the main interface. They think this is entirely unnecessary.



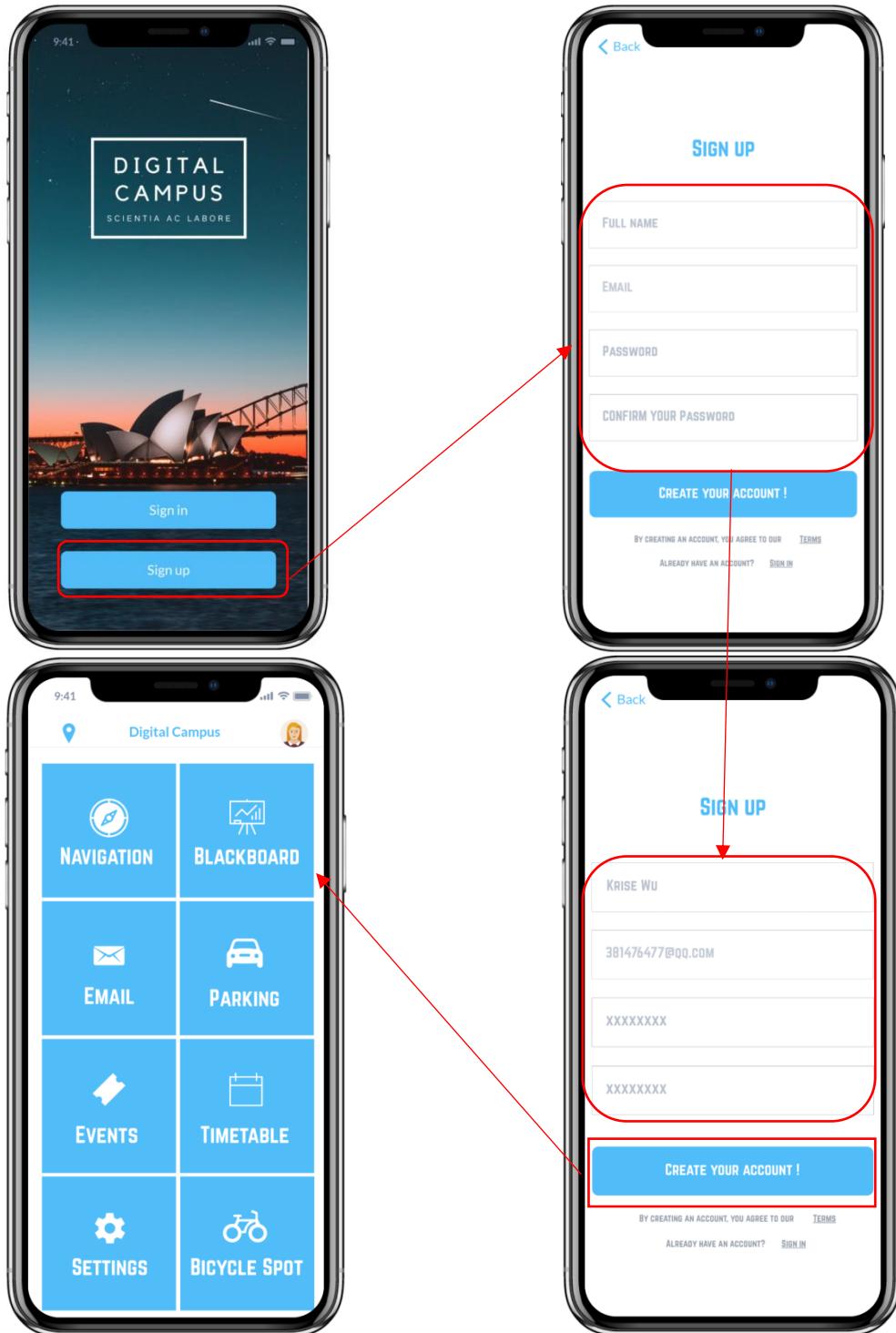
Therefore, in the High-fidelity prototype, we deleted the Timetable button in the Personal Profile. On the other hand, our team also found another design defect: Parking function requires users to write their license plate number for the purpose of helping users reserve Parking Spaces. However, there is no interface in the Digital Campus that allows users to fill in their vehicle information. Therefore, we add a new function - Personal Profile editor in the Personal Profile interface after removing the Timetable button in the Personal Profile interface. In this page, users can not only edit their vehicle information but also change their profile picture, username, personal information and link Digital campus account to their social accounts.



3.5 Scenario to demonstrate the usage flow

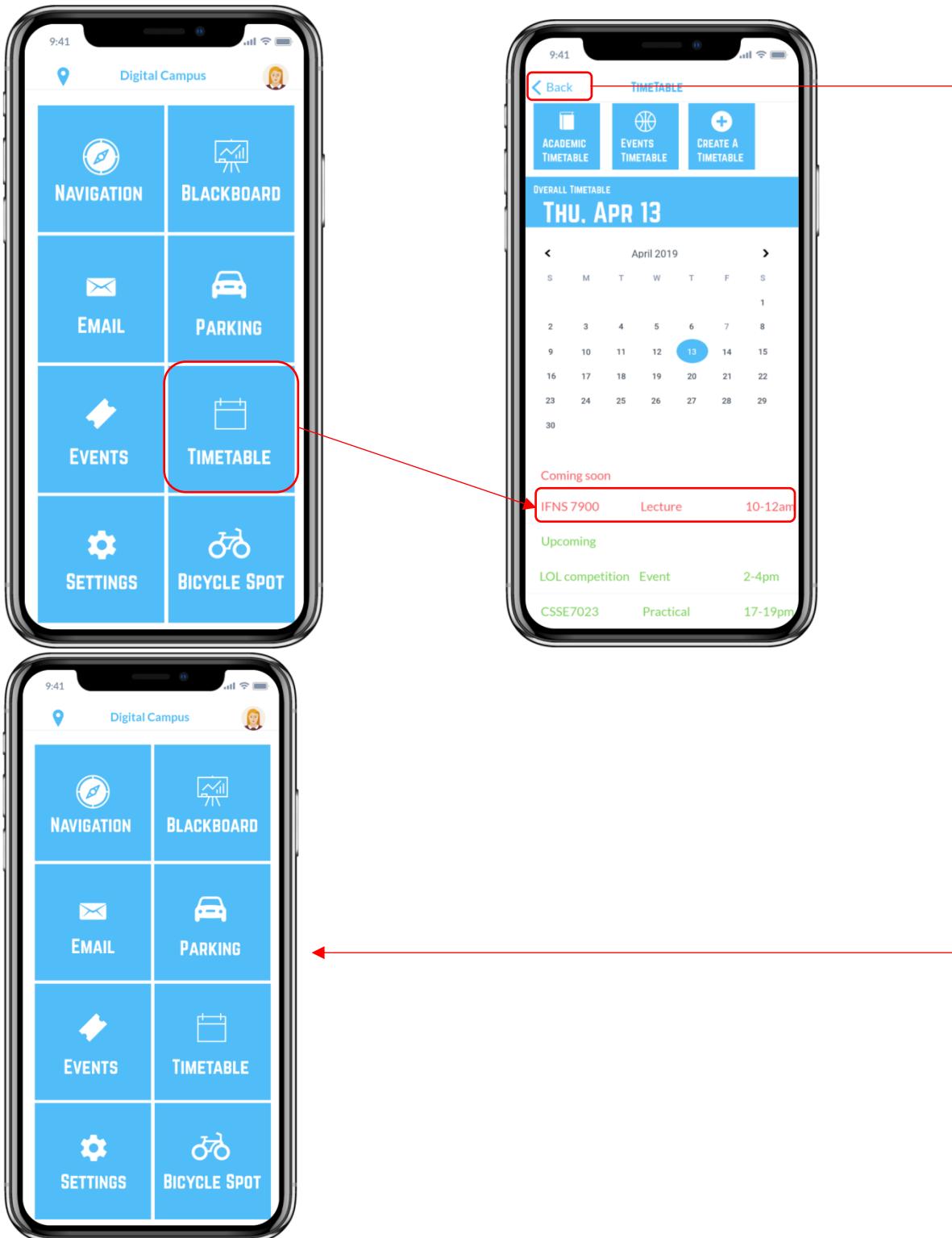
Scenario: Kris Wu Freshman at the University of Queensland, after using the mobile phone application provided by the University of Queensland, he found them very difficult to use. He tried to find alternatives to these applications, and by chance, he downloaded the Digital Campus. This morning, Kris WU got out of bed at seven, and he vaguely remembers that he had an IFNS 7900 lecture today, but he could not remember the time of the class. So, he opened the Digital Campus and wanted to query this information. After registering the account, a simple function interface appeared in front of him. He thought that Timetable would definitely help him find information about class time, just like UQ Timetable. Sure enough, he saw that his class time was 10 – 12 am. Now two hours before the start of the course, he wants to drive his Toyota Camry to the St Lucia campus, so he needs to reserve a parking space. He returned to the main function page from the Timetable page, found and entered the Parking interface. He found that the Parking function had found the parking lot closest to his classroom through the timetable information, and there was actually parking rate information on this page. He felt the price was acceptable and clicked the "Booking and Start Navigation" button. When he clicked this button, Digital Campus immediately jumped to the navigation interface. Although it is estimated that the time to arrive at the destination is only 23 minutes, he considers that Brisbane is in the morning rush hour. In order to avoid traffic jams, he decided to start to go immediately and clicked the "Start" button. Kris WU followed the navigation to the target parking lot. Today's traffic situation is not so bad, and now there are 40 minutes from the start of class. Then he went to the classroom. He thought that the University of Queensland had many student events. As an international student, participating in social activities should help him learn English and learn some knowledge of his interest. So, he turned on the Digital Campus again, and the Digital Campus happened to have the Event feature. After entering the Events interface, he immediately found an event he liked: NASA – A Human Adventure. Kris WU loved the universe since he was a child, so he immediately clicked the "Yes! Add to my timetable" button, and then prompted him to the event. Then the system successfully added to his timeline. He was satisfied with the service of Digital Campus and exclaimed: This mobile app is much more useful than the one offered by the University of Queensland.

The interaction flow of Kris Wu: Step 1 - Sign up



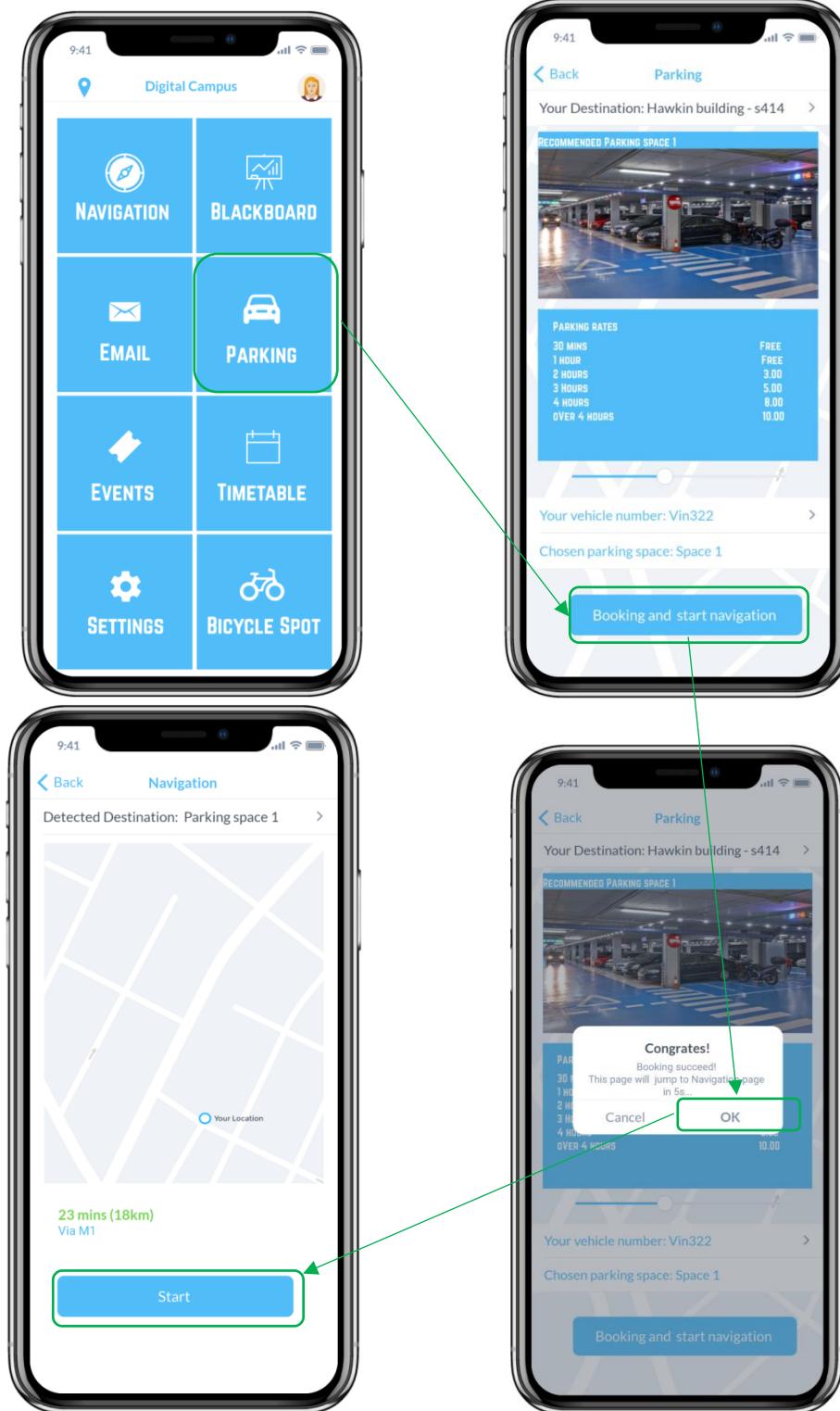
Click “Sign up” Button → Click Information Blocks to fill information → Click “Create Your Account” Button → Entry Function page of Digital Campus

The interaction flow of Kris Wu: Step 2 – Check Timetable

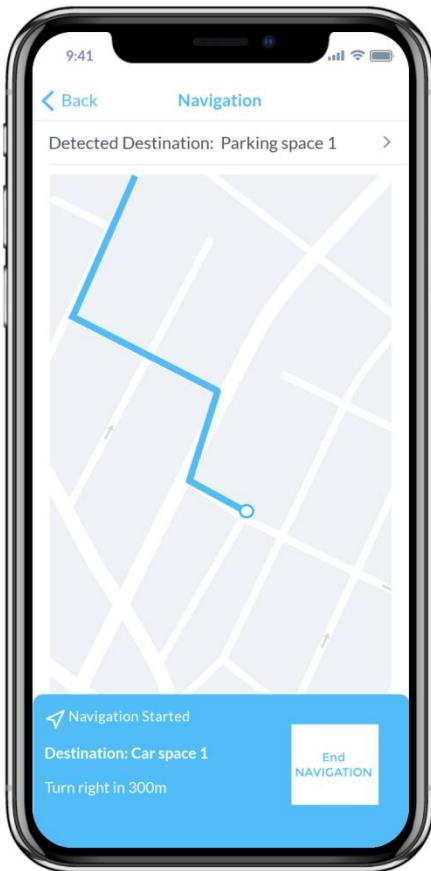


Click “Timetable” Button → Check Class time in Timetable interface → Click Back button to back function page

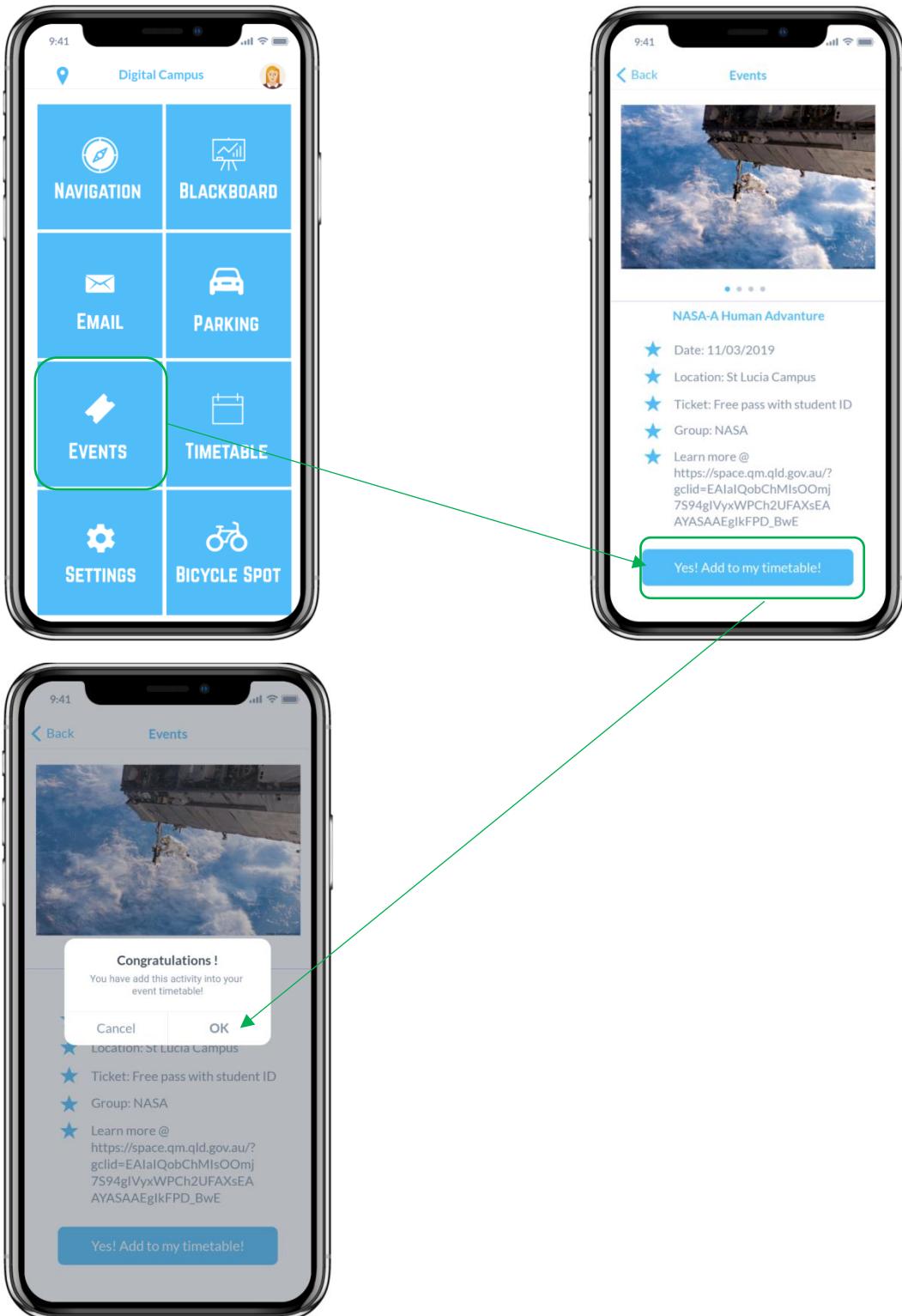
The interaction flow of Kris Wu: Step 3 – Booking parking space and Navigation to St Lucia Campus



Click “Parking” Button → Chose the Parking lot then click “Booking and Start Navigation” Button.



The interaction flow of Kris Wu: Step 4 –Add an Event to his Timetable



Click “Events” Button → Chose the preference Event → Click “Yes! Add to my timetable” Button

3.6 High Fidelity Prototype Presentation

Sign in / Sign up page



Sign in/ Sign up

If the application cannot get the information from user, it cannot provide the course information and facilities information to the user.

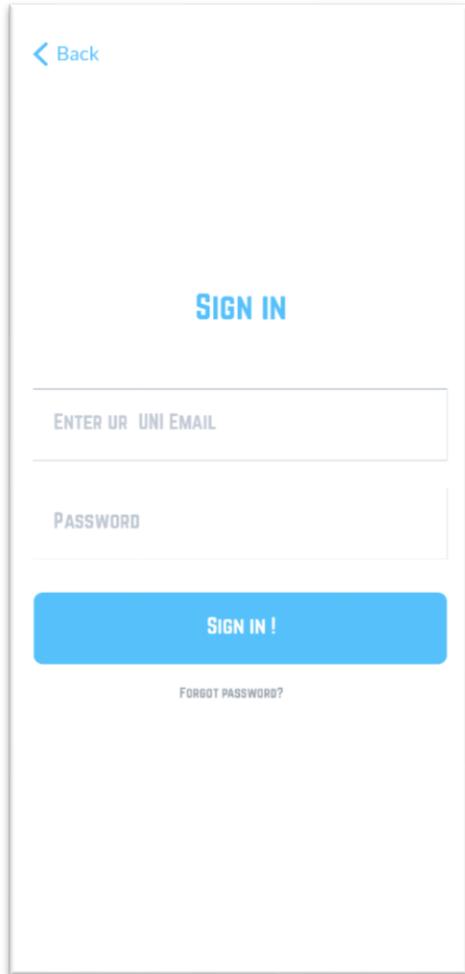
Therefore, a new user must register their accounts through this interface and link their university accounts to the app.

This is the first interface that a new user or one who has not logged in for a long time will see when opening the application.

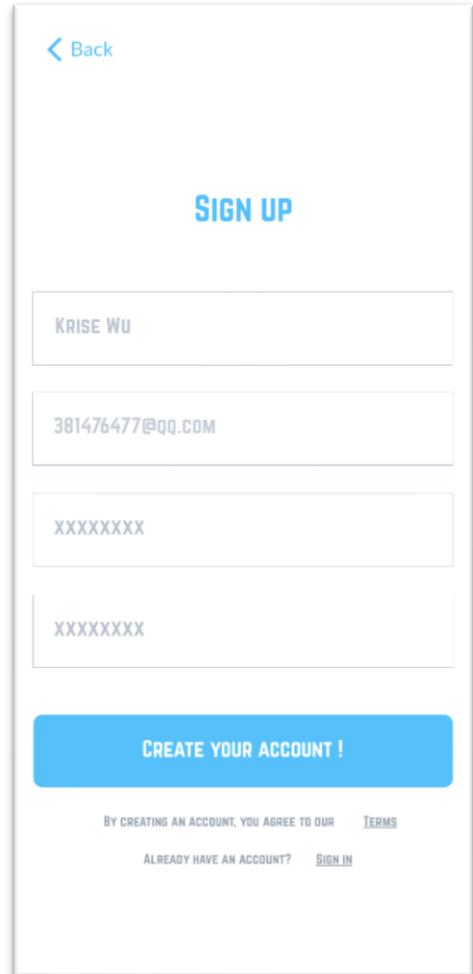
Sign in & Sign up page contains 2 sub-pages:

- Sign in page
- Sign up page

Throughout the design of prototype's button, we refer to Fitt's Law, which explains that in a page, large and close objects mean that users can easily reach the goal without too detailed observation and adjustment (Guillard, 2009). Therefore, in the process of designing the buttons of Digital Campus, we set the buttons to a noticeable size, so that users can find the buttons accurately without thinking.



The sign in screen features a back arrow at the top left. The title "SIGN IN" is centered above two input fields: one for "ENTER UR UNI EMAIL" and another for "PASSWORD". A large blue button labeled "SIGN IN !" is positioned below the password field. At the bottom, there is a "FORGOT PASSWORD?" link.



The sign up screen features a back arrow at the top left. The title "SIGN UP" is centered above four input fields containing placeholder text: "KRISE WU", "381476477@QQ.COM", "XXXXXXX", and "XXXXXXX". Below these fields is a large blue button labeled "CREATE YOUR ACCOUNT !". At the bottom, there is a link "BY CREATING AN ACCOUNT, YOU AGREE TO OUR TERMS" followed by "ALREADY HAVE AN ACCOUNT? [SIGN IN](#)".

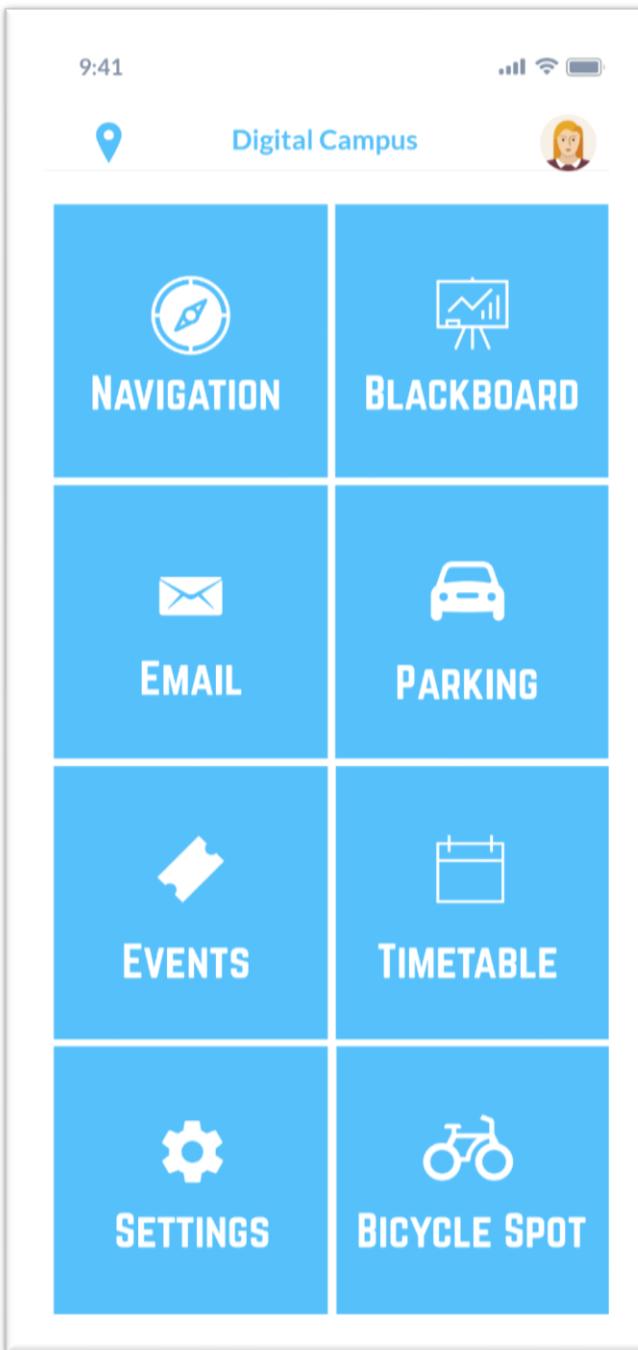
Login page:

Users can log in the app by filling in the mobile phone number, email and password when they register. When the user clicks the text box, the system default keyboard pops up.

Registration page:

Users can register by filling in a custom username, email and password. When the user clicks the text box, the system default keyboard pops up.

Main Function Page



Main function page

Once a user is succeeded registered or logged in, the main function page is displayed in front of the user. On this page, users can find most of the features they need. The sub-page of this page has:

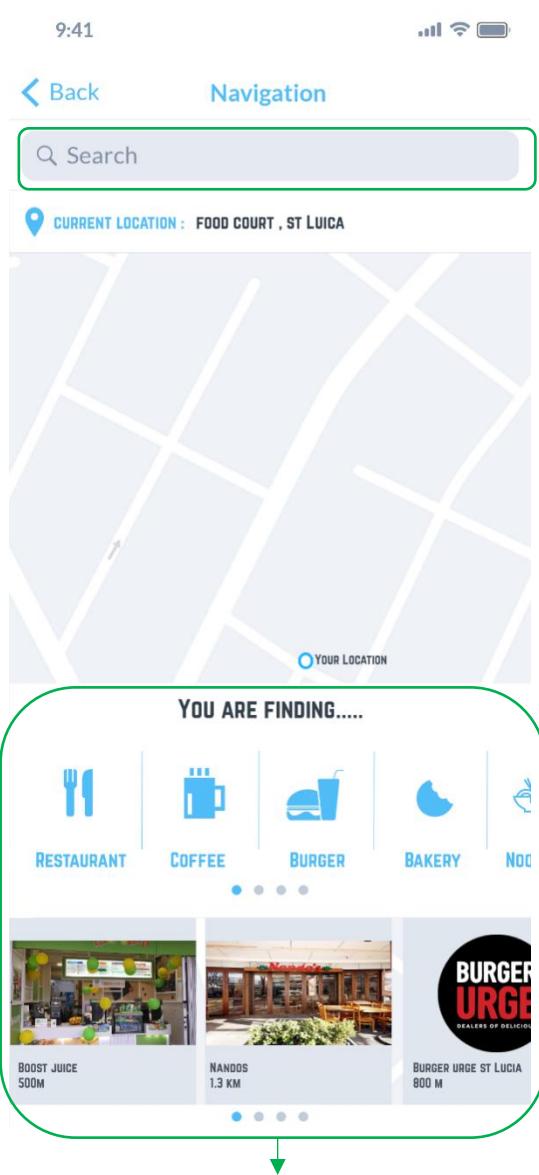
- Navigation
- Blackboard
- Email
- Parking at campus
- Events
- Timetable
- Settings
- Bicycle Spot

Link to: Users can enter the personal profile page through the button in the upper right corner of the screen.

In the design of the main functional interface, the team consulted the Similarity principle from Gestalt Theory, which explained that the relative distance between objects affects whether and how we perceive them to be organized. Objects that are close to each other (relative to other objects) appear to belong to a group, while those that are farther away are automatically grouped out of the group(Bian & Zhang, 2012). Hence, when we designed the page, we made each function module outlook and colour the same, but the

icons and text on each block were different. This keeps the layout neat and allows the user to distinguish between the functional blocks and the background visually.

Navigation



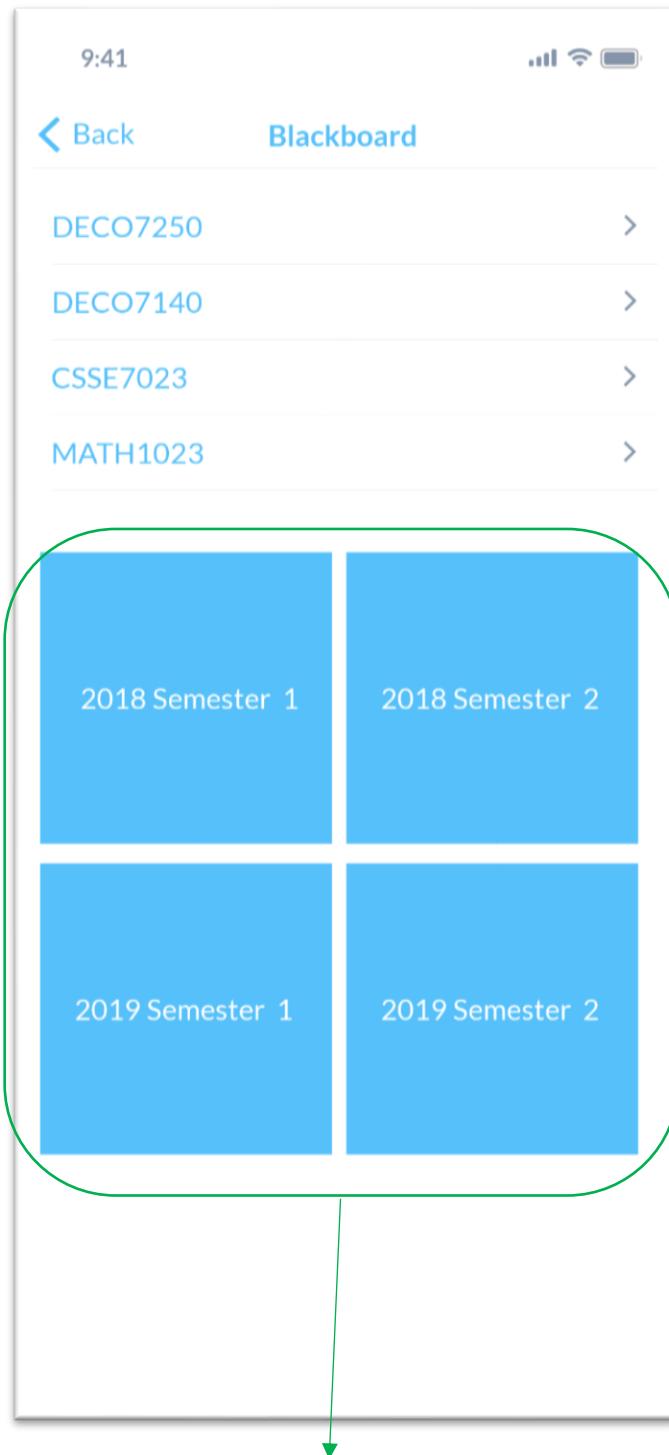
Navigation

When the user enters the Navigation screen, there is a **Search bar** at the top of the screen for the user to Search the destination.

In addition, the bottom of this interface will provide users with quick navigation to food court. These include the types of food, and restaurant pictures. Users can browse restaurant foods by swiping a picture of the restaurant at the bottom

Quick navigation of food categories and restaurant illustrator at the bottom of this interface are slid-able. In order to allow users to understand these two sections on the static page, we refer to the Continuity principle in Gestalt Theory. Continuity is also called truncated design in interaction design. It tends to mean human vision perception in the form of a continuous rather than discrete pieces (Hollender, Hofmann, Deneke, & Schmitz, 2010). Thus, in this interface, users will not be misunderstanding designer to adjust the picture at the wrong place because of the lower right of the screen image is incomplete and, user's brain will produce a continuous image, and tell the user of this interface can be sliding browsing.

Blackboard



Blackboard

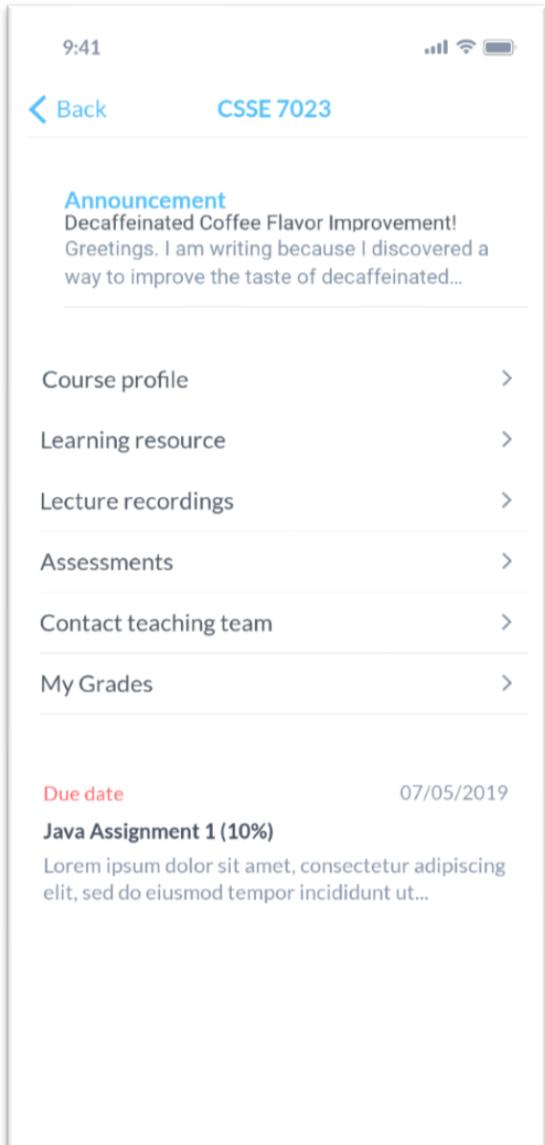
Users can view their courses of the semester through this page and can enter the course information interface by clicking the course button

Blackboard displays the user's semester information in the lower half of the screen, and the user can click to see the courses that the user has enrolled for the corresponding semester.

The function buttons of Semester are also referred to Fitt's Law. The large and concise function buttons can help users better distinguish Semester information and click the button. We also apply Fitt's Law in the buttons of Personal Profile, Timetable and

Settings.

Also, we set the buttons on each page to the same size and colour, which was also based on the Gestalt Theory Similarity principle.



Blackboard

Take CSSE7023 as an example. When users click the CSSE7023 button in the Blackboard main interface, the page will automatically jump to the page of this course.

At the top of the page, it will show the user the Announcement for this course.

Users can also query the following information through this interface:

- Course profile
- Learning resource
- Lecture recording
- Assessment
- Contact Teaching team
- My Grads

Blackboard displays the upcoming assignment information to the user at the bottom of the page.

Email

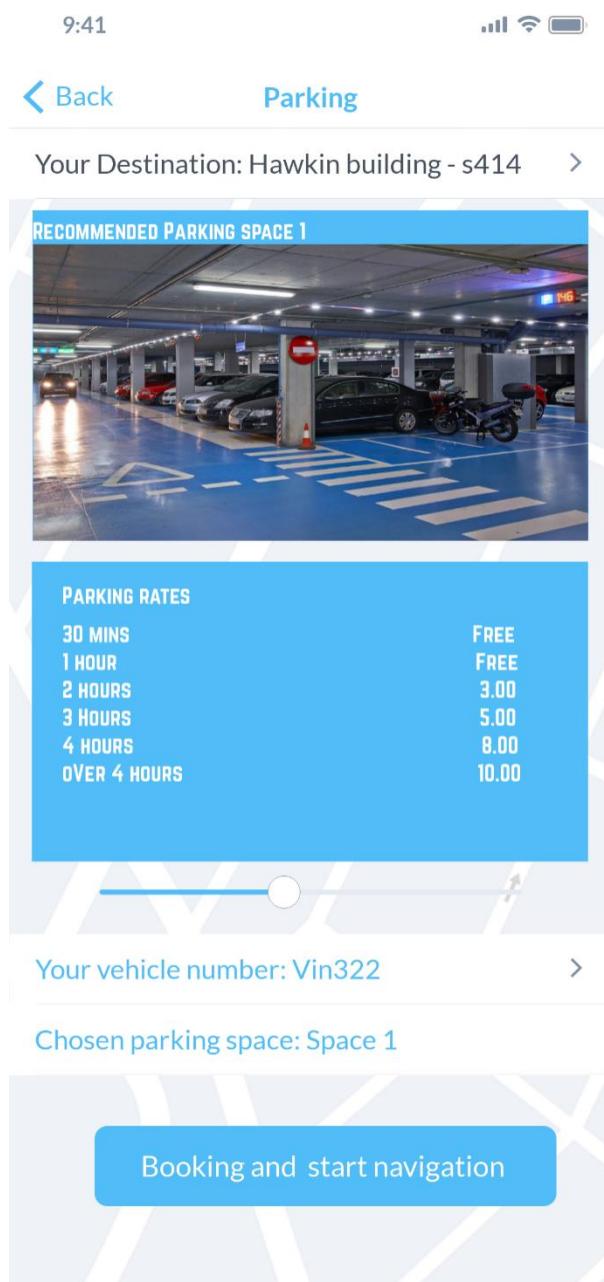


Email

Users can enter their university mailbox by clicking the Email button in the main function page.

At the top of the Email page, users can search for course codes to query for course emails.

Parking



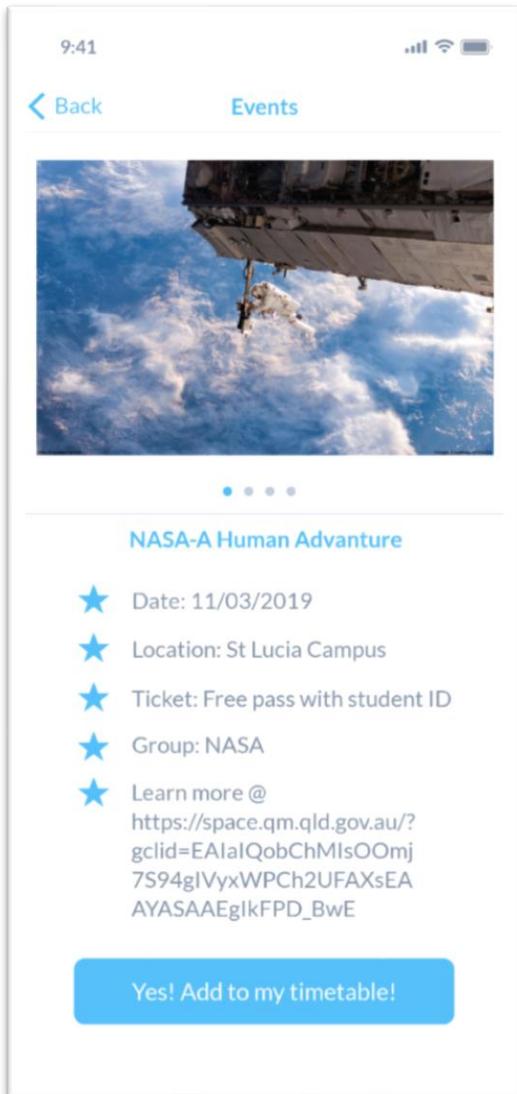
Parking

Digital Campus can get information about a destination based on the user's upcoming events. Parking system will automatically find the Parking lot nearest to this destination (Multiple parking lots, arranged from near to far), and to show the user hourly rates of corresponding to the parking lot.

When the user clicks the Chose button, the system sets the parking lot to be the destination. Once the user clicks the Booking and start navigation button, the Digital campus will automatically redirect the page to the navigation page and provide the user with navigation information.

When the user thinks the destination is wrong, the user can click on the address bar to change and search for the address

Event



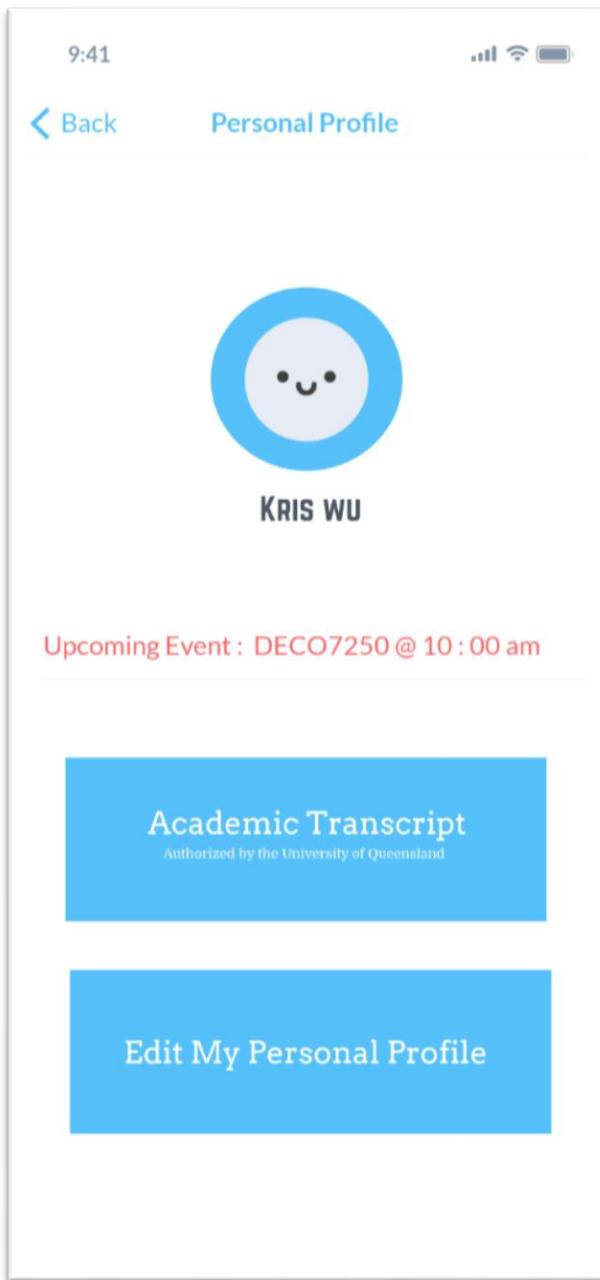
Events

The top half of this interface shows the overview of the activity through pictures, for example, the logo of the faculty can be used to indicate which school this activity is held by, or the general purpose of this activity can be explained through pictures.

At the bottom of the screen, additional information associated with the image above is displayed: time, place, ticket information and the description of the event.

When the user clicks the button at the bottom of the screen, Digital Campus automatically adds the event to the user's timetable.

Personal Profile



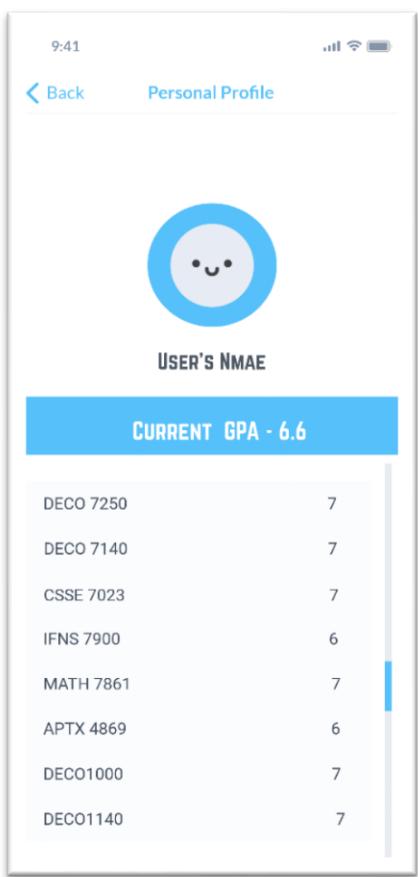
Personal profile

Users only need to click the Personal Profile button in the upper right corner of the main function interface to enter the personal profile interface, and the upcoming events of the user will be displayed in the middle of the page.

This interface contains two sub-pages:

- Academic Transcript
(Check Academic record and personal GPA)
- Edit My Personal Profile

Academic Transcript



Academic Transcript

On this page, the user can visually see his overall GPA and his overall grade of each course

Time Table

The screenshot shows a mobile application interface for managing timetables. At the top, there is a header bar with the time '9:41' and signal strength indicators. Below the header, a navigation bar includes a 'Back' button, a 'TIME TABLE' title, and three buttons: 'ACADEMIC TIMETABLE' (with a book icon), 'EVENTS TIMETABLE' (with a basketball icon), and 'CREATE A TIMETABLE' (with a plus icon). A blue banner at the top says 'OVERALL TIMETABLE' and displays the date 'THU. APR 13'. Below the banner is a calendar for April 2019, showing days from Sunday to Saturday. The date '13' is highlighted with a blue circle. At the bottom of the screen, there are sections for 'Coming soon' (IFNS 7900 Lecture 10-12am) and 'Upcoming' events (LOL competition Event 2-4pm and CSSE7023 Practical 17-19pm).

Coming soon

IFNS 7900 Lecture 10-12am

Upcoming

LOL competition Event 2-4pm

CSSE7023 Practical 17-19pm

Timetable

From this page, the user can view the current time, date, and calendar for the month.

The timeline at the bottom of the screen will remind users of class schedule and activities today.

Timetable interface contains:

- Academic Timetable
- Events Timetable

9:41

Back Academic Timetable

2019
Thu, Apr 13

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

TODAY

Coming soon

IFNS 7900 Lecture 10-12am

Upcoming

CSSE7023 Practical 17-19pm

9:41

Back Event timetable

2019
Thu, Apr 13

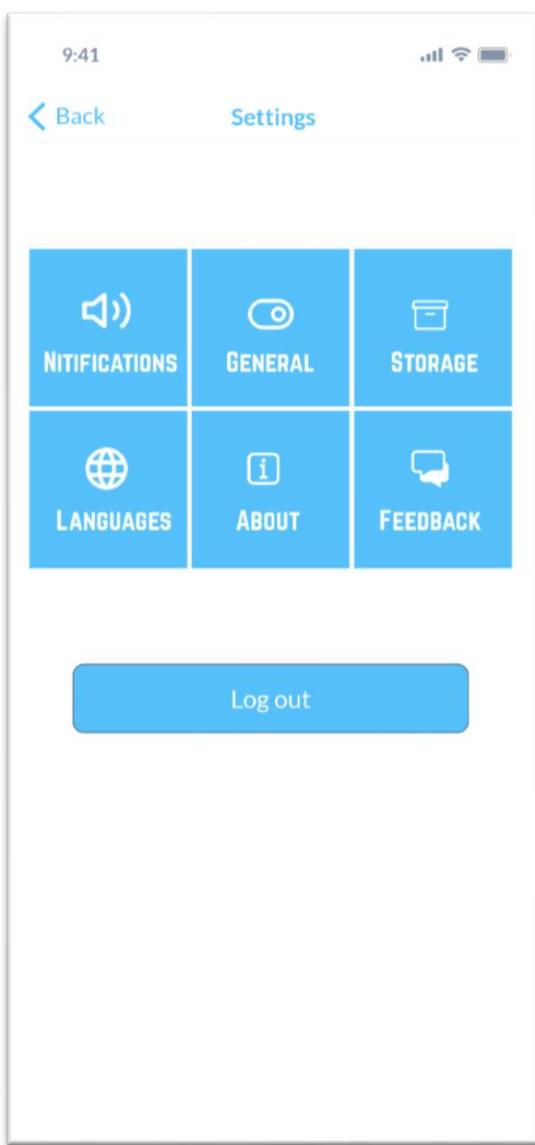
S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

TODAY

Coming soon

LOL competition 13-14pm

Settings

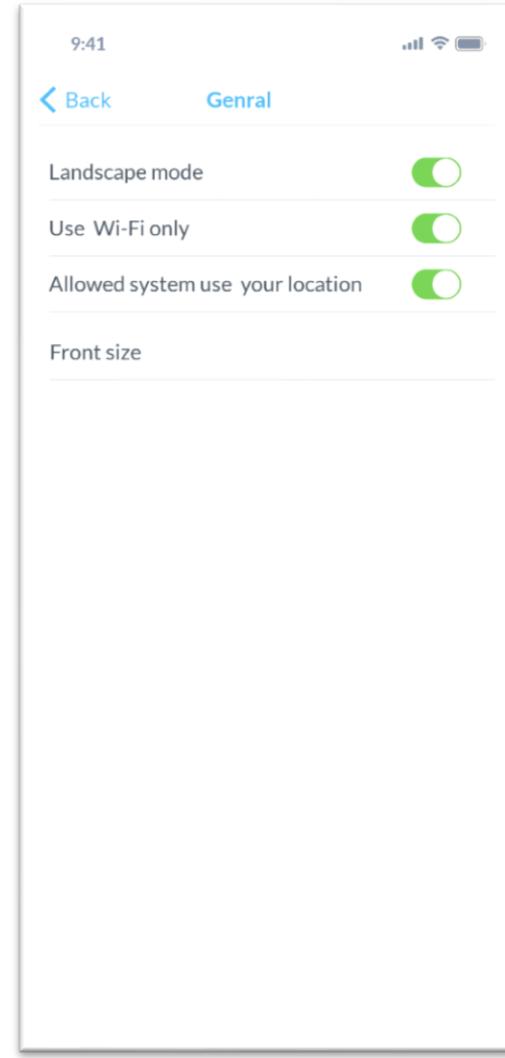
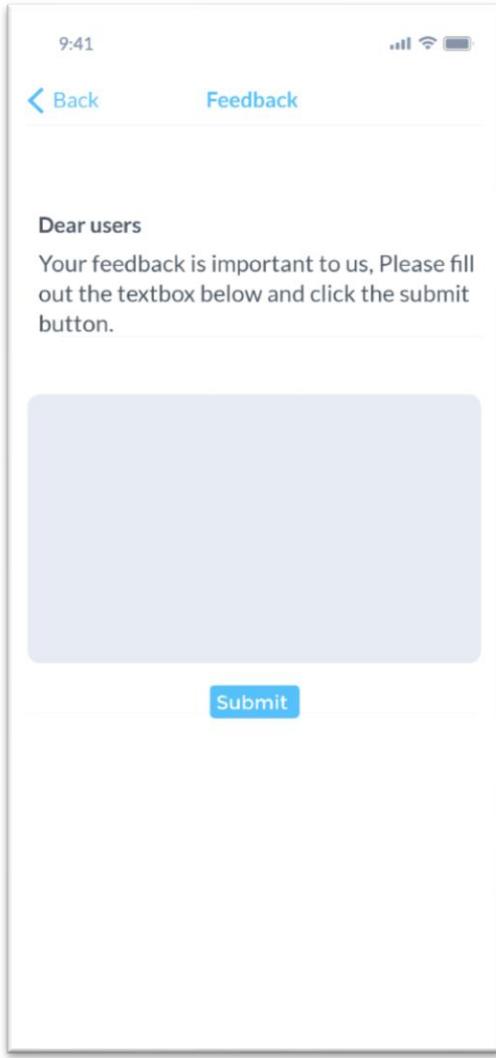


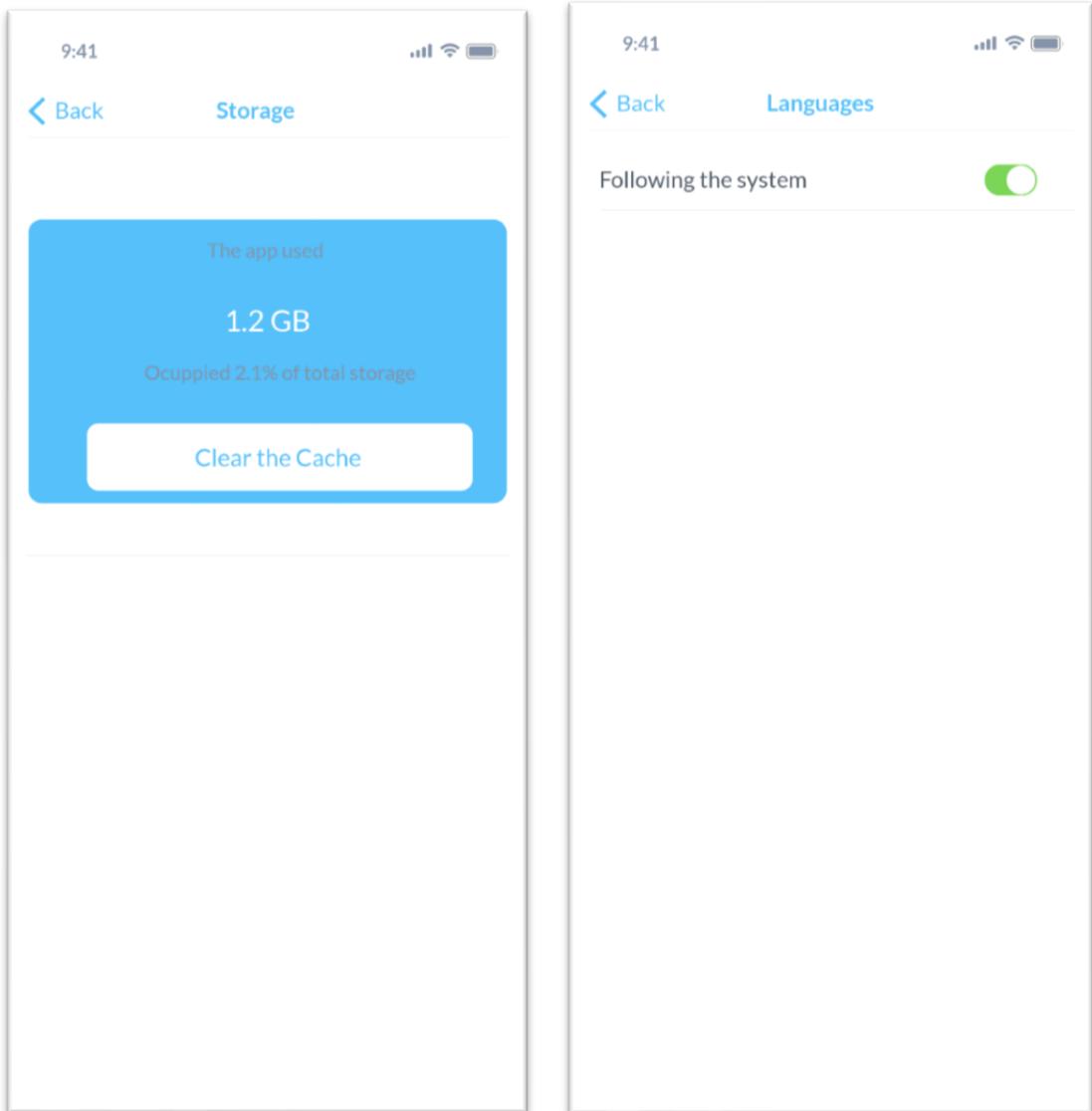
Settings

Users can access the Setting page via the Settings button on the main features page, which includes the sub-pages:

- Notifications
- General (Edit text size)
- Storage (Clear Cache)
- Languages (Edit Language preference)
- Feedback
- About

Users can log out their accounts or switch accounts by clicking the Log Out button, link to: Sign in/up page





9:41

Back About



Developing team
Team Space Pirate
Contact us: 0450860501
381476477@qq.com

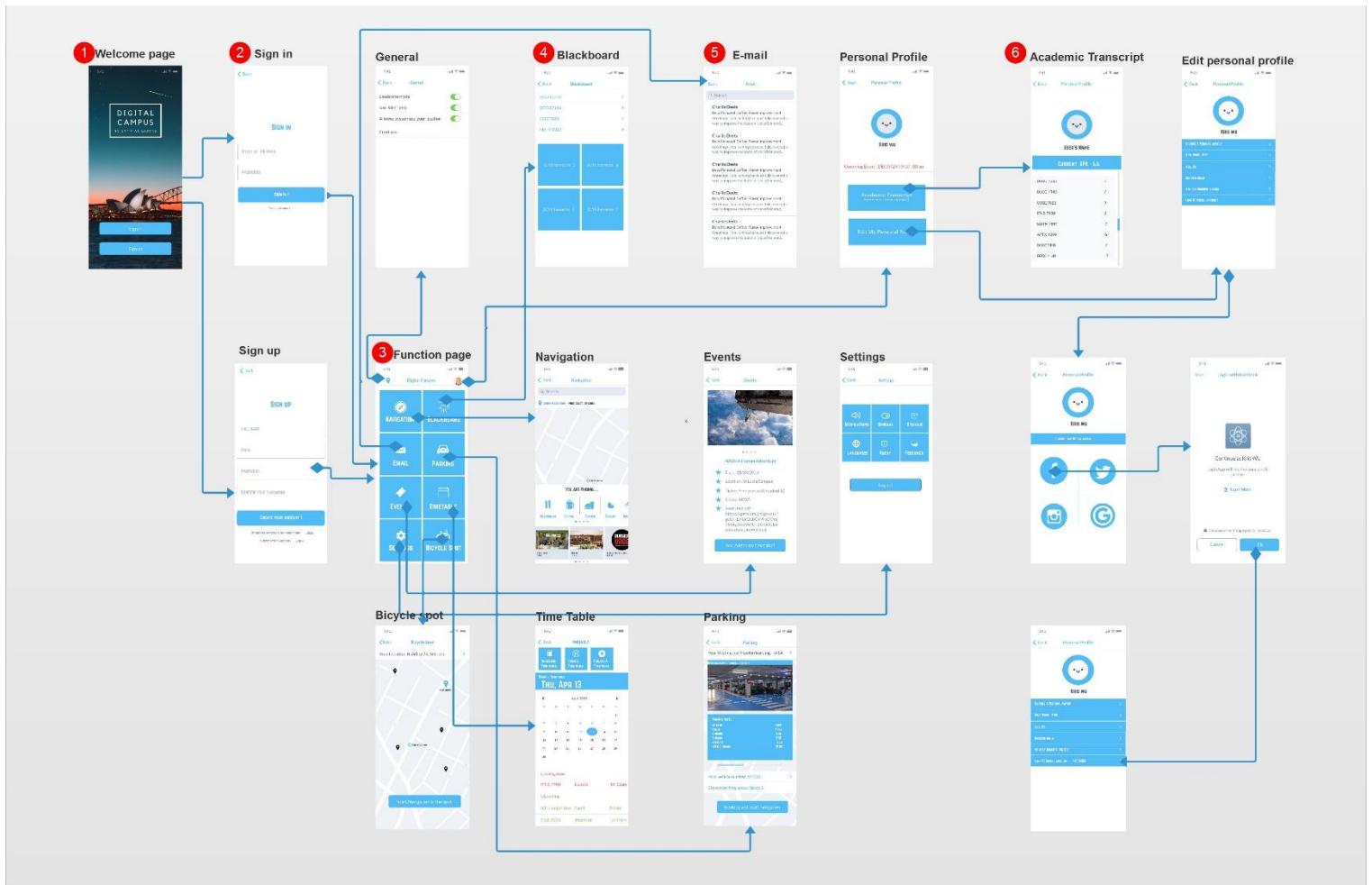
9:41

Back Notification

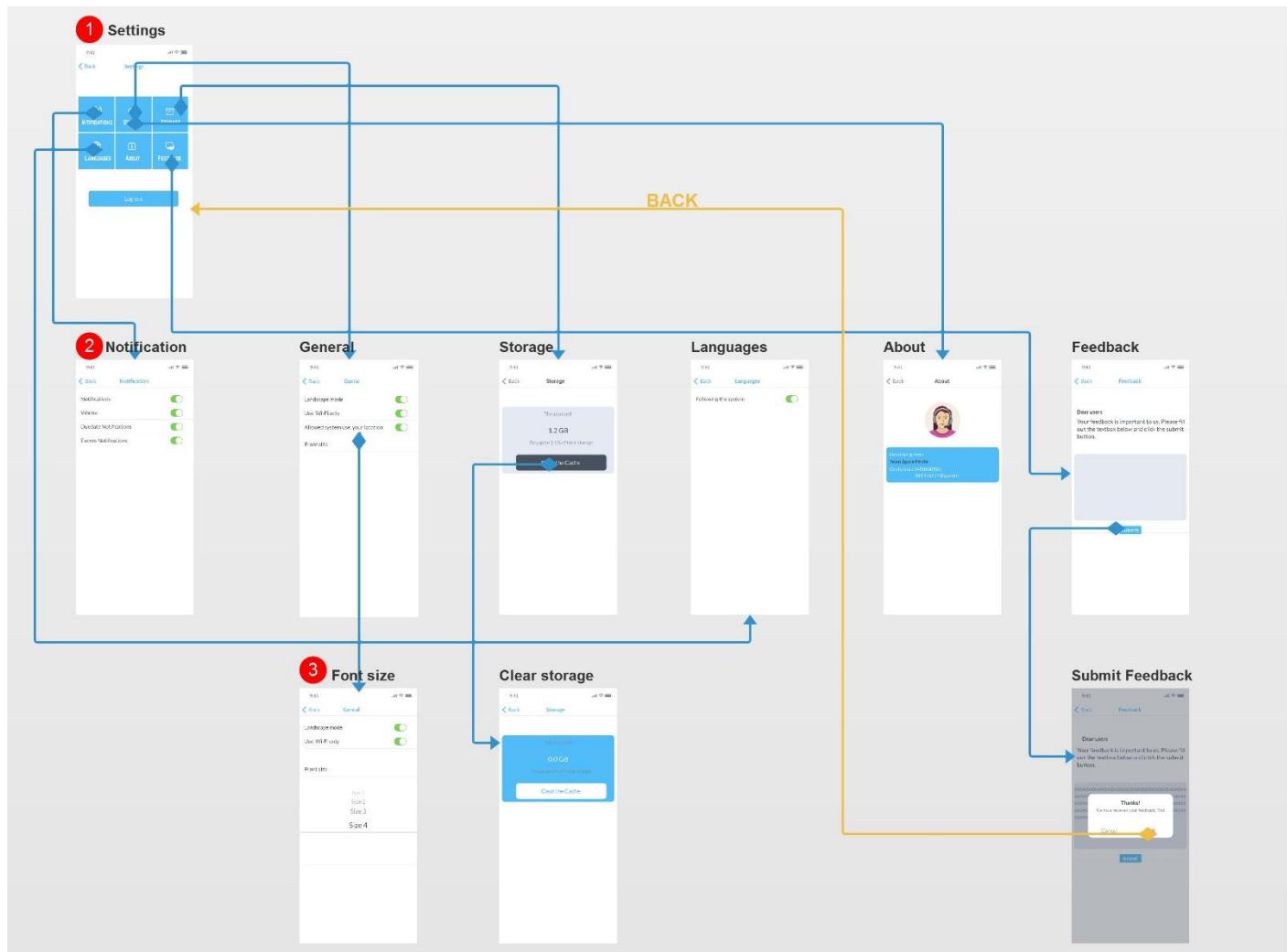
Notifications	<input checked="" type="checkbox"/>
Vibrate	<input checked="" type="checkbox"/>
Duedate Notifications	<input checked="" type="checkbox"/>
Events Notifications	<input checked="" type="checkbox"/>

3.7 Interaction Diagrams

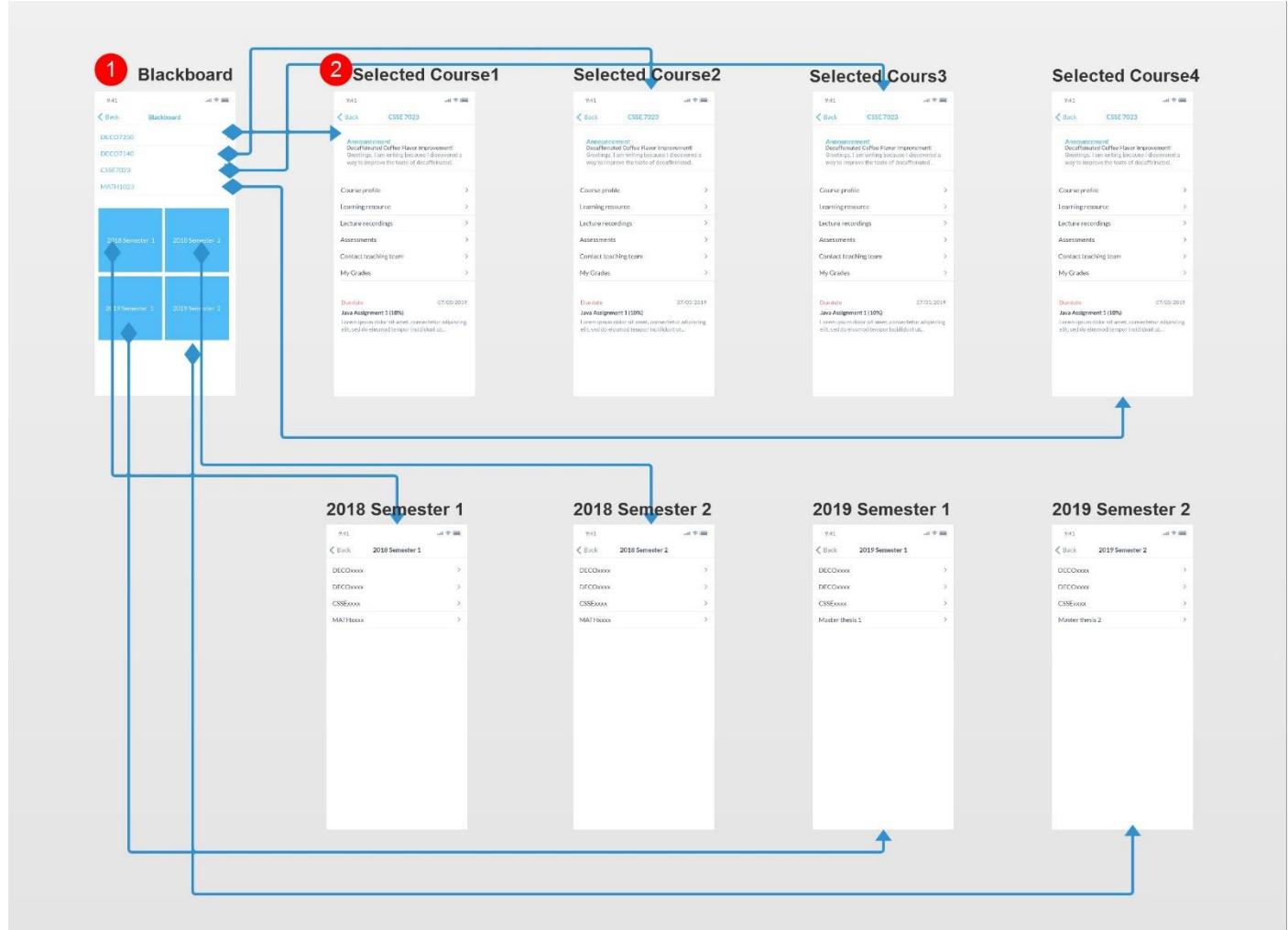
Home page



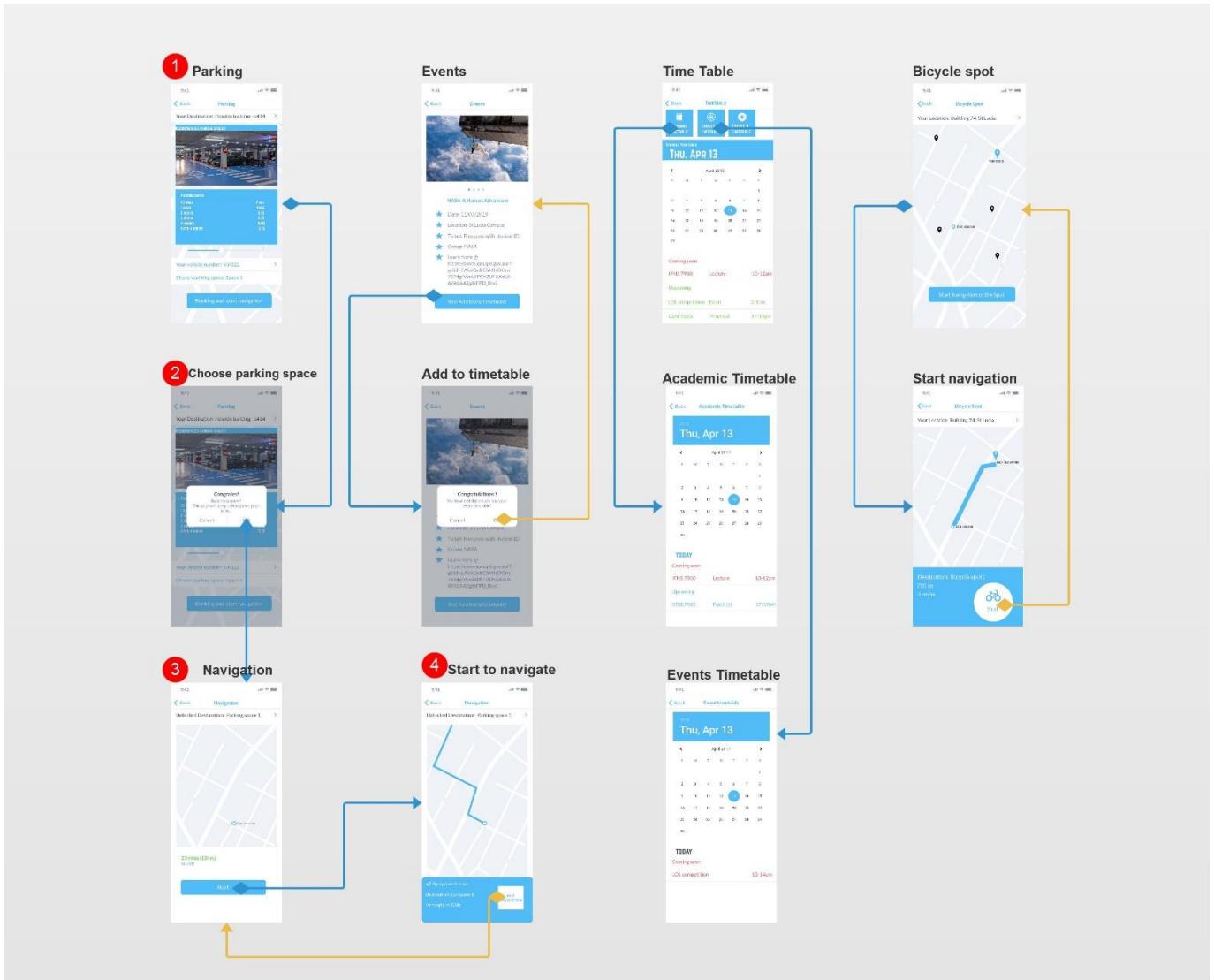
Setting page



Blackboard



Parking & Events& Timetable& Bicycle spot



3.8 Prototype Downloads on testing purpose

The digital campus is a mobile app running on the IOS operating system. However, the team have made three versions of a prototype for three operation system (Android, IOS, Computer), which allowed tutors or graders to download the application (Prototype without any function) and test the interaction flow of our medium-fidelity prototype.

Tutors can download an APK (For Android) and IPA (For IOS) through the following links:

Android: <https://marvelapp.com/build/509636lshin26sn>

(Can install on any Android device (System version higher than 5.0))

IOS: <https://marvelapp.com/build/6lc848sroetcasf>

(Can install on any IOS device (System version higher than IOS 9.0))

In order to install on Android and IOS device, the tester must enable "unknown sources". Once APK or IPA is successfully installed on the device, the application icon of "Digital Campus" will appear on the homepage of the mobile phone screen of the tester, and the tester can test by clicking this icon. It is very similar to a real mobile app, but it does not have any features (like text input, navigation queries).

Since the prototype of Digital campus is based on the framework of iPhone X, this may lead to the situation that the size of prototype and the mobile phone screen of the tester are not suitable for each other. Therefore, the team provides the computer version for the testers.

Computer(multi-system) <https://share.weiyun.com/56t1XWQ>

Please use the Pin: **HCITSP** to download.

Once the testers have downloaded the zip file, they can extract it and click on the index.html file to Interact with the prototype.

4.0 Step 3: Evaluation

4.1 Overview

After creating the high-fidelity prototype, the team started to conduct rapid formative evaluations to measure user experience, as well as the metrics and measures that the team have identified as part of the conceptual design. Three types of evaluations have been conducted during this stage: 8 groups of experts and one user were involved.

Referring back to the UX Honeycomb by Peter Morville. To evaluate “usable” and “findable” in the honeycomb, the team has decided to conduct a heuristic evaluation using Nielsen’s Usability Heuristics, as well as pluralistic walkthrough involving UX experts and users. For evaluating “useful” and “desirable” in the honeycomb, the team has decided to use TAM with interviews after to understand the responses from users.

Figure 4-1 UX Honeycomb



This section includes the three evaluation methods the team have conducted and the outcome of evaluations. The raw data of each method during the evaluation stage and signed consent forms of participants are attached in the appendix.

4.2 Evaluation method

4.2.1 Heuristic Evaluation

Experts analyse the interface concerning a set of criteria in order to determine whether the application meets the standard of usability. The evaluation is based on ten heuristics from Nielsen's Usability Heuristics. The severity of the usability issues the experts have identified is rated combining the aspect of frequency, impact and persistence. The experts involved in this stage of evaluation know application domain and usability, so it is a quick and cheap way of identifying obvious usability issues throughout the development cycle.

4.2.2 Pluralistic walkthrough

A group of stakeholders, including experts and users meet together to walk through a set of tasks, discussing and evaluating the usability of a system. Group walkthroughs have the advantage of providing a diverse range of skills and perspectives to bear on usability problems. As with any inspection, the more people looking for problems, the higher the probability of finding problems. Also, the interaction between the team during the walkthrough helps to resolve usability issues faster.

4.2.3 TAM

TAM is a way with five elements, Perceived usefulness, Perceived ease of use, Attitude, Intention to use, actual system use to seek to determine whether people are likely to accept and use technology. The interview after which is an appropriate way to understand the responses of the TAM survey. Therefore, the team have decided to use these evaluation methods to access many perspectives of the UX Honeycomb by Peter Morville.

4.3 Evaluation protocol

Evaluation ID	User Test 001-008
Aims	<ol style="list-style-type: none">1. Evaluation of an interactive prototype2. Learn more about the user and their needs3. Obtain feedback about the user experience with the respect of Nielsen's Usability Heuristics
Date	23 May 2019
Creator	Space Pirate

Prepare the material being used for the user testing session:

1. Consent forms
2. Heuristic evaluation forms
3. Task sheet
4. Questionnaire
5. UX experts and user
6. Nielsen's Usability Heuristics
7. High fidelity prototype

Introduction

We are the design team “Space Pirate”. Today we are going to get your feedback from the perspective of the usability of the Application “Digital Campus”. It’s an application that integrates applications students would frequently use on campus.

We are looking at how easy it is for users to use the application, how well users understand the process of interaction, and whether there are any problems with the interface.

There is a consent form that we need you to complete. It tells you what is the purpose of this task today and how the data will be used. This is a voluntary task, and if you feel uncomfortable, please feel free to stop the testing session.

Through this process, we are evaluating the software and how effective the design is.

Consent

Participants read through, fills in and signs a consent form. We fill in our parts as well.

Thanks for providing consent. Just a reminder you can withdraw from this task at any time without any negative consequences to you.

Task 1: Heuristic Evaluation

Instructions

We would like you to follow the instructions below and complete the task. At first, you will be given a few minutes to get feel for the application. Then you will work through selected evaluation scenarios below and use scenarios to walk through the user interface.

Evaluation scenarios

1. Log in university account and check your GPA
 2. Find a parking site
 3. Use navigation function to find a food court
 4. Find assessment of course CSSE7023
 5. Find an event and add it to the timetable.

When working with the scenarios, mark usability issues on the form.

Then categorise usability issues using a checklist

Please respect the ten heuristics from Nielsen's Usability Heuristics.

10 Usability Heuristics for User Interface Design

- Visibility of System Status
- Match Between System and The Real World
- User Control and Freedom
- Consistency and Standards
- Error Prevention
- Recognition Rather Than Recall
- Flexibility and Efficiency of Use
- Aesthetic and Minimalist Design
- Help Users Recognize, Diagnose, and Recover from Errors
- Help and Documentation

Rate severity of usability issues.

- Frequency of encountering problem (common, rare)
- Impact of the problem (low, high)
- Persistence – how easily is it overcome each time? (not, very)

Severity Rating Scale

0 = not a problem at all

1 = cosmetic (e.g. Freq – rare; Imp – low; Per – not) → fix if time

2 = minor usability problem (e.g. Freq – common; Imp – low; Per – not) → low priority fix

3 = major usability problem (e.g. Freq - common; Imp – low; Per- very)

4 = catastrophic usability problem (e.g. Freq – common; Imp = high; Per – very)

Do you have any questions about the task you are about to complete?

When the participant is ready, ask the participant to start on the task.

Task 2: Pluralistic Walkthrough

1. The method includes three participants in the walkthrough session: the user and two usability experts.
2. The system is presented with high fidelity prototypes.
3. All participants take the role of a user. They work separately.
4. The participants write down the actions they would take to perform the given tasks.
5. The group discusses the solutions to which they have reached.

The administrator first presents the correct answer.

Then the users describe their solutions, and only after that, do the usability experts offer their opinions.

Tasks:

1. Log in university account and check your GPA
2. Find a parking site
3. Use navigation function to find a food court
4. Find assessment of course CSSE7023
5. Find an event and add it to the timetable.

Task 3: TAM Survey

Ask the participant to fill in the short questionnaire of the Technology Acceptance Model.

It contains a few short classification questions and then some more detailed short answer questions about your experience, followed by a few quick response questions to rate your experience.

We will check over the responses to make sure that all parts have been filled out, and that the answers are legible.

- | | |
|-------|--|
| PU1 | I can accomplish my tasks more quickly using the Digital Campus. |
| PU2 | I can accomplish my tasks more easily using the Digital Campus |
| PU3 | Digital Campus enhances my effectiveness in utilizing |
| PU4 | Digital Campus enhances my efficiency in utilizing |
| PU5 | Digital Campus enables me to make better decisions in utilizing |
| PU6 | Overall, I find Digital Campus useful |
| PEOU1 | Learning to use Digital Campus is easy for me |
| PEOU2 | It is easy to use Digital Campus to accomplish my tasks |
| PEOU3 | Overall, I believe the Digital Campus is easy to use |
| ATT1 | In my opinion, it is desirable to use the Digital Campus |
| ATT2 | I think it is good for me to use Digital Campus |
| ATT3 | Overall, my attitude towards Digital Campus is favourable |
| ITO1 | I will use Digital Campus on a regular basis in the future |
| ITO2 | I will frequently use the Digital Campus in the future |
| ITO3 | I will strongly recommend others to use Digital Campus |

Task 4: Post-interaction interview

Finally I have a few questions to ask you about your response to the survey.

Note: Interviewer – probe into responses using the following questions:

1. Would you please explain what you mean by [statement]
2. Why do you feel that way?
3. Can you tell me about a recent experience you have had with that?

Interview Schedule:

- Think back to your response to Question PU5. Please explain why you gave that response.
- Think back to your response to Question PEOU2. Please explain why you gave that response.
- Think back to your response to Question ATT2. Please explain why you gave that response.
- Think back to your response to Question ITO1. Please explain why you gave that response.
- Think back to your response to Question ITO1. Please explain how you plan to use the Digital Campus in the future.

Closing

Tell the participant that the session is at an end. Remind them about consent is voluntary and that they can withdraw at any time.

Thank you for volunteering your time, and your data is valuable.

Let participant know that they are free to go.

4.4 Outcomes of evaluation

4.4.1 The main results of heuristic evaluation:

Table4-1

Prototype screen	Usability issue	Heuristic category	Probable effect on the user	Severity rating
Sign in	User may find out they do not have an account	User control & Freedom	Cannot go back and sign up	3
Blackboard	Cannot go back from the external link	User control & Freedom	Need to exit from the app and redo	3
Event	No change after adding to timetable	Visibility of System Status	Wasting time to add again	2
Profile	GPA is supposed to be in Blackboard	Visibility of System Status	Hard to find	2
Navigation	Target is not focused at the center	Recognition Rather Than Recall	Missing important information	2
Navigation	Font size is too small	Aesthetic and Minimalist Design	Confusion	1
Parking	Some people do not need parking	Flexibility and Efficiency of Use	Useless	1

4.4.2 TAM survey results

Figure4-2

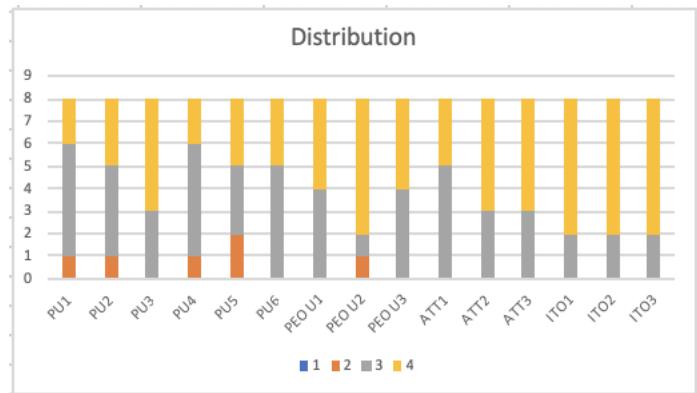
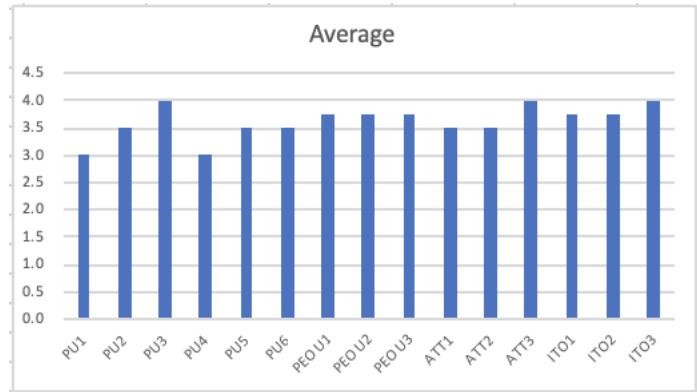


Figure4-3



After collecting the responses of the ten questions about the technology acceptance model, we have interviewed them, particularly about their responses. From the graph of TAM results, it can be seen that the lowest score from the ten questions is PU1 and PU3. The responses of question PU4 and PU5 were not as positive as other questions as well. So we asked the participants to think back to their response to these questions and explain why they gave that response. For question PU1, PU4 and PU5, the reason given by the participants was that they found there were too many options in some of the pages they can choose from, which retarded them to accomplish the tasks quickly. The efficiency of utilising was affected as well. For question PU3, the participants mentioned that when they choose system functions by mistake and cannot find a marked “emergency exit” to leave the unwanted state, which affects effectiveness in utilising.

Generally, we have got positive responses from the TAM survey, as the average result of the questions is above 3, revealing that the participants think our application is acceptable on a regular basis.

4.5 Key findings

From the outcome of heuristic evaluation listed above, it can be seen that the most severe issue the experts have identified is about user control and freedom. Additionally, the heuristics we have missed in some of the pages are visibility of system status and recognition rather than recall.

During the process of the pluralistic walkthrough, the anticipate actions of participants are mostly close to the steps needed when using our application. For a reason we have built the application based on their cognitions of existing applications, which helps to reduce the cognitive overload effectively. The response shows that the Gulf of execution can be reduced when using our application. Despite many options exist in some of the interfaces, which blocks the user to notice the correct action available to them.

TAM results and following interviews, particularly about the TAM results show that the variety of information in some of the pages may lead to confusion. Moreover, from the responses of interviews after TAM, users responded to the strong need of a redo, which helps us to establish further requirements of users.

5.0 Step 4: Establishing Requirements

5.1 Overview

Our team did a series of observations, as well as methods, such as a heuristic walkthrough, and pluralistic walkthrough to test our high-fidelity prototypes, which helps us gather more statistic to improve our application further. In this section, we will analyse what data we collected from the evaluation. Based on data, we will dialogue issues of our high-fidelity prototypes about the functionality and visualisation and find feasible solutions for these issues.

5.2 Analysis

sign in page

Issues: There are two participants reflected that the sign-in page made them confused because of aesthetics and functionality.

Interview:

Expert one: “The background image, it looks like a section of sign-up form. So I tried to click the background image, but there were no changes while I was registering.”

Expert two: “I cannot go back and sign up, anywhere, homepage lacks a ‘back’ button.”

Expert three: “yeah, I think so! It is better to get a ‘back’ button.”

Analysis: Sign-in page gives users first impression on applications which will decide whether users are intrigued by this application. Therefore, it is important for the sign-in page to establish a trustworthy impression.

Solution: Firstly, we need to design a “back” icon for users while they make errors and want to be forgiven by their wrong operations. Secondly, it would better to change the background image of our homepage to reduce users’ confusion.

source	UX Goals	Measures	Requirements
“The background image, it looks like a section of sign-up form. So I tried to click the background image, but there were no changes while I was registering.”	I want to use a more intuitive interface.	The number of clicks	Use succinct background image with simple colour.
“I cannot go back and sign up,	I want to have a return route.	The number of errors	Set a “back” icon.

anywhere, homepage lacks a ‘back’ button.”			
Expert three: “yeah, I think so! It is better to get a ‘back’ button.”			

Blackboard

Issues: For blackboard, there are at least five experts mentioned that there is no “back” button when they finish the task or scenario so that they cannot continue completing the next task until they restart the whole application and do the task again.

Observation:

Experts sooked the “back” button for a few seconds and hesitated to click the screen many times to try to back to the last page.

The average number of clicks is five, and the average hesitating time is six seconds.

Solution: Setting “back” icon at the blackboard page is the most effective way to fix this problem.

source	UX Goals	Measures	Requirements
Experts restarted the application.	I want to have a “back” button to allow them to justify their errors.	The number of restarting; The number of clicks; The average hesitating time.	Set the “back” icon at blackboard page.

Event

Issues: One participant considered there are no changes after adding any activities to a personal profile. It means they need to back to the main page and enter the event page again to check other activities they are interested when finishing adding one event to timetable.

Heuristic walkthrough:

Event	No change after adding to timetable	Visibility of System Status	Wasting time to add again	2

figure 1 Heuristic walkthrough

Solution: The application can show a sign “Let us explore more activities!” with “no” and “yes” buttons. If users want to find more interesting events, they can click the “yes”

button; then the page will back to the event list page automatically. If they choose “no” button, the page will close and jumps to timetable page.

source	UX Goals	Measures	Requirements
No change after adding to timetable	I want this digital campus can back automatically after adding my first reservation.	The number of back;	Automatically return while finishing one operation; More choices after adding. The application can be visible about the system status.

Personal profile

Issues: Three experts mentioned that it is hard to find GPA option. Therefore, they clicked the screen many times to find the location of GPA.

Pluralistic walkthrough: (group discussion notes)

One expert said “The account button, GPA, is very bad and hidden. It could be better.”

Heuristic walkthrough:

No.	Prototype Screen	Name of Heuristic	Reason for reporting as negative or positive	Probable effect on user	Justification of Severity Rating			Severity Rating
					Frequency	Impact	Persistence	
	profile		No GPA!	important	common	high	not	3

figure 2 Heuristic walkthrough

2	GPA page	some events hard to find	visibility	hard to find	rare	low	low	1
1	GPA page	it supposed to be in blackboard	visibility	Users may think GPA is in	rare	low	low	2.

figure 3 Heuristic walkthrough

Solution: There are two ways to figure out this issue. One of them is resetting the location of GPA; for example, it can be set in the profile page instead of one internal link page of the profile. However, we need to consider the privacy of users. We are unexpected to leak any personal details to others while users are checking the profile page. Therefore, we assume the second approach is better, which is to design a flip card of GPA. While users are checking the GPA, they just need to click the flip card at the page of profile to check the GPA which is hidden on the back of the card.

source	UX Goals	Measures	Requirements
“The account button, GPA, is very bad and hidden. It could be better.”	I want this digital campus can show the GPA clearly.	The number of back; The average time of finding GPA	Change the location of GPA;

		The number of errors	
--	--	----------------------	--

Navigation

Issues: There are two main problems of navigation page. Firstly, the destination is not shown at the centre of the map. While users search a place they want to go, sometimes, the target is on the edge of the map and cannot be enlarged, which it is difficult to use. Secondly, it is about aesthetics. The font size is too small to browse which it is not kind for users with poor eyesight.

Heuristic walkthrough

Navigation	Target is not focus at center	Recognition Rather Than Recall	Missing important information	2
Navigation	Font size is too small	Aesthetic and Minimalist Design	Confusion	1

figure 4 Heuristic walkthrough

Solution: Resetting the map of navigation with bigger font-size is to inform users' feedback. Resetting map means make map flexible which provide more functions for users, such as enlarging the pad and tracking the route.

source	UX Goals	Measures	Requirements
Target is not focused at the center	I want a more flexible map at navigation page.	the feeling of users experience Survey: Questionnaire	Provide comprehensive functions, including enlarging the pad and tracking the route.
Font size is too small	I want to use application with clear typography.	The hesitating time of click; The feeling of user experience. Survey: Questionnaire	Change font-size with appropriate hierarchy.

Parking

Issues: There are two experts pointed out that there are too many details on the parking page so they can not make the best decision. Only one expert considered that the parking could not be cancelled. For example, users cannot regret booking the parking site.

Heuristic walkthrough:

2	parking	↑ parking rates too many.	too much info	com	low	high	very	1
---	---------	------------------------------	---------------	-----	-----	------	------	---

figure 5 Heuristic walkthrough

Parking	A	cont. print. cancel.	cont. reject.	3	2	4
---------	---	----------------------	---------------	---	---	---

figure 6 Heuristic walkthrough

Solution: We need to minimise the information of parking to simplify the interface of parking and help users make the best decision. Meanwhile, we need to add a button about the cancellation of the reservation.

source	UX Goals	Measures	Requirements
Too much information in parking page	I want a simplified interface with maximum efficiency.	the feeling of users experience Survey: Questionnaire	Provide a succinct interface with sufficient functions
“I cannot press cancel.”	I want to use a function about the cancellation.	The feeling of user experience. Survey: Questionnaire	Add a “cancel” button.

6.0 Conclusion

Based on the data obtained in the previous two reports, we further evolve the conceptual design and upgrade the medium fidelity prototype into a high fidelity prototype which based on the design alternative. The design alternative was optimised by the evaluation in the previous two cycles.

Therefore, we add several new pages such as the link to social media in the general page and the bicycle spot function in the home page.

Then the team evaluated the hi-fi prototype by heuristic evaluation, pluralistic walkthrough and TAM. The most severe issue the experts have identified is about user control and freedom in heuristic evaluation. During the process of the pluralistic walkthrough, the anticipate actions of participants are mostly close to the steps needed. The response shows that the Gulf of execution can be reduced when using our application. The response shows that the Gulf of execution can be reduced when using our application. TAM results show that the variety of information in some of the pages may lead to confusion. The strong need for redo reflected by users can help to establish further requirements of users.

The team dialogued issues of hi-fi prototypes about the functionality and visualisation and found feasible solutions for these issues.

Overall, through the testing based on the above methods, although the user's requirements are mostly satisfied, there are still some details that we need to improve.

7.0 Appendix

7.1 Heuristic Evaluation Forms

No.	Prototype Screen	Name of Heuristic	Reason for reporting as negative or positive	Probable effect on user	Justification of Severity Rating			Severity Rating	
					Frequency	Impact	Persistence		
01	Sign in	User control & choice for freedom	user may find out they don't have an account	can't go back and sign up	R	H	N	3	
02	Navigation		Restaurant vs. noodles and repeat? ; else -- what about other places	confuse	C	L	V	1	
03	Parking	flex ~	parking rates? don't understand		L	H	N	3	
04	Parking	flex ~	people don't need parking	useless	R	L	V	1	
05	e-mail	~		need to exit the app and					
	Blackboard	recover from error	can't go back from the login page	renews everything	C	H	N	4	
	Event	Vis---	for the event added before there is no change	add again	E	C	L	V	2

Legend
 Frequency of encountering problem (common, rare)
 Impact of problem (low, high)
 Persistence – how easily is it overcome each time? (not, very)

Severity Rating Scale
 0 = not a problem at all
 1 = cosmetic (e.g. Freq = rare; Imp = low; Per = not) → fix if time
 2 = minor usability problem (e.g. Freq = common; Imp = low; Per = not) → low priority fix
 3 = major usability problem (e.g. Freq = common; Imp = low; Per = very)
 4 = catastrophic usability problem (e.g. Freq = common; Imp = high; Per = very)

No.	Prototype Screen	Name of Heuristic	Reason for reporting as negative or positive	Probable effect on user	Justification of Severity Rating			Severity Rating
					Frequency	Impact	Persistence	
	black board.		sometimes doesn't have response.		1	4	2.	
	event ..		size is not multiple		4	2	4	
	parking.	A	can't print. cancel.	can't. regret.	3	2	4	

Legend

Frequency of encountering problem (common, rare)

Impact of problem (low, high)

Persistence – how easily is it overcome each time? (not, very)

Severity Rating Scale

0 = not a problem at all

1 = cosmetic (e.g. Freq – rare; Imp – low; Per – not) → fix if time

2 = minor usability problem (e.g. Freq – common; Imp – low; Per – not) → low priority fix

3 = major usability problem (e.g. Freq – common; Imp – low; Per- very)

4 = catastrophic usability problem (e.g. Freq – common; Imp = high; Per – very)

No.	Prototype Screen	Name of Heuristic	Reason for reporting as negative or positive	Probable effect on user	Justification of Severity Rating			Severity Rating
					Frequency	Impact	Persistence	
	profile		No GPA!	important	common	high	not	3.
	parking.	b	positive	N/A.				
	Food court		Font - family size too small!	confused	common	high	not	2
	Timetable.		Should show the timetable immediately after I select.	control trouble	common	low	not	1.
	blackboard		No bottom to go back!	confused	rare	high	very	4.

Legend

Frequency of encountering problem (common, rare)

Impact of problem (low, high)

Persistence – how easily is it overcome each time? (not, very)

Severity Rating Scale

0 = not a problem at all

1 = cosmetic (e.g. Freq – rare; Imp – low; Per – not) → fix if time

2 = minor usability problem (e.g. Freq – common; Imp – low; Per – not) → low priority fix

3 = major usability problem (e.g. Freq – common; Imp – low; Per- very)

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Informed consent form

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Consent is voluntary – you do not have to participate if you don't want to. If you do participate, you may withdraw your consent at any point, and all your data up to that point will be destroyed and not used.

All data collected is confidential and will be kept in a secure location, and your data will be indexed by a participant ID rather than by name.

If AV recordings are taken, they will be seen only by the students doing this particular project and possibly also by their Studio tutors and the course coordinator (Dr Chelsea Dobbins).

All your data, including any recordings, will be erased/destroyed once class grades are released.

There is no reimbursement or payment for participation.

I have read the information above and give my consent to participate.

Participant Name: Menghao Li

Participant Email: liruanganbaron46@gmail.com

Signature: Menghao Li Date: 23/05/2019

Researcher Name: _____ Date: ____ / ____ / 2019

Researcher Signature: _____

Researchers:

Space Pirate

Instructor in charge of DECO2500/7250: Dr Chelsea Dobbins, School of ITEE, UQ (c.m.dobbins@uq.edu.au)

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There is no reimbursement or payment for participation.

I have read the information above and give my consent to participate.

Participant Name: Zhuoran Li

Participant Email: zhuoran.li1@ugconnect.edu.au

Signature: Li Date: 24/05/2019

Researcher Name: _____ Date: ____ / ____ / 2019

Researcher Signature: _____

Researchers:

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I have read the information above and give my consent to participate.

Participant Name: Sommer Yang

Participant Email:

Signature: Sommer Date: 24/05/2019

Researcher Name: _____ Date: ____ / ____ / 2019

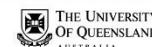
Researcher Signature: _____

Researchers:

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I have read the information above and give my consent to participate.

Participant Name: Yi Lv

Participant Email: lv.yi1@ugconnect.edu.au

Signature: Yi Lv Date: 24/05/2019

Researcher Name: _____ Date: ____ / ____ / 2019

Researcher Signature: _____

Researchers:

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I have read the information above and give my consent to participate.

Participant Name: Yuchen Ye

Participant Email: yuchen.ye24@b2b3.com

Signature: Yuchen Ye Date: 24/05/2019

Researcher Name: _____ Date: ____ / ____ / 2019

Researcher Signature: _____

Researchers:

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I have read the information above and give my consent to participate.

Participant Name: Yuchen Ye Date: 24/05/2019

Participant Email: yuchen.ye24@b2b3.com Date: 24/05/2019

Signature: Yuchen Ye Date: 24/05/2019

Researcher Name: _____ Date: ____ / ____ / 2019

Researcher Signature: _____

Researchers:

Space Pirate

Instructor in charge of DECO2500/7250: Dr Chelsea Dobbins, School of ITEE, UQ (c.m.dobbins@uq.edu.au)

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There is no reimbursement or payment for participation.

I have read the information above and give my consent to participate.

Participant Name: Shane Wei

Participant Email: Xinyuan.Wei@engconnect.edu.au

Signature: Shane Wei Date: 26/5/2019

Researcher Name: _____ Date: ____ / ____ / 2019

Researcher Signature: _____

Researchers:

Space Pirate

Instructor in charge of DECO2500/7250: Dr Chelsea Dobbins, School of ITEE, UQ (c.m.dobbins@uq.edu.au)

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There is no reimbursement or payment for participation.

I have read the information above and give my consent to participate.

Participant Name: Sichang Yang

Participant Email: Suyang.b50@engconnect.edu.au

Signature: Sichang Yang Date: 23/5/2019

Researcher Name: _____ Date: ____ / ____ / 2019

Researcher Signature: _____

Researchers:

Space Pirate

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7.3 Appendix 2 TAM survey

Dimension	Question													
PU1	I can accomplish my tasks more quickly using Digital Campus.													
PU2	I can accomplish my tasks more easily using Digital Campus													
PU3	Digital Campus enhances my effectiveness in utilizing													
PU4	Digital Campus enhances my efficiency in utilizing													
PU5	Digital Campus enables me to make better decisions in utilizing													
PU6	Overall, I find Digital Campus useful													
PEOU1	Learning to use Digital Campus is easy for me													
PEOU2	It is easy to use Digital Campus to accomplish my tasks													
PEOU3	Overall, I believe Digital Campus is easy to use													
ATT1	In my opinion, it is desirable to use Digital Campus													
ATT2	I think it is good for me to use Digital Campus													
ATT3	Overall, my attitude towards Digital Campus is favourable													
ITO1	I will use Digital Campus on a regular basis in the future													
ITO2	I will frequently use Digital Campus in the future													
ITO3	I will strongly recommend others to use Digital Campus													
		1 strongly disagree												
		2 disagree												
		3 agree												
		4 strongly agree												
			Distribution				Average							
			1	2	3	4								
PU1		0	1	5	2	PU1	3.0							
PU2		0	1	4	3	PU2	3.5							
PU3		0	0	3	5	PU3	4.0							
PU4		0	1	5	2	PU4	3.0							
PU5		0	2	3	3	PU5	3.5							
PU6		0	0	5	3	PU6	3.5							
PEOU1		0	0	4	4	PEOU1	3.8							
PEOU2		0	1	1	6	PEOU2	3.8							
PEOU3		0	0	4	4	PEOU3	3.8							
ATT1		0	0	5	3	ATT1	3.5							
ATT2		0	0	3	5	ATT2	3.5							
ATT3		0	0	3	5	ATT3	4.0							
ITO1		0	0	2	6	ITO1	3.8							
ITO2		0	0	2	6	ITO2	3.8							
ITO3		0	0	2	6	ITO3	4.0							
			Distribution				Average							
			1	2	3	4								
PU1		6	2	1	0									
PU2		5	3	1	0									
PU3		4	4	1	0									
PU4		3	5	1	0									
PU5		2	7	1	0									
PU6		1	8	1	0									
PEOU1		0	8	1	0									
PEOU2		1	8	1	0									
PEOU3		0	8	1	0									
ATT1		0	8	1	0									
ATT2		1	8	1	0									
ATT3		0	8	1	0									
ITO1		1	8	1	0									
ITO2		0	8	1	0									
ITO3		1	8	1	0									