Information At Your Fingertips:
OCADay – An Inclusive Mobile-based
Information System for International Students

by

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Ⓒ Yijin Jiang, 2015

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Abstract

This Major Research Project is a response to my own lived experiences as an international student from China at OCAD University. In this report, I describe the language barriers, cultural barriers and socio-economic barriers I faced, and provide evidence to show that these barriers are common across most Chinese students. I identified the information gaps that create these barriers and visualized the structure of an inclusive information system to mitigate this situation. Wearing my inclusive designer hat, I designed a prototype mobile application OCADay (name signifies *Okay day* or a *day at OCAD*) based on that information system, which responds to the student needs identified through this research. Although OCADay is designed for Chinese students, it would be useful to most other international students, and even local students. Plans for future development therefore include addition of more personalization features to position OCADay as the signature student-centric App for OCAD University.

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With the deepest gratitude I wish to thank every person who has come in to my life, inspired, and illuminated me through their presence.

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1 Introduction

1.1 Background and Problem

Globalization, accelerated by the Internet, has been substantially influencing the migration of students across the world in search of the best educational opportunities. It is estimated that 4.5 million students around the world are getting their post-secondary education abroad today—twice as many as roughly a decade ago—and more than half of them are from Asia (The Star, September 11, 2014).

The number of international students enrolling in Canadian universities and colleges has increased significantly over the past 15 years. In 1998, there were 85,803 foreign students studying in Canada (Liu & Winn, 2009), and by 2013, according to the Canadian Bureau for International Education, the total number rose to 293,505 (CBIE, 2014). This represents an unprecedented increase of 342% within fifteen years. Of the 293,505 international students in Canada, 83% are in Ontario, British Columbia or Québec (*ibid*). As of September 2014 the number of international students in Ontario stood at 66,417, each contributing about $35,000 to the economy (The Star, September 11, 2014).

During the same period of 1998 to 2003, the number of Chinese students that graduated from Canadian postsecondary institutions increased

from 3,505 to 95,160, representing an increase of 27 times the number in 1998 (Liu & Winn, 2009). Chinese students accounted for 32.42% of the total international students in Canada in 2013 (CBIE, 2014).

OCAD University is one of the oldest art and design institutions in Canada. Of the 387 international students studying in the university, 153 are from China[1]. According to statistics taken from the 2013-14 school year[2], 20% of graduate students are international; 6% of its undergraduate students are international; 15% of students do not have Canadian citizenship; and one-third of the student body's first language is not English.

Previous research shows that students from China and other countries, where English is not the medium of instruction, have considerable difficulties in coping with the academic and social life in Canada (Berry, 1997; Kim & Abreu, 2001; Zhang & Zhou, 2010). Given the steady and rapid increase in the number of Chinese students studying at Canadian universities in general, and in OCAD University in particular, and given the notable contribution made by these students to the province's economy, there is a need to take measures to help them integrate better into the Canadian university environment and have a richer overall living experience.

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[1] Personal email communication dated October 2, 2014 from Susan Kemp, coordinator of International Student Services at OCAD University
[2] http://www.ocadu.ca/about/facts-and-figures.htm

1.2 Design Challenge and Outcomes

As a Chinese post-secondary student in OCAD University in Toronto, Ontario I undertook to examine, through this study, the information needs of Chinese students, and to design an information system to facilitate their life as international students. The challenge in taking on the aforesaid task of designing an information system to facilitate the academic and social lives of Chinese students was in identifying their specific needs and ensuring that necessary information could be made available to them in culturally accessible ways. I could bring to this study my personal experiences as a Chinese international student at OCAD University, and my understanding of the associated communication challenges due to language barriers, cultural barriers, and socio-economic barriers, leading to unique information needs (these factors are elaborated upon in the next Section).

What resulted was a mobile application (OCADay App) that provides a convenient interface to a carefully designed system of essential information directly sourced out of the University's databases and other social information sources to ensure Consistency, Authenticity, Simplicity, Equity and Security (CASES value framework). This values framework emerged from the user requirements analysis and is explained further in the next Section.

1.3 Design Approach and Methods

The design approach adopted was based on the Design Thinking concepts of Empathy, Creativity and Rationality (Brown, 2008, 2014.) User requirements for the design were elicited *empathically* from a review of relevant literature, an environmental scan of mobile Apps of some universities in Canada and China and my own personal experiences as a student who arrived from China in the summer of 2013 to undertake a Masters program. All conceivable design criteria for creating a mobile-based information system were *creatively* listed out, and, finally, a subset of design components were selected through a MoSCoW[3] prioritization exercise (IIBA, 2009) to be included in the design of the OCADay App for OCAD University.

A Rapid Expert Design[4] method (Saffer, 2009, p. 45) was used to develop the mockups and prototype. This method involves only the designer engaging in the exercise of creating mockups and developing the prototype without inputs from users at this stage. I selected this method because I was a target user as well as a designer. This prototype will be evaluated for usability and user experience with Chinese students in the next phase of the study.

The goal was to design an accessible mobile app that is culturally inclusive of students from China. The eventual benefits for the students might

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[3] MoSCoW analysis involves the prioritization of offerings, functions and features based on Must-have, Should-have, Could-have and Would-have rankings.
[4] http://www.ixda.org/node/18893 (Jim Leftwich)

include better academic performance, greater social integration and improved economic situation. The anticipated benefit to the university could be greater satisfaction among Chinese students resulting in increased number of future admissions.

1.4 Report Outline

This introductory Section is followed by an account, in Section 2, of relevant previous research, contemporary mobile-based student information systems in other universities in Canada and China, and personal experiences/insights from which relevant user requirements are elicited. Section 3 describes how a number of possible design criteria are identified from those user requirements. Out of these, a smaller set of design components are extracted in Section 4 and used to design a mobile-based information system called OCADay. Mockups of the user interface screens and a visual representation of the process flow are provided and explained. Section 5 presents the unique contributions of the study to the field of inclusive design and describes the limitations and future steps in the work.

2 Literature Review

This section presents a first level review of literature with a focus on the experiences of Chinese students studying abroad, especially in North America (Section 2.1). My personal experiences as a Chinese student studying in Canada helped in teasing out the barriers these students face and their requirements in terms of information gaps. Design components for the design of a mobile-based information system were elicited from this review (Section 2.3).

2.1 Previous Research

The history of Chinese students studying abroad can be traced back to 1847 when the first Chinese student, Rong Hong, went to study at Yale University in the USA. After that, China gradually opened its doors to Western education and the first surge of studying abroad began in the early twentieth century.

The literature exploring the needs and problems of Chinese students studying abroad can be divided into two different periods: the first period runs from the late-1980s to mid-1990s, which was the beginning of the third surge of Chinese students studying abroad, when Deng Xiaopeng launched the reform and opening-up policy in 1978. The second period, which commenced after 1998, continues to the present.

Although research from the two different periods tends to have different focuses, all researchers identified the influence of language and cultural differences, as well as other problems, which Chinese students usually meet when studying and living in Western countries.

Most researchers frequently reference challenges experienced by international students such as difficulty with the English language, cultural differences, and loneliness (Berry, 1997; Kim & Abreu, 2001 ; Zhang & Zhou, 2010). Specifically, loneliness can be attributed to an information gap, in that it renders students unable to join in with the social activities of local students. These three aspects – language problems, cultural barriers and information needs are examined below.

2.1.1 Language Problems

Most Chinese students have learnt English for over 10 years before they get into college or university. However, a large number of them cannot do well in further education through English. One of the reasons is that Chinese students have good skills to pass tests, but those skills do not help them much in dealing with communication in academic or life situations. Sometimes, language problems can be a barrier to success for international students (Guthrie, 1983).

To qualify for admission to universities in most western countries, international students are required to obtain IELTS[5] or TOEFL[6] scores above a prescribed level. It is often the case that even though most Chinese students have high IELTS or TOEFL scores and a large English vocabulary, they have problems with using the language both in studying and in living in Canada. For example, in IELTS, there are four tests involving listening, oral, reading, and writing skills. A large number of Chinese students are able to qualify to go abroad by scoring 6.5 or higher in the test through rote learning and repeated practice. Passing these exams does not imply that Chinese students have the same reading and writing skills as native English speakers. Therefore, they find it difficult to communicate in English in real life situations.

Most Chinese international students have had their education in Chinese for twenty years or over. Thereafter, then have to use a totally different language when studying in Canada. Chinese international students have lower learning efficiencies than local students, because they cannot read or write as fast as local students. Zhang and Zhou (2010) observe that one of the major challenges for international students is their weak English language proficiency, which affects their acclimatization to the new learning environment. According to the Sapir-Whorf Hypothesis (Kennison, 2013), the languages we learn as a child strongly influence the way we think of and view

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[5] IELTS - International English Language Testing System – www.ielts.org.
[6] TOEFL - Test of English as a Foreign Language - www.ets.org/toefl.

the world. Language is not just a tool to communicate, but also the first step to understanding a new country.

Oral communication in English is perceived as a major challenge for many students (Zhang & Zhou, 2010). The language barrier in daily life encompasses a student's language comprehension, communicational skills and habits. Researchers have discovered that Chinese students cannot develop good oral English skills because of a lack of a speaking environment, and also a preference to use their home language when they meet with problems. Even though many students learned English as a required course in China since joining high school and continue to learn and speak English in Canada, they prefer to speak in Mandarin among themselves (Ping, 2012). When given a choice to communicate in English or Mandarin, Chinese students almost always chose Mandarin, as that makes them feel more comfortable and they can use it more accurately.

One problem that occurs in-class is that some professors speak too fast, and sometimes with a strong accent that can be difficult to follow and understand. It should be possible to quickly record difficult portions of lectures to listen slowly later on or to be able to convert the audio into text using speech-to-text software.

Another requirement is finding outside class assistance. Sometimes, following the schedule of the course syllabus is different for ESL students

because it is takes them much longer to complete readings and assignments than professors anticipate. Therefore, outside class assistance is very important for ESL students in order to catch up. The assistance should not only include a simple review of material, but also aid in the process of adapting students to their new academic learning environment. In my own experience, I often use the Writing & Learning Centre at OCAD U, which is helpful but not convenient enough. I have to make an appointment and it is time limited. If help could be obtained online or if there was a readily accessible tool that could help, a greater proportion of students could benefit from this type of assistance.

2.1.2 Cultural barriers

The cultural barriers are a big problem for most international students. There is a double-sided requirement. On the one hand, international students want to be involved in the local culture, and they need a way to learn more about it. On the other hand, they also want local people to know more about their own culture, so that they can understand and respect international students' requirements, preferences and unique challenges.

Chinese students find it hard to get involved socially because of cultural barriers. One of my friends once told me, "When I watch movies here, I don't know when to laugh, whereas local people laugh like crazy. I can

only either keep silent or 'laugh' with them." Another had mentioned, "I cannot understand that native people eat uncooked vegetable leaves, or what they call salad, as a meal; just like native people cannot understand how I eat pig's liver."

The cultural barrier can also be interpreted as culture shock. The term 'culture shock' was introduced for the first time in the early 1960s, when anthropologist Oberg (1979) noticed the phenomenon of cultural mismatch that overseas students experience. Culture shock is precipitated by the anxiety that results from losing all our familiar signs and symbols of social intercourse and not knowing what to do in a new environment (Guanipa, 1998; Xing & Spencer, 2008, p. 169-181). Cultural barriers might be hard to erase and could always exist.

Cultural barriers are not just different behaviors from different people who grew up in varying environment, but also unfamiliar ways to think about things. International students are faced with the task of rebuilding a new understanding of what works and what does not work in that new culture (Lang, 2012). The Chinese have a way of explaining this as being the "three different views", which are the "views of world", the "views of values", and the "views of life".

International students prefer to establish a social circle with friends of the same nationality or a similar cultural background in order to buffer

themselves against problems associated with a lack of assimilation to the host society (Al-Sharideh & Goe, 1998).

The cultural barriers experienced by Chinese international students are common to most international students around the world. The best way is to guide these students to understand and adapt to the culture of their new country, so that they can get involved into their new community more easily, which can become a positive feedback loop. In order to facilitate this, students must participate more in social and cultural events. And for that they should readily have information about free and paid social and cultural events happening in the university as well as in the city.

Moreover, international students are not familiar with local cultural expressions, and generally do not understand questions such as "How's it going?" or wishes such as "Break a leg!" Likewise, when they want to say something in a social situation, they are at a loss to know what are the appropriate words to use. It would be good to have a handy common phrase translator for this purpose.

2.1.3 Socio-Economic barriers

There are limited resources for international students to find information about university activities and enrich their lives by participating in them. The first important item lacking information for international students concerns part-time jobs and practical training opportunities. For

most Canadian companies, the employers require the interviewees to have some Canadian work experience. It is a struggle even for local students in Canada to find part-time work. A study done with domestic local students attending York University found them expressing that some of their courses were actually too general and repetitive from high school. This group of students was also disappointed that their courses lacked hands-on experience or were perceived as not relevant to their major (Pidgeon & Andres, 2005). In most Canadian universities and colleges, students cannot find enough work experience while studying; therefore, they have to find a somewhat relevant part-time job in their field or some practical training to apply what they learnt in classes. Only by seeking out work experience they are able to find a good job after graduation.

Furthermore, most international students do not have adequate money to cover their essential expenses. Living in a costly city, not earning money and having a lot of expenses affects all areas of student life and does not leave many opportunities for them to enjoy their student experience (Turcic, 2008). Therefore, information such as discount sale promotions, cheap rental housing, and second-hand textbooks and study tools would be very useful for students so that they can save money and satisfy their needs at the same time.

Many international students do not know enough basic knowledge, which most locals know, to live without difficulty in Canada. For example,

credit history is very important in North America, and most local people start to accumulate their credit history much earlier than international students. An international student who is new to Canada will most likely lack a credit history, let alone a good credit score (Eiyebholoria, 2012). Low credit history not only affects business prospects but also affects daily life. Thus, lack of important information and knowledge about living and studying abroad can cause plenty of inconvenience to international students.

2.2 Summary of Student Requirements

The three barriers experienced by Chinese students and the resulting requirements are summarized below:

Language barriers: The first language of students arriving from Mainland China is Mandarin, which is not similar to Latin-based languages such as English. Mandarin is fundamentally different from English. Even though most Chinese students have passed IELTS or TOEFL, they still have more oral and written communication problems than native speakers when studying and living in Canada.

Cultural Barriers: As the Chinese saying goes, "human beings are shaped by the land around them". When a Chinese student has lived and studied in China for almost twenty years, it is hard for them to adapt to a totally different culture. These cultural barriers are embodied in many areas, such as in daily habits, food, entertainment, etc.

Socio-Economic barriers: Most Chinese students would want to be involved in local student groups and activities, but they cannot easily find the information to help them participate. They also need more information to help them during their off-campus lives, pertaining to housing, part-time work and volunteer opportunities.

Their requirements with regard to overcoming the above three barriers could be listed as below:

1. Ability to quickly look up meanings of words in a dictionary.
2. Easy access to writing resources.
3. Easy and reliable access to all information about courses. Additional explanation about courses to help in selecting courses.
4. Facility to contact professors and academic staff quickly.
5. Chance to participate in local social and cultural events.
6. Ability to look up common phrases and sentences used daily and their translation from/to Chinese.
7. Ability to optimize their resources by accessing economical markets.
8. Access to simple information on local legal and banking practices.

2.3 Design Components Based on Student Requirements

From the user requirements summarized in Section 2.2, design components were derived for a mobile-based information system as listed in Table 1:

Table 1: Design components

No.	User requirements	Design components
1	Ability to quickly look up meanings of words as and when needed, anywhere.	A handy tool, like a dictionary, on the phone to quickly access the meaning of English words.
2	Easy access to writing resources and extra language support.	Links to reliable academic writing resources and other outside class language support.
3	Easy and reliable access to all information about courses.	Information about courses.
4	Facility to contact professors and administrative staff quickly.	Contact information for academic and administrative staff.
5	Chance to participate in local social and cultural events	Information about local events
6	Ability to look up common phrases and sentences used daily and their translation from/to Chinese	Phrase translator and/or language translator
7	Ability to optimize their resources by accessing economical markets	Information on sale and cheap services; ability to sell
8	Access to simple information on local legal and banking practices	Knowledge bank on important local practices.

The above design components were used in designing a mobile App called OCADay that would cater to the needs of Chinese students studying in OCAD University (Section 4).

3 Environmental Scan

Some universities develop mobile applications (Apps) and make them available to prospective and current students. These applications provide access to useful student-focused information. I conducted an environmental scan to study the good and bad features of mobile Apps created by some universities in Canada (Section 3.1) and some universities in China (Section 3.2) for their students. Bringing in my personal experiences with using a mobile phone and mobile Apps as well as the lessons I learned as a designer and as a student of the Inclusive Design Master's program, I examined mobile App best practices (Section 3.3). Design features derived for the OCADay mobile App from these exercises are listed in Section 3.4.

3.1 Student Mobile Apps in Canada

U of T App (University of Toronto)

Good features:

1. Many functions: U of T's App has plenty of functions such as learning materials, news & events, and social networking. Most of the functions are easily accessible to the user so they can find what they need when they need.

2. Customizable interface: Users of this App can choose icons they need and put them on the surface of the App. Therefore, the App becomes more convenient and personalized.

3. Uncluttered screen: The colors and icons in this App are simple. The entire App uses the U of T "Varsity Blue" colour as its theme colour.

Bad features:

1. Repetition of icons: The icons used in this App are repeated a lot, which causes visual fatigue for users.

2. Some functions need extra Apps to support: when using some functions like Portal and UTSC Mobile functions, the user needs to download another App to support them, or they cannot use the function within the original App.

3. Use of external links: While opening some icons, the information will be displayed in an external link instead of being shown within the App.

Western U App (University of Western Ontario)

Good features:

1. Customizable Drawer: Users can choose what functions they want to be displayed in the menu.

2. Important dates: This function shows the important dates in the whole semester in calendar form. The users can understand tasks and events easily for each day.

Bad features:

1. Redundant and useless functions: There are some functions that are useless and redundant, like the text contrast function. No matter if user turns it on or off, it does not change anything.

2. Background and text colour: Visual fatigue is caused because the colour of the text and the background are similar and cannot be changed.

3. Some functions need extra Apps to support: when using some functions, such as course information or grades, the user needs to download another Apps to support them, or they cannot use the functions within the original App.

4. Use of external links: when opening some icons, the information will be displayed in an external link instead of being showed in the App.

Ryerson Mobile App (Ryerson University)

Good features:

1. Useful functions: there are some useful functions that other Apps do not have, such as finding computers, finding rooms and barcode scan functions. These functions can offer users a lot of convenience.

2. Great icon design: the icons of the App are simple and meaningful. Every function has its own icon and users can know what the icon means immediately when they see it.

Bad features:

1. Automatically quit: when clicking some icons like "Smart Campus", the App will automatically quit.

2. Use of external links: when opening some icons, the information will be displayed in an external link instead of being shown in the App.

Seneca Mobile App (Seneca College) – Blackboard

Good features:

1. Use of Blackboard system inside the App: students can contact with their professors and classmates, and check class announcements.

Bad features:

1. Late upgrade: the App uses out -of -date mobile operating system capabilities and displays.

2. Misuse of functions icon: represented by a small newspaper image, leading the user to think they will receive broad news coverage. However, the function only provides Seneca-related news.

**George Brown App (George Brown College) - Ellucian**

The App from George Brown College is well - rounded and useful. It is almost devoid of glitches and is clearly using current mobile technology to support its functions. It can be used seamlessly.

Good features:

1. Important Numbers: Through this function, users can find important numbers and contactable persons of departments within the college.

OCAD student App (OCAD University)

When I searched online to see whether there was any student App from OCAD University, I found an App about OCADU in the Apple store. It was a student App that had no functionality. The four screens of the App are reproduced in Figure 1. This motivated me to create an App that could be used by all students in OCAD University.
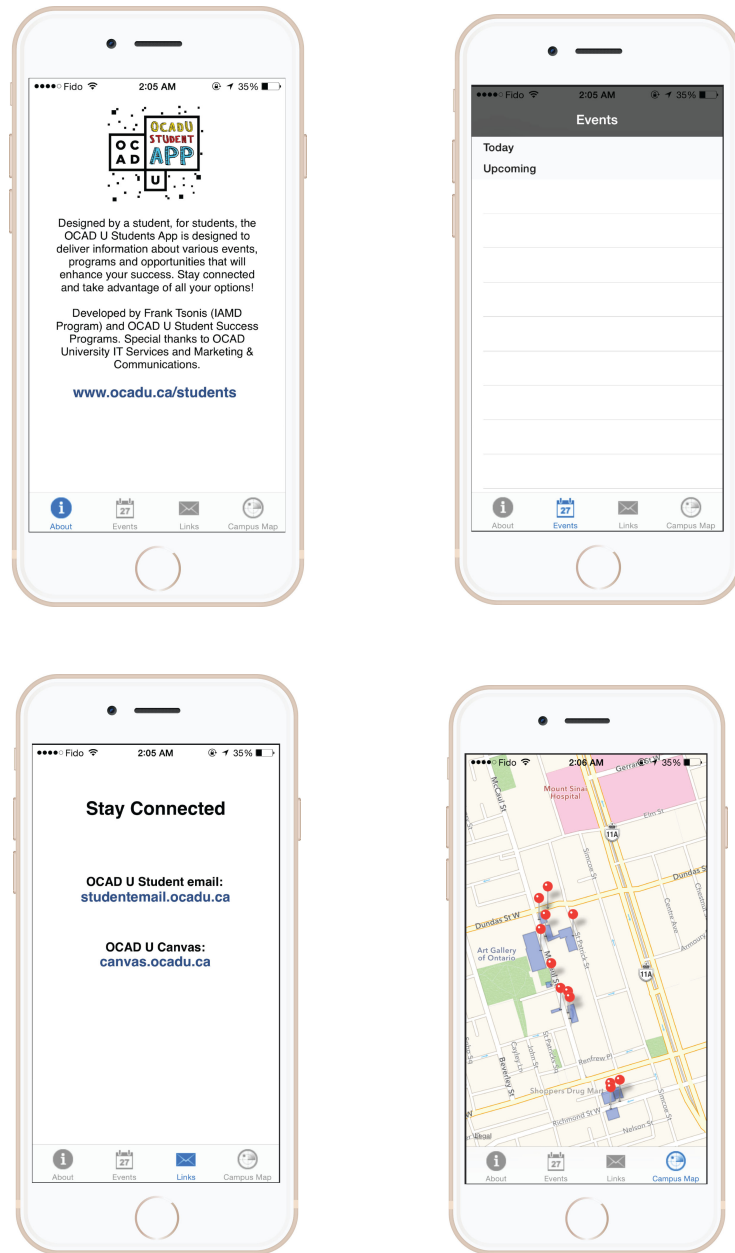
Figure 1: Screenshots of OCAD University student App from iTunes Store[7]

3.2 Student Mobile Apps in China

Currently, many Chinese universities have their own Apps, like "Tsinghua Online" for Tsinghua University, "iFudan" for Fudan Universiy, "Misro Tongji" for Tongji University. These Apps have a feature to provide information about the university easily to prospective students. For example, this year, before the new students of Chongqing University of Posts and Telecommunications (CUPT) arrived on campus, they were already well informed about the school. There was a QR code in their letter of admission. When the QR code was scanned with a student's mobile phone, the App got installed on their phone. They got all information they needed from the university such as their admission status, course information, dormitory distribution and other student information.

The App for East China Normal University Called "iECNU" has functions like University News, Announcements, Weibo, Academic Forums, Available Classrooms Check, and Directory of Instructors. The functions were convenient to all students and employees of the university. A student of ECNU told me that, he does not need to check academic forums on the billboard on campus, and only needs to check the App; he will not miss any forums he is interested in.

Some students' self-developed campus Apps as well, of which the functions are different from official Apps. A student group of Ji Mei University

develop an App "Caiyuan Bang", whose functions include Real-time Homepage, News, University Guidelines, Take-out service, and On-line store, etc. Students can also use this App to access the official website of the university, so that students can pick courses, check books at the library, and check their email in boxes.

This App does not just provide services to aid students in their study, but also offers services to improve the daily life of a student. For example, the App collects information from stores and restaurants around the campus, so that students can get part-time job information, discount information and even a food take-out service.

There are some other issues that emerge with respect to design of mobile student Apps. The most important problem is about information *security*. In order to offer more convenience to students, most Apps require students' usernames and passwords to access the website of the university. Many students are concerned that their private information may be compromised and hence refuse to use the App.

Sometimes, the quality of university Apps are inconsistent, especially if student groups develop the Apps. Further, most information and materials on the Apps are shared and often provided by users. As a result, the *authenticity* of the information and materials is not guaranteed. This is also one of the

reasons why some students do not want to use the App. A successful App must ensure privacy and authenticity in order to gain the trust of users.

3.3 Mobile App Best Practices

As the user of a personal mobile phone, and mobile Apps, and as a designer and student of the Inclusive Design Masters program, I have experienced/learned some mobile App best practices. I present below some points from that experience with a view to elicit relevant design features for the proposed student mobile App.

Mobile-accessible Internet has become almost ubiquitous as well as being portable, and easy-to-use. Most university and college students have smartphones, and are the target market of high-end cellphones. Therefore, the development of new mobile applications (Apps) is usually directed toward the mainstream student market.

1. Content – focused on user needs

A good App should be convenient and functional. The clients' requirements should be the first priority; the App's development should focus on these core requirements. Every App has its own specific user group and specific problems, which should be identified first to solve and satisfy the clients' requirements.

In developing the mobile App OCADay, the target user group is international students at OCAD U. Therefore, the functions of OCADay will focus on two areas which students are most concerned with. The first part is study requirements, like class information, university guidelines at OCAD U, and study materials. The second part is life essentials, such as part-time jobs, discount information, and housing information.

2. Interface – with minimal clutter & optimal depth of menu

The user interface, in the industrial design field of human–machine interaction, is the space where interactions between humans and machines occur. The goal of this interaction is to allow effective operation and control of the machine from the human end, whilst the machine simultaneously feeds back information that aids the operators' decision-making process.

Redundant interface elements that are not related to current tasks will influence the clients' user experience. The more redundant elements, the more difficult it will be to find required materials. An example of reducing redundant interface elements is the default display on the iPhone, which has limited elements or buttons on each page. Cognitive psychology points out that humans can only process a limited amount of information at one time. Therefore, a good App should focus on the clients' key user experience and reduce redundant elements to increase the utility of the App.

At the same time, the clients will focus most on the initial interface of the App. If some functions exist only in further interface levels, there will be a lower possibility that users will find these functions: for example, if a user needs to click more than one button to find a function. Therefore, the designer should be able to control "the critical point", which occurs when users are discovering a specific function, learning how to manipulate the App, and need clear instruction on how to use it successfully before they become frustrated and give up. At that moment, the designer should help and encourage users to continue to use and gain benefits from the function.

3. Aesthetics – attractive, minimalist,

Designing an App is like writing a true crime novel; every step the story takes should be enticing. Even an App with a specific function, such as the Toronto Transit Commission (TTC) App, should be designed to capture the attention and emotions of its users. For example, lots of Apps will display pictures or videos on the first page of the App, to make the program more appealing and humane.

Each element on the interface should have clearly differentiating, useful purposes. If an element is highlighted, it should have the most important function. In App designing, form and function should be balanced. The designer should consider suitable colors and sizes of elements to lead the users' experience, so that users can use the App intuitively. Icon design

should be easily understood, using clear visual references and uniting them under one cohesive style.

4. Good balance between text and image

Images can sometimes communicate information more effectively than text. Designers should be able to decide where to place images in order to complement text, and communicate information more clearly. Basic design elements, such as contrast and composition, should be used effectively.

5. Use of phone features

Content can be presented through a number of interfaces, appealing to a variety of user stimuli. A good App can take full advantage of the capabilities of mobile devices, like the GPS, gyroscope, voice and activation camera. In fact, it is the use of different interaction channels that provides enjoyment to users.

3.4 Design Features Derived from Student Apps and Best Practices

Based on the environmental scan of mobile Apps developed by some universities in Canada and in China (discussed in Sections 3.1 and 3.2) as well as on the mobile App best practices I identified through personal and academic experience (discussed in Section 3.3), I derived the following design features for the OCADay mobile App:

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1. Ensure good colour contrast

2. Make campus news available

3. Enable QR code based access to university web pages

4. Enable access to student email

5. Provide discount sales information about food and other essentials

6. Provide information about part-time jobs in and around campus

7. Enable course management

8. Enable online access to library

9. Include as much functionality as possible

10. Make the interface customizable

11. Keep the screen uncluttered

12. Design pleasing and meaningful icons

13. Ensure security of information

14. Ensure authenticity of information

15. Avoid calling external Apps

16. Avoid accessing external links

17. Avoid redundant functions

18. Avoid unexpected termination of the App

Combining the design components from Section 2.3 and the design features listed in Section 3.4, a design for the OCADay mobile App is presented in the next Section.

4 Design of the OCADay App

This section begins with the visualization of the information architecture of the OCADay App in the form of a flowchart (Section 4.1). This is followed by a description of each of the components of the flowchart (Section 4.2) and 14 screen mockups (Section 4.3) to illustrate some of the important components that could be a part of the first iteration of the OCADay mobile App.

A working prototype of the App is available at http://app.墨刀.com/app/LLIyhbdLw3LgXUJNAObI.

4.1 Visual Flow of Design Prototype
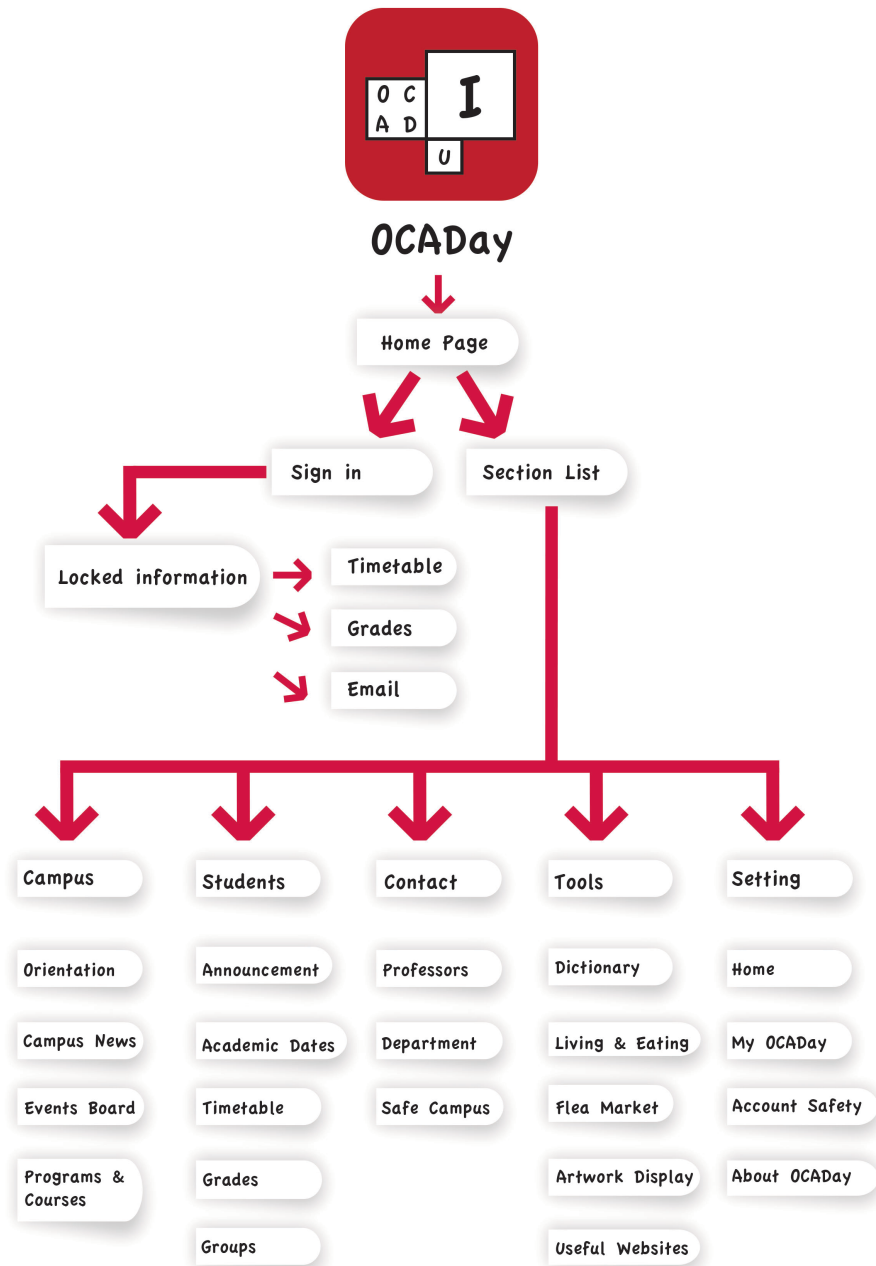
Figure 2: OACDay App flowchart

4.2 Description of the Prototype App

There are 5 main modules in the OCADay App: Campus, Students, Contact, Tools and Setting. There are several subordinate modules in each main module which are visible upon opening them. OCADay is devoted to improving every single feature to offer users the best experience.

1. Campus module:

1.1 Orientation: This function is for new students to know OCAD U with more ease. Students will see a QR code, which they can scan with their smart phones and link to the websites OCADay prepared for them. OCADay will use the official website of OCAD U as the example in demonstration and create a unique orientation page in future. This page will include a video, which will show all resources and departments in the campus.

1.2 Campus News: In this section, users can easily know what happened on campus recently, the opening and closing time of the campus and various alert messages would also be shown in this part.

1.3 Events Board: This section focuses more on the events such as activities, competitions, conferences and speeches, etc. Users can see the time and place of the events and set a reminder before the events start. In that manner, this is different from the Campus News section.

1.4 Programs & Courses: Students always have questions about program changes and course selection. In this section, all program and course information will be included, such as credit and course requirements, professors' information and rating website, such as ratemyprofessors.com, and detailed introduction to each program and course, etc. All information will be updated regularly or directly linked to the university databases.

2. Students module:

This will be a secure module. Users will be required to sign in to use this module.

2.1 Announcements: This part will show users the important messages or emails from the university or their professors, such as assignment deadlines, class cancellations and changes, and tuition payment information.

2.2 Academic Dates: The important dates, such as study week, mid and final exam dates and the dates for picking or dropping courses, etc. will be shown in this part. All dates will be displayed in a calendar format.

2.3 Timetable: Users can check their schedule in a current semester in this section and get more information easily by clicking the courses on the timetable.

2.4 Grades: Users can check their historical and current grades, and check their GPA and credits in this part.

2.5 Email: This relates to users' student email of OCAD U. Users can receive and send email in by this function.

2.6 Groups: Users can add their classmates and professors into their group. Thereby, they can communicate together without third party tools, so that group members can discuss together, and ask professors questions using twitter-like @username format.

3. Contact module:

3.1 Professors: Contact information of professors for enrolled courses will be shown in this section. This will include their name, office room number and hours, cell phone number and email address. This will help students contact their professors when they need, as soon as possible.

3.2 Departments: This section will show users all the departments and contact information about staff. For example, users can find the phone number of the librarian of the library to find a book or reserve a study room.

3.3 Safe Campus: Sometime, 911 alone cannot solve the emergency situation immediately. When users have emergency situation, Safe Campus will tell them how and who to contact to get help as soon as possible on campus. Campus Security and urgent contact numbers will also be included.

4. Tools module:

4.1 Dictionary: Users can use this function to have translations, such as English-English, English-Chinese, and Chinese-English, etc. Both words and common phrases will be included.

4.2 Living & Eating: This information will be updated by users, who can share the information about living and eating around the campus. Other students can use the filtering feature to see what they want. For example, they can simply choose Eating - Chinese Restaurants - 0~5 KM - $20~$40/person to find the Chinese restaurants which are less than 5km far from the campus and costs $20-$40 per person. Student can then also respond to the original post.

4.3 Flea Market: This is the platform for students to sell and buy used items, such as textbooks, study tools, or even cars. Students can save money and time by using this function. The buyers can also rate the sellers depending on the quality and information of the items.

4.4 Artwork Display: Users can display their art works by simply uploading pictures. The pictures will be shown as slides randomly on the screen. The issuers can also offer an expected price, so other users can contact the OCADay administrators and buy it if they want.

4.5: **Useful Websites:** This section will offer several useful academic websites for users, such as https://owl.english.purdue.edu. Students can also suggest more useful websites to administrators.

5. Settings module:

5.1 Home: This option takes the student back to the main page of OCADay.

5.2 My OCADay: In this section, students can set the option to hide or show specific modules, the background picture of OCADay, theme color of OCADay, and turn on or off the colorblind mode, which is designed for users who may have different visual issues.

5.3 Account Safety: Users can set their backup email address or safety questions to reset or change their password.

5.4 About OCADay: This section provides information and description of the OCADay App.

4.3 Screen mockups

Figures 3 through 16 present the 14 screens that were designed as part of the OCADay prototype mobile App. As can be seen, not all of the screens envisoned in the visual flow chart presented in Figure 2 were designed, but only some representative samples as a proof of concept.

Figure 3: OCADay icon on phone screen

This screen shows the OCADay application icon as it would appear on the home screen of any mobile phone.
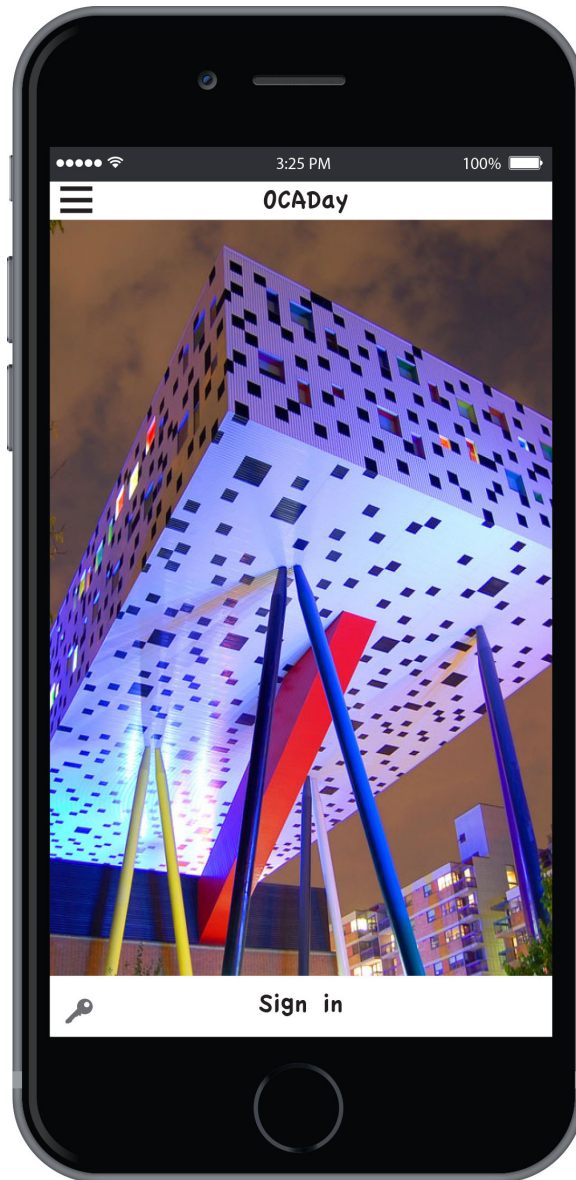
Figure 4: OCADay home page

This is the home page of the OCADay student mobile App. It shows the

OCAD University's iconic Sharp Centre for Design, a black and white

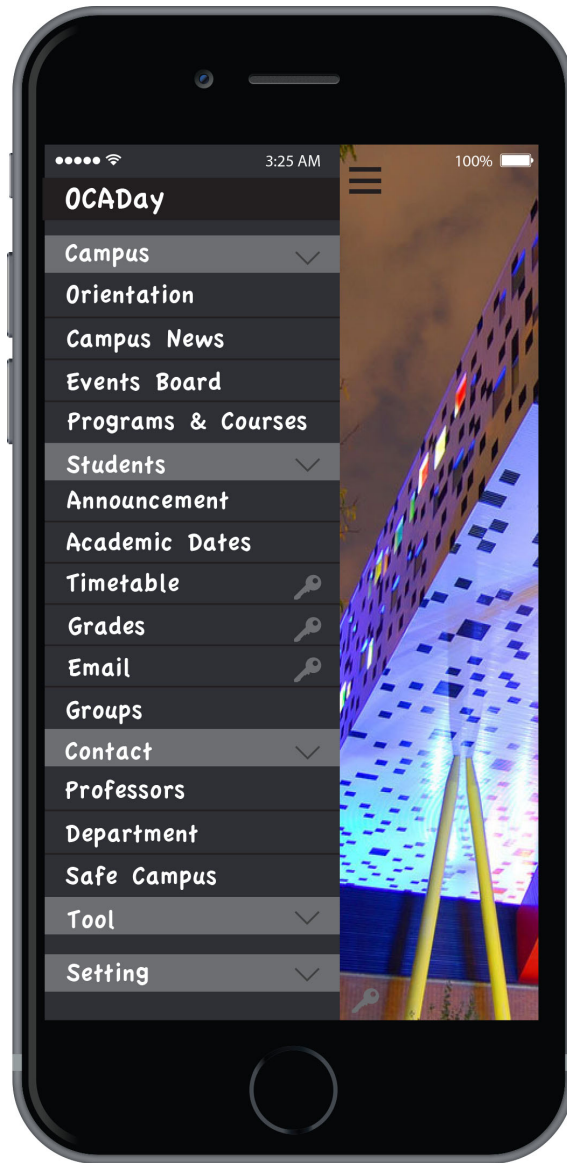"tabletop" structure standing on 12 multi-coloured crayon-shaped steel legs.
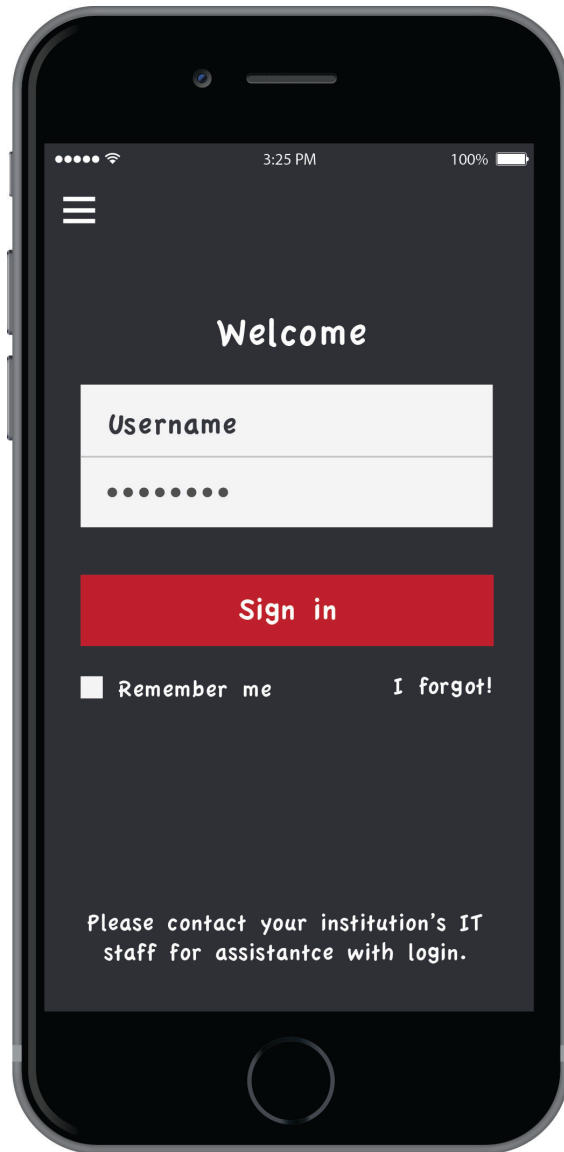
Figure 5: OCADay Sign in screen

This screen allows the user to sign into the secure data area of the underlying information system to gain access to their timetable, grades and email.
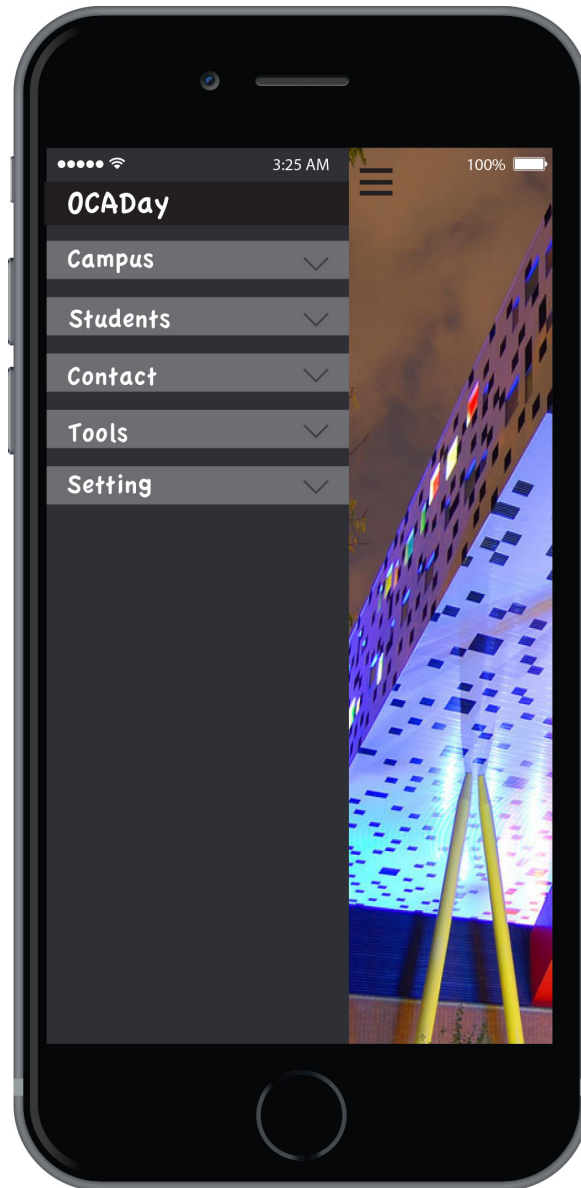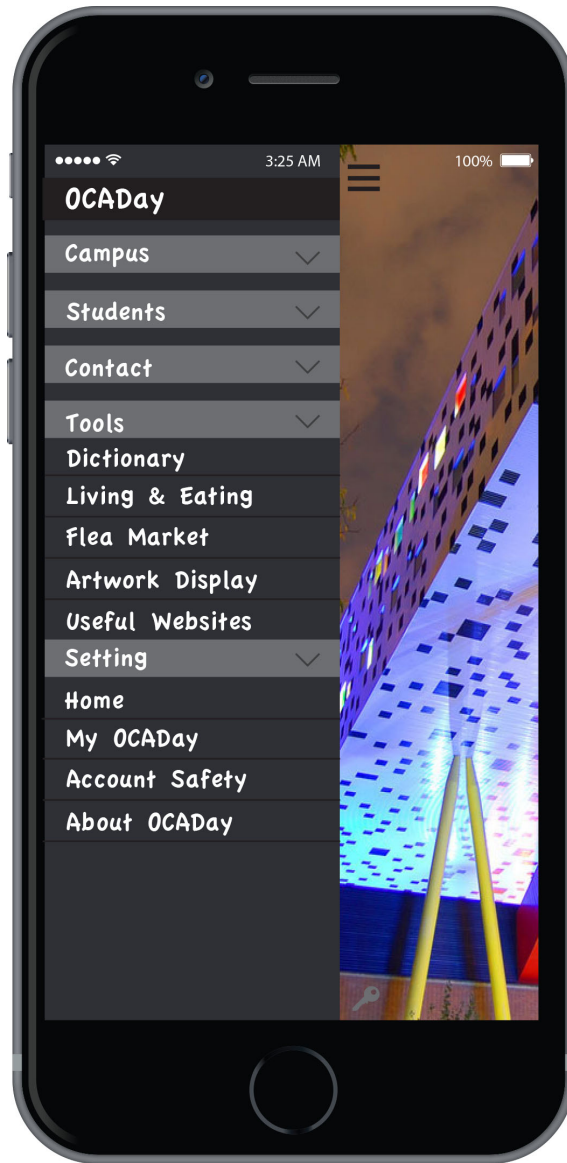
Figure 6: OCADay main menu

The main menu of the OCADay App with five items, is displayed on this
screen.

Figure 7: OCADay expanded menu 1 of 2

This screen shows the sub menus for the Campus, Students and
Contact menu items.

Figure 8: OCADay expanded menu 2 of 2

This screen shows the sub menus for the Tools and Settings menu items.

Figure 9: OCADay Campus - Orientation

By scanning the QR code displayed on this screen with their smart phones, students will be able to link to the web page OCADay prepared for them. This will be an attractive welcome page with links to information for prospective students.
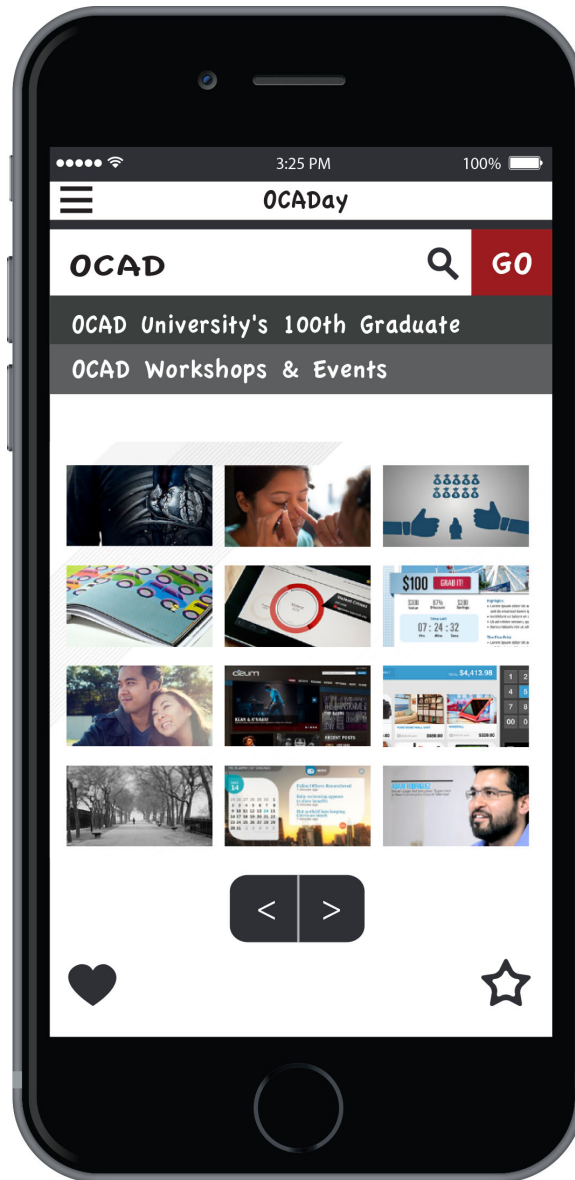
**Figure 10: OCADay Campus – Events board**

On this screen, users can see the time and place of activities, competitions, conferences and speeches, and set a reminder before the events start.
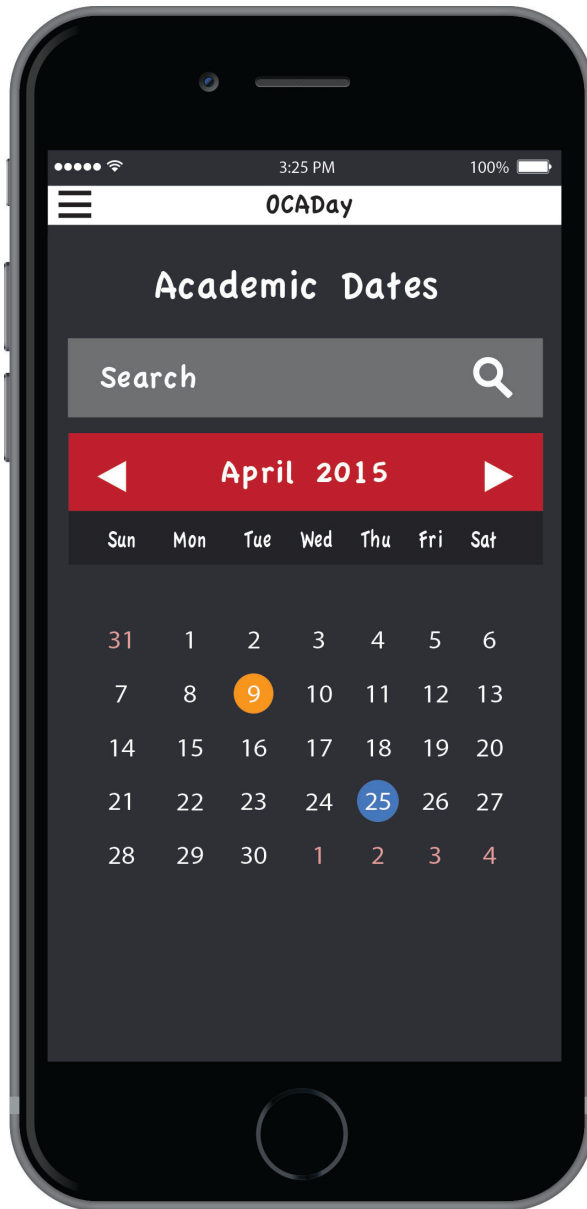
Figure 11: OCADay Students – Academic dates

All important academic dates, such as study week, mid and final exam dates and the dates for picking or dropping courses dates will be displayed in a calendar format on this screen.
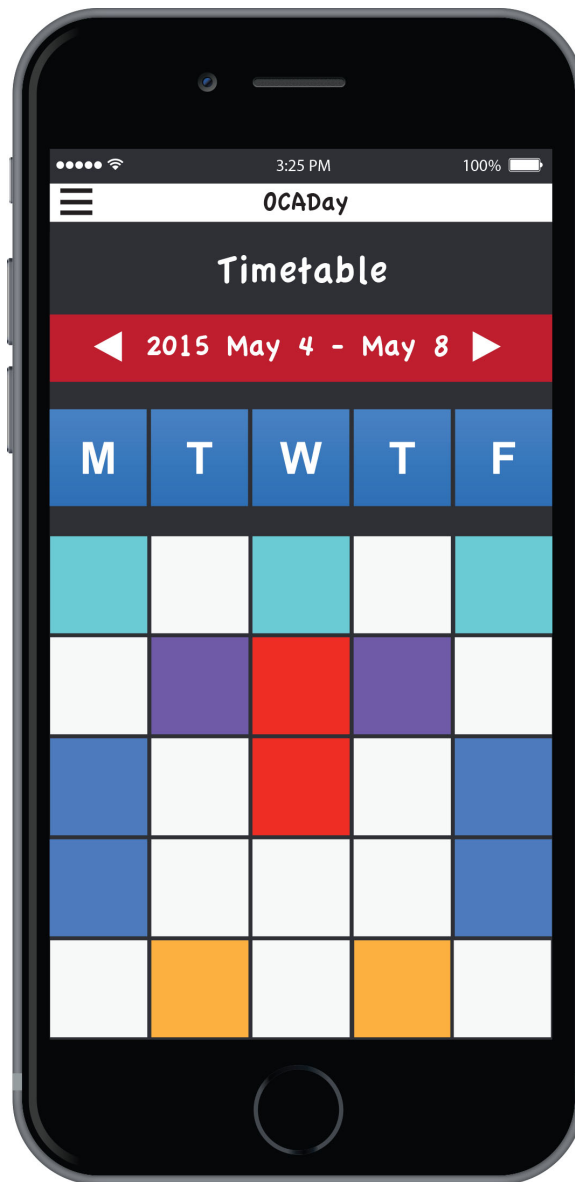
Figure 12: OCADay Students - Timetable

This screen displays the schedule of courses in the current semester in this section.More information about courses could be accessed by clicking the courses on the timetable.
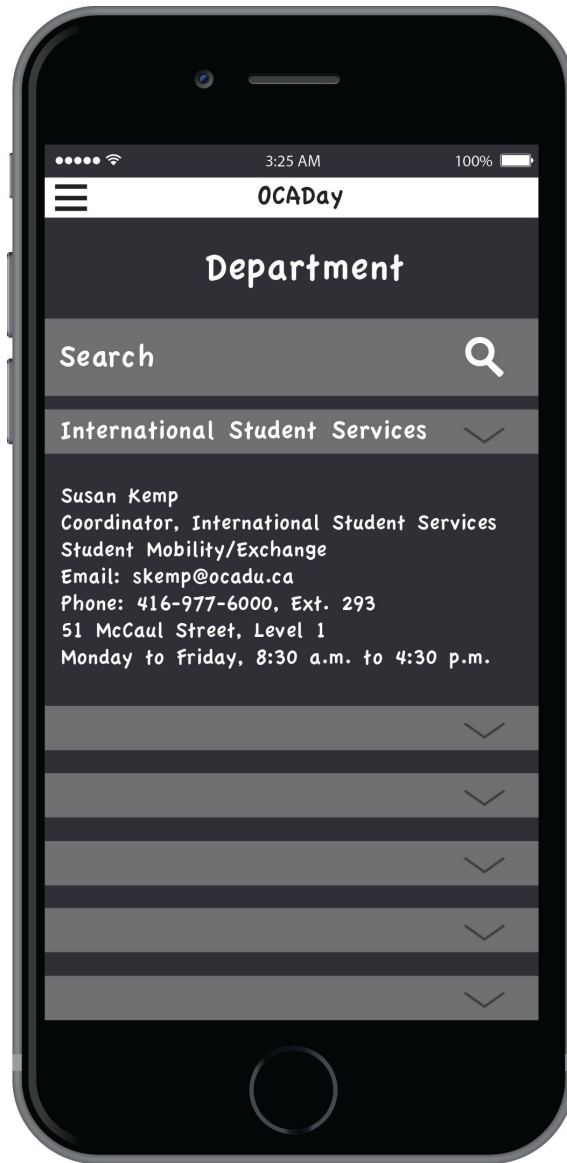
Figure 13: OCADay Contact - Department

Information about all the departments and contact information about

professors and staff members are accessible through this screen along with a
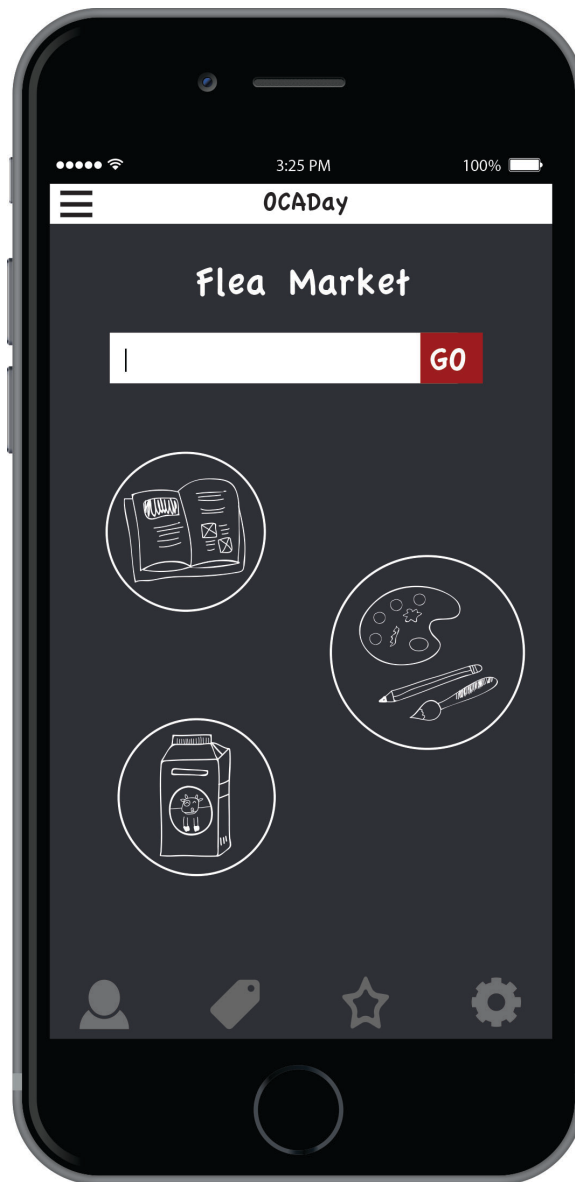
'search and display' feature.

Figure 14: OCADay Tools - Dictionary

The Dictionary option is illustrated on this screen for users to have

translations, such as English-English, English-Chinese, and Chinese-English.

Figure 15: OCADay Tools – Living & Eating

This screen shows the space where students could share information about living and eating around the campus.

Figure 16: OCADay Tools - Flea market

This screen shows the flea market option for students to sell and buy used items, such as textbooks, study tools, or even cars.

5 Conclusion

5.1 Bridging the information gaps

An essential aspect of Inclusive Design is that it recognizes the need to design relative to the user, the context, and the goal. This study synthesized the lived experiences of myself as an international student from China at OCAD University, with outcomes from research studies from the literature, to identify some information needs of Chinese students in OCAD University that would help them manage barriers such as English as second language, a new culture, and socio-economic constraints.

Based on design considerations derived from the user requirements and environmental scan of student-focused mobile Apps in some universities in Canada and China, a prototype mobile app called OCADay for providing essential information to Chinese students in OCAD University was conceived and built.

Inclusive Design stresses the need to work towards a broader beneficial impact beyond the intended beneficiary of the design[8]. As an inclusive designer, while creating the design of the OCADay mobile App, I tried to remain aware of the context and broader impact of my design on all international students or even all students of OCAD University. I believe that

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[8] http://idrc.ocadu.ca/index.php/resources/idrc-online/library-of-papers/443-whatisinclusivedesign

the OCADay App could be useful not just to students from China but to all students in OCAD University.

5.2 Limitations and Next Steps

User requirements were derived for the design primarily based on my own experience as a student from China, and backed by evidence from previous research studies and existing mobile student Apps. While I believe that my views are socially constructed through my interaction with other students from China, and therefore, mostly reflect the views of Chinese students in OCAD university, the prototype design will certainly benefit through user studies with some students. The next steps would be to iteratively refine and develop the prototype through user testing.

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