4-2016

Enhancing the campus experience: Helping international students to adapt to North American campus life

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PURDUE UNIVERSITY
GRADUATE SCHOOL
Thesis/Dissertation Acceptance

This is to certify that the thesis/dissertation prepared

By Qiaoying Wang

Entitled

Enhancing the Campus Experience: Helping International Students to Adapt to North American Campus Life

For the degree of Master of Fine Arts

Is approved by the final examining committee:

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Head of the Departmental Graduate Program Date

ENHANCING THE CAMPUS EXPERIENCE: HELPING INTERNATIONAL STUDENTS TO ADAPT TO NORTH AMERICAN CAMPUS LIFE

A Thesis

Submitted to the Faculty

of

Purdue University

by

Qiaoying Wang

In Partial Fulfillment of the

Requirements for the Degree

of

Master of Fine Arts

May 2016

Purdue University

West Lafayette, Indiana

This thesis is dedicated to my parents Mingming Wang and Wenyan Xia. Thank you for all your love and support throughout my life.

ACKNOWLEDGEMENTS

I would like to express my gratitude and thanks to my advisor, Cheryl Zhenyu Qian, for your guidance and support to this study. Thank you for walking with me through my research and design process. Without your support, none of this project would have been possible.

I would also like to thank Professor Steve C Visser, Professor Victor Yingjie Chen and Director Cyndi Lynch for your contributions on my committee and invaluable guidance for my research initiatives. Thank you for your generous support, advice and inspirations.

I would like to thank my best friend Wei for your generous help and performance in producing the short film.

Last, I would like to thank my family, whom has supported me during my study at Purdue and for my career development. It is because their support standing behind me that makes me feel grateful and motivated.

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ABSTRACT

Wang, Qiaoying. M.F.A. Purdue University, May 2016. Enhancing the Campus Experience: Helping International Students to Adapt to North American Campus Life. Major Professor: Cheryl Zhenyu Qian.

This thesis investigates how cultural adaption can be applied as a design solution by enhancing the international students' experience on North American campuses. Each year, more than half a million international students enroll in American institutions. Many of these students will spend several years on a campus working toward their degrees. Most of them arrive with clear academic goals, but they may have less of an idea about their social lives. In that case, a common phenomenon that most of the international students need to get along with is called "culture shock" which involves adapting difficulties and academic environment, and limited social contact with domestic students and communities. While some educators and researchers have been studying on this issue and also considered ways to remedy the phenomenon, how to address culture shock on campuses is, unfortunately, rarely applied in the area of interaction design. In order to become a feasible design solution rather than simply a

suggestion, this approach to address the cultural adjustments process must be integrated into campus life.

In this thesis, I propose a vision mobile-based campus application Explore to provide international students useful campus information over four dimensions of cultural difference: cognition, psychology, behavior, and phenomenon. It aims to help international students adapt to North American campus life and build social networks within their host nationals. In addition, the mobile application provides some basic campus living information to the first-year students. Both qualitative and quantitative data were collected via online questionnaires, interviews, and existing frameworks. Also, I will address the approach of implementing business model design and distributed user needs into the design outcome. Lastly, a heuristic evaluation and a usability testing will be completed to discuss refining the design outcomes. As a result, I would like to see how effectively and widely that cultural differences can be implemented into campus in the future. Ideally, the mobile application should help international students to diminish their “cultural gap” with domestic students. My objective is that the design solution will help international students to adapt to culture differences, step outside their comfort zone, and participate in the diversity of campus life.

Keywords: Campus Experience, International Students, culture shock, cultural adjustment, social networking, mobile-based application

CHAPTER 1. INTRODUCTION

This chapter provides the background for this study in order to give readers a basic understanding of the research topic. I will discuss the research motivations and problems in the field of study. I will also indicate the assumptions, current limitations, and delimitations.

1.1 Problem Identification

More than half a million new international students enter the United States to enroll in colleges and universities every year. During the 2013-2014 school year, nearly 900,000 international students studied in US institutions, eight percent more than the previous year. Many will spend several years on a campus working towards their degree. Most of them arrive with clear academic goals, but they may have less of an idea of what their social lives will be like. In this end, a common phenomenon that most international students face is called culture shock. The most common causes of culture shock include: “information overload, language barrier, generation gap, technology gap, skill interdependence, formulation dependency, homesick (cultural), infinite regress (homesickness), boredom (job dependency), and response ability”

(Pedersen, 1995). Difficulty adapting to a new culture and limited social contact with domestic students is also related with students' recognition of the extent to which they have been able to adjust or fit into different environment, both culturally and academically.

Many educators and researchers have been studying this issue for decades and have multiple practical insights and suggestions to help Asian international students, in particular, through such difficulties. For example, Trice (2004) suggested that assisting American and Asian international students to interact casually would help break down cultural and language barriers that keep intercultural friendships from forming. Yan and Cardinal (2013) suggested that institutions should put efforts on providing both environmental and social support to encourage Asian international students' participation in physical activities. As one of the international students myself, I believe that Asian international students would take advantage of these suggestions and the impact would be positive. We can see some of these research plans already been put into the practice. For instance, providing an orientation for new international students during their orientation week by department is quite handy, particularly an orientation that involves academic departments and interaction with the seniors. The focus here is helping international students to quickly understand the cultural norms of American higher education, academic rules, and procedures.

However, decades of such research results has yet to be put into action for one reason or another. To become a feasible design solution rather than just a general suggestion on paper, I recognize the opportunity to defend the problems, and make great efforts to realize it. As an Asian international student by myself, I also experienced a culture shock when I came to Purdue. Everything was so different: the language, the food, the people, and the environment. It took me a while to realize that I was immersing myself in an entirely new culture. Moreover, as a professional designer, I realized that there is an urgent need for a change given the current circumstances. The more practically and efficiently we apply our research result into reality, the more international students we will encourage to integrate into the new culture.

In light of this situation, the purpose of this study is a cultural difference study, collecting both qualitative and quantitative data to determine a practical approach or system that can be utilized to help international students through such difficulties and help them to integrate into American culture much more comfortably and confidently. In the following chapters, my approach will be as follows: identify user difficulties, needs, and their expectations of the design outcome. After reviewing previous research papers and existing frameworks, I propose a vision portable mobile-based campus application to provide international students useful information about their campus, based on four dimensions of cultural difference: socialization, acculturation, educational achievement, and cultural patterns. It is my objective that future international students will have a

mobile guide system to help in their understanding of cultural differences, step outside of their comfort zones, and engage in the diversity of campus life.

1.2 Research Questions

The questions central to this research were:

1. Which aspects of culture shock are experienced by international students and can contribute to negative behavior, including: information overload, language barrier, generation gap, technology gap, skill interdependence, formulation dependency, homesick (cultural), infinite regress (homesickness), boredom (job dependency), and response ability (Pedersen)?
2. According to the user data collection process, which functions are most necessary in the design outcome to satisfy their needs?

CHAPTER 2. LITERATURE REVIEW

2.1 Social Justification

This section presents a brief framework for the social-psychology of culture shock. For the purpose of this study, I try to identify the relevant factors from social and psychological perspectives, and seek to understand their causes in the formation of the culture shock.

2.1.1 Culture Shock

Culture shock is a feeling of disorientation many international students feel when experiencing an entirely new way of life, which may include new cultural, environmental, and academic settings. It can be categorized into several of the most common problems: “information overload, language barrier, generation gap, technology gap, skill interdependence, formulation dependency, homesick (cultural), infinite regress (homesickness), boredom (job dependency), and response ability.” (Pedersen, 1995) There are no identified prevention methods for culture shock because each individual experiences a new cultural setting differently (LRM, 1976). There are four commonly

theorized stages of culture shock: Honeymoon Stage, Culture Shock/Conflict, Recovery and Understanding, Adjustment (Ward, Okura, Kennedy, 1998).

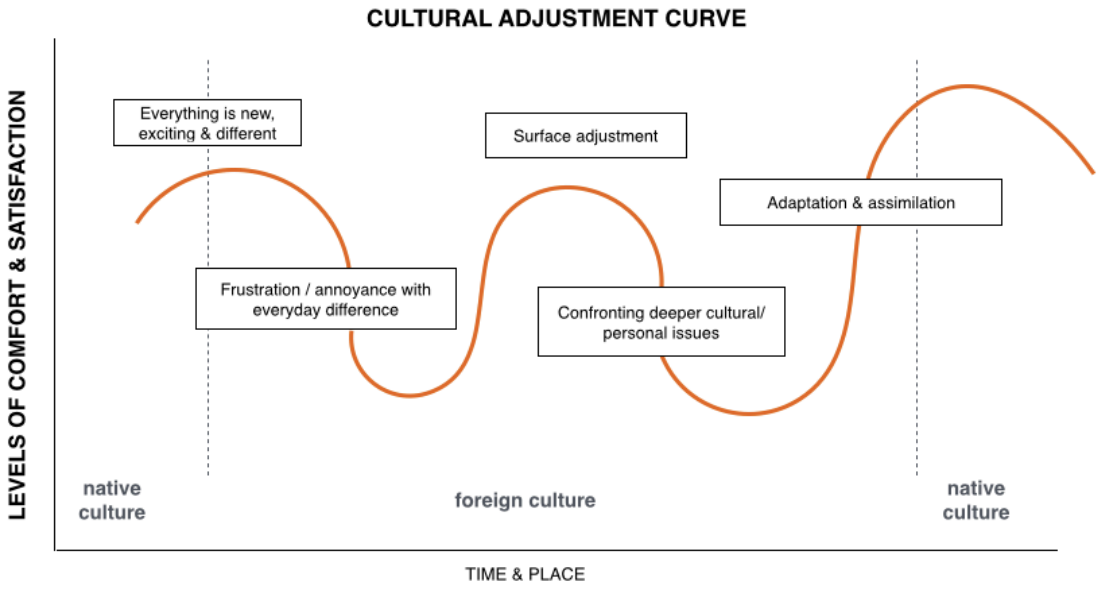


Figure 1. Cultural adjustment curve (redrawn from University of Cincinnati)

A Culture Adjustment Curve is a method to follow and present the variety of feelings involved in making a cultural transition (Figure 1). The 5 Rs of culture shock identify five major perspective stages (routines, reactions, roles, relationships and reflections about yourself) students might experience when they transition to a new culture (Kate, 2012).

Cross-cultural study is a new experience for international students that comes with new challenges. Their routines undergo a great shift: they have to adjust

themselves to a different language, a new environment, new friends, and a different patterns of life. At the same time, people with different cultural background may also have different cultural values. They try to react appropriately order to adjust a new way of working, interacting, or engaging. Most of the students will experience changes of their roles and responsibilities when they move across cultures. Additionally, some of them may lose their sense of identity (and feel defined instead by their role as a "foreigner" or as a representative of their home culture). When students move to another culture, they may become estranged from friendships back home. At the same time, they are challenged to create relationships in the new environment. As a result, the experience of a new culture serves as a self-identify transition channel that allow international students to aware of the changes from different perspectives on what happened (Kate, 2012). Figure 2 shows some common signs and symptoms of culture shock.

Common Signs and Symptoms of Culture Shock

- Anxiety	- Lack of Energy	- Overly Critical
- Homesickness	- Lack of Focus	- Intense Feelings of Loyalty to Home Country
- Sadness/ Depression	- Changes in Sleep Patterns	- Exaggerated Cleanliness or Disorganization
- Withdrawal from Others	- Changes in Appetite	- Loss of Enjoyment in Daily Activities
- Irritability	- Headaches	- Loss of Self-Confidence/ Insecurity
- Loneliness	- Upset Stomach	- Dependence on Fellow Nationals
- Short-tempered	- Hostility	- Defensiveness

Figure 2. Common signs and symptoms of culture shock

A study of adjustment during cross-culture transition examined by the University of Canterbury and International Pacific College (Ward & Okura, 1998) also showed that there is a u-curve trial period for international students at four critical junctures: within two days of arrival in the country, also at a quarter, a half, and one year from their arrival in New Zealand. The research also indicated “both psychology (depression) and sociocultural (social difficulty) adjustment difficulties were the most pronounced during the first stage. Adjustment difficulties decreased between entry and four months of overseas experience, with no further significant changes at the 6 and 12 months mark.” (Ward & Okura, 1998)

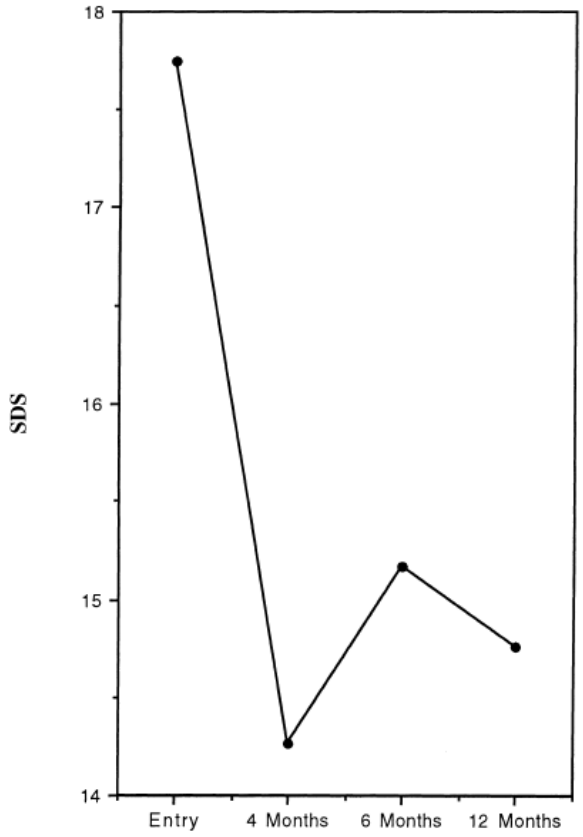


Figure 3. International students' depression over time

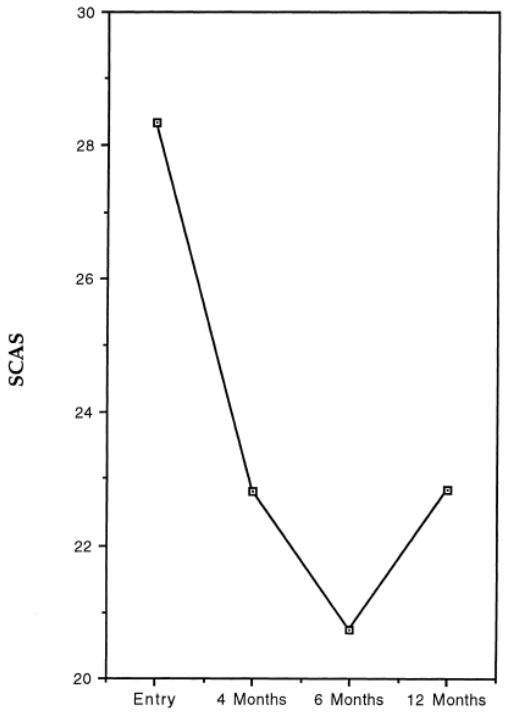


Figure 4. International students' social difficulty over time

In my review of pervious research on culture shock and cultural adjustment, I found that cross-culture adjustment literature has largely been utilized from many perspecitves. Based on the perivous research findings, the main challenge for study abroad students is adjusting to a new culture and separating from their own culture, family, and support system. Another challenge expressed by study is figuring out how to engage students with diverse international experiences who are less willing to integrate into the new environment.

In the following sections, four relevant perspectives will be referenced to explain the influencing factors of culture shock. Socialization, acculturation, education

achievement, and culture patterns will be summarized, classified, and compared using case studies and other examples.

2.1.2 Behavior Socialization

Social identity is part of period when people generate their self-identity from a related social group. (Tajfel & Turner, 1979). Social identity is a way to explain intergroup behavior. When people feel like be threatened by the other social groups, they will often prove their behaviors such as stereotyping and discrimination against out-groups to keep the dominate group image. (Figure 5).

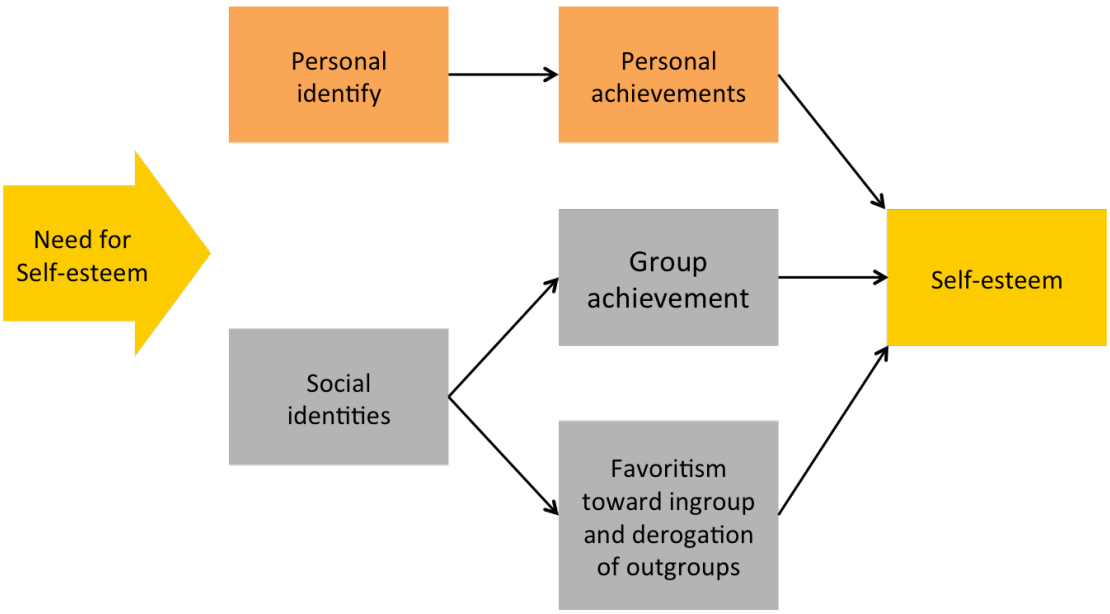


Figure 5. Social identity theory (Source: Brian Francis Redmond)

Socialization was initially defined as the process that by which children start to obtain the basic skills to act as a functioning member of their society, which also be considered as the most crucial learning process during this period of experience (Billingham, 2007). Human beings undergo their first natural socialization when they are the ages of 0-10; this learning stage helps them to practice attitudes and behaviors to learn and adjust to the society. During the second stage, 10 years of age and older, it becomes more difficulty to change a youngster from the way s/he was raised. In Erikson's stages of psychosocial development chart, there are total eight stages in human psychosocial development (Figure 6).

Erikson's Stage Theory in its Final Version

Age	*Conflict*	*Resolution or "Virtue"*	*Culmination in old age*
Infancy (0-1 year)	Basic trust vs. mistrust	Hope	Appreciation of interdependence and relatedness
Early childhood (1-3 years)	Autonomy vs. shame	Will	Acceptance of the cycle of life, from integration to disintegration
Play age (3-6 years)	Initiative vs. guilt	Purpose	Humor; empathy; resilience
School age (6-12 years)	Industry vs. Inferiority	Competence	Humility; acceptance of the course of one's life and unfulfilled hopes
Adolescence (12-19 years)	Identity vs. Confusion	Fidelity	Sense of complexity of life; merging of sensory, logical and aesthetic perception
Early adulthood (20-25 years)	Intimacy vs. Isolation	Love	Sense of the complexity of relationships; value of tenderness and loving freely
Adulthood (26-64 years)	Generativity vs. stagnation	Care	Caritas, caring for others, and agape, empathy and concern
Old age (65-death)	Integrity vs. Despair	Wisdom	Existential identity; a sense of integrity strong enough to withstand physical disintegration

Figure 6. Erickson's stages of psychosocial development chart

Given that most international college students are 20-25 years old, psychosocial stage 6 represents their psychological state, a period of adulthood when they are exploring personal relationships (Erik, 1994). Erikson asserts that stage 6 is a crucial period during people develop close, committed relationships with others. Those who achieve this step will form committed and secure relationships.

Classroom norms are the behavioral expectation or class rules that determine socialization. These norms influence how students are expected to behave towards each other and towards their school surroundings. For an example, in the United States, students are more likely to encourage open discussion with their classmates and teachers. Participation and presentations are important elements of the American education system. The rising number of international students who come to the United States bring diverse perspectives to the classroom. In an Inside Higher Ed article, Elizabeth Redden discusses the effects of increasing international student enrollments on classroom culture and related challenges from the faculty perspective. Student perspectives are not really addressed in the article. However, this article is helpful for understanding the differences in academic expectations and evaluations of academic work that larger international enrollments require faculty to grapple with as they try to figure out the best way to teach all of their students. Some of the topics discussed in the article overlap, in fact, with the causes of culture shock (Redden, 2014).

> "They're seeing more non-native speakers of English who in many cases are unfamiliar or uncomfortable with American classroom norms: participating in classroom discussions, asking the professor a question, engaging in group work." (Redden, 2014)

Purdue University states in a report in 2014 that "the international student body comprises 23.4% of the total number of enrolled students", the 2nd highest among public U.S. institutions. Students from China, India, and South Korea rank as top three in total enrollment by country (Figure 7). Adjusting class norms in order to address this global diversity in the classroom becomes a challenge for Purdue University faculties and students.

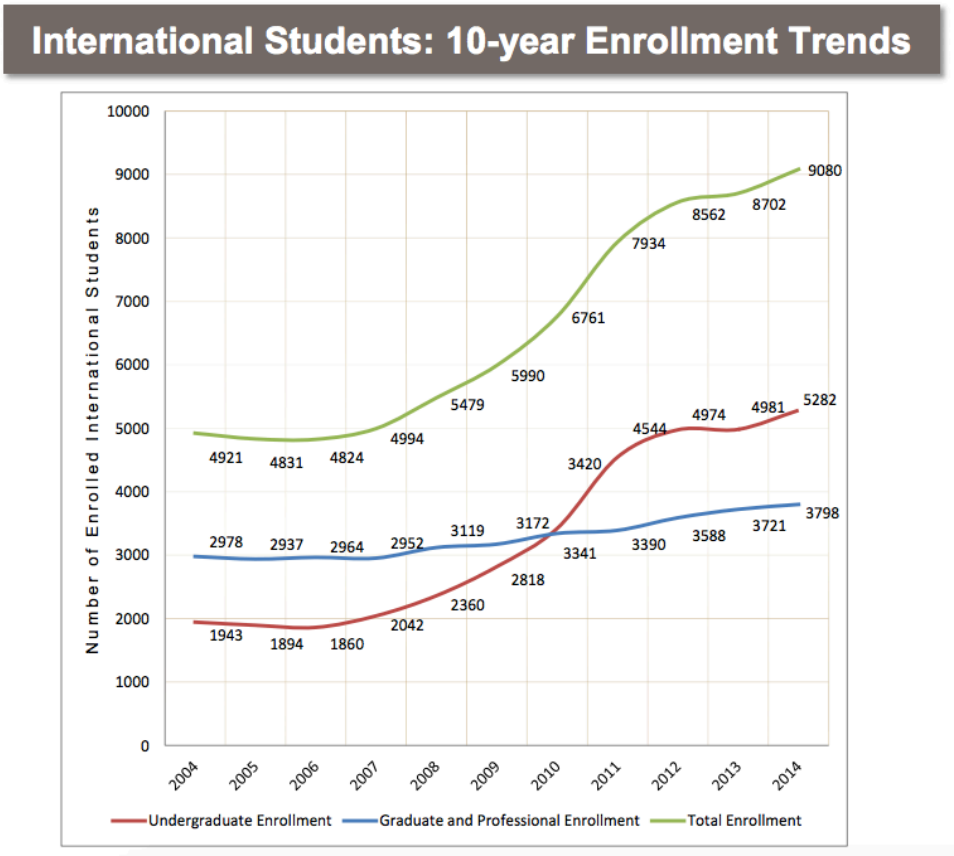


Figure 7. Purdue University international students: 10-year enrollment trends

Being physically active is one of the most important choices that students can make to improve their health. Physical activities can be categorized into occupational, sports, conditioning, household, and other daily activities. Most of the previous work in sport socialization has neglected the effect of culture on the socialization process. However, recently, there has been a trend indicates the generation of socialization not only in the childhood, but also all the way through the entire life. Institutionalized physical activity or sports also has considerable influence on the socialization process. (Kenyon, McPherson, 1973). According to the study, the role sports plays involve some

dependent variables such as social integration, community identification, social mobility, and social control.

Low levels of participation in physical activity by international students, especially Asian students, were reported, which may create difficulties for them to develop cognitively, physically, and socially (Yan & Cardianl, 2013). According to the research, female Asian international students are the most inactive demographic. Asian female college students spend only 1.3 hours on physical activity per week. Compared to Asian students, Western students--especially American students--are the most physically active. Most American students spend 60 minutes daily on physical activities, like walking, or jogging out at the gym (Yang and Gordon, 2008).

Asian students' low rates of participation physical activity can be explained by these causes. In traditional Asian countries, people hold strong gender-role related understandings since ancient time, which may affect how they perform in the society (Taymoori, Rhodes, & Berry, 2010). Secondly, people in Asian countries tend to adopt increasingly "sedentary lifestyles". Third, low rates of participation physical activity may also be attributed to the limited number of physical education programs that proceed in Asian schools (Yan, Berger, Tobar, Cardinal, 2013).

2.1.3 Acculturation

Acculturation is the adjustment process of cultural and psychological repositioning, which results after the meeting of cultures (Sam & Berry, 2010). The effects of acculturation can be applied in two perspectives. In the group perspective, acculturation causes changes regarding to cultures, customs, and social behaviors. Especially in food, clothing, and language. In the individual perspective, differences are more related to the level of psychological and physical welfare.

Due to the unique identification of international students, providing support to international students has always been a challenge for American counselors. International students are typically regarded as different from domestic in their values and basic assumptions; their social support situation is unique; their social communication styles are typical; they are more likely to not deliver the counselor's conception of a counselor's role; moreover, the problems and issues of adjustment they face to are different from others clients (Thomas & Althen, 1989).

As report shows that instead of looking for help from professional counselors, Asian international students are more willing to ask senior relatives or senior members in the Asian community for advice or help for personal difficulties. (Atkinson, Pontenrotto, & Sanchez, 1984; Root, 1985). From the institution's point of view, Asian international students often underuse resources such as counseling. An elder role model is often a valuable asset for an international student who is experiencing difficulties with

culture adaptation in relationships, daily routine, or way of life (Wille J, 2000). Interestingly enough, the students who have the strongest ability to adapt are most likely to seek professional psychological help, and most willing to discuss their personal problems with a psychologist. (Atkinson & Gim, 1989).

2.1.4 Educational Achievement

Much of the early research pointed out that an individual's academic success depends entirely on that person's IQ (intelligence quotient) and the level of effort they apply to their studies. Another theory is that society works in a meritocracy: people work for what they achieve and achieve what they deserve, according to their own pain and gain. They work hard to get what they deserve to in later on in life. Other sociologists did not concur with this idea. They thought that other factors more affect one's education. These factors might include social class, background, gender, and ethnicity (Grant, 2001).

One issue that identifies with Asian international students is they have difficulties to achieving higher education in Western universities. Three main difficulties for international students at South Australian University were highlighted "different learning styles, cultural barriers, and language problems," (Wong, 2004). Wong also indicates that Chinese learning is very much driven by rote learning, or learning through repetition/practice. Kirkbride and Tang state that Chinese students preferred lecture and

teacher-centered learning (Kirkbride & Tang, 1991). However, based on the results obtained in Wong's study (2004), many of them prefer a more student-centered learning; however, these Asian international students came from a traditional Asian "duck-stuffing" type of teaching.

This section attempts to explore the difference and limitation in terms of learning styles. These culture and psychological factors need to be understood in order to facilitate further research work to ease the differences in class norms.

2.1.5 Cultural Patterns

> "Oh, East is East and West is West; and never the twain shall meet." (Rudyard Kipling, "Ballad")

This quote from Kipling was written in 1889. After so many decades, with the technological development of the transportation and communication, the cross-cultural system Westerners and Easterners are trying to build, Kipling's poetry still reflects on people with different cultural patterns.

Cultural patterns contain many perspectives, including "beliefs, values, attitudes, norms, and customs, etc." (Qingxue, 2003). Given this wide range of topics, this study is unable to mention all the dimensions of this field. Communication between Easterners and Westerners is different. For example, Liu compared some cultural patterns: "high-context communication vs. low-context communication, individualism vs.

collectivism, equality vs. hierarchy, and assertiveness vs. interpersonal harmony" (Liu, 2003). Besides, several additional variables also can influence the cultural patterns. For example, the length of time staying in the U.S., level of exposure to American culture, gender, marital status, and interactions with other students from one's home country also affect cultural patterns (Trice, 2004).

All in all, we are living in an age where we inevitably interact with people of different backgrounds. Whether we accept it or not, this pattern will continue and grow. Understanding the basis of cultural differences helped me to understand why people from other cultures act differently. On the other hand, only by understanding the differences from a social justification perspective, helped me to achieve acknowledgement of the culture. This process largely motivated the present study and the design solution.

2.2 Conceptual Justification

This section studies online and offline social networks, and the use of online social networks to connect and reconnect with friends and family. The objective is to investigate mobile device usage patterns among college students.

2.2.1 Online and Offline Social Network

Over the past decade, using the Internet to interact with others has becomes very popular among young people. It is crucial to study the relationship that college students are using social network sites (SNSs) to connect with offline communities as well. Online communications are numerous and varied, including “instant messaging, email, and chat rooms, as well as blogs, social networking sites (SNSs), and applications” (Subrahmanyam, Reich, Waechter, &Espinoza, 2008). Some SNSs allow users to post their lives, connect to their social networks, and interact with others. These sites can be work oriented, such as LinkedIn.com; connecting those with common interests, such as MySpace.com; serve a specific target group, like Facebook.com (Ellison, 2007).

Ellison (2007) also found that Facebook bridges online and offline social networks. He noticed that many users used Facebook to sustain or develop their offline connection, rather than to create new relationships; for instance, they prefer to add new friends online based on their offline social network group. Another study discovered that online SNSs maintain both existing social ties and new connections. Individuals connect with others outside their pre-existing social groups when using these systems (Wellman, Salaff, Dimitrova, Garton, Gulia, & Haythornthwaite, 1996).

Prior studies also demonstrate the connectedness between college students’ online and offline worlds. Anderson (2001) indicated that the uncontrolled use of Internet might lead to some problems, such as starting new relationships or

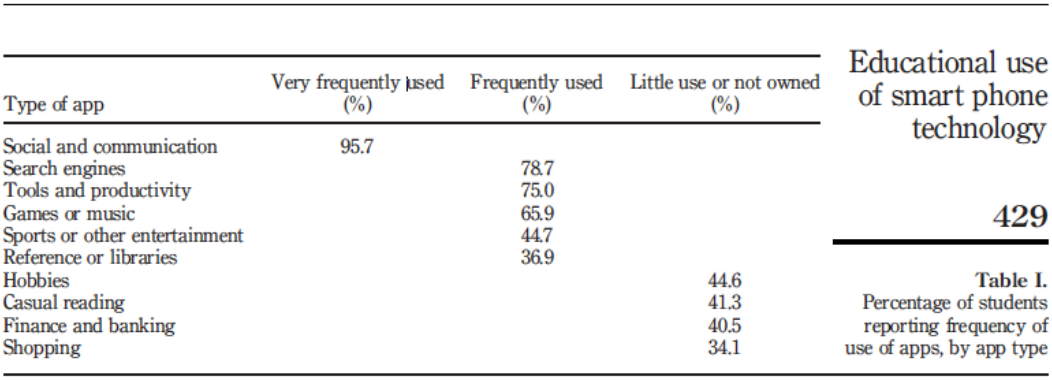
individuation. Another report claimed that college students used their online virtual communities to keep up with their offline lives, for example using an online system to generate social activities with their existing friends offline (Mcmillan & Morrison, 2008).

Although these studies showed that using social network sites to connect people could have both positive and negative outcomes, the question still remains: how do online connections affects their offline networks, and vise versa? The purpose of this section is to understand the relationship between offline and online social networks for college students, and whether or not using online communication can help to maintains existing ties and forms new ones.

2.2.2 Mobile Device Usage Among College Students

As smartphones have become more popular during the last few years, college students are tending to rely on them more and more. It is quite normal to see a student playing with his or her smartphone all over on college and university campuses: while walking down the street, waiting for the bus. At the mean time, I wonder which apps are they using? According to Bomhold (2013), the most frequently-used apps are “social and communication” apps 95.7 percent of undergraduate students from a university in the Southern U.S. report that they used these apps at least 1-2 times a day (Figure 8). When asked to specify up to three apps they used most frequently, Facebook, Twitter and email are at the top of the list. In addition, the majority of number (76 percent) students

use apps to search for academic purpose because the systems are familiar; these include dictionaries, translators, library catalogues, etc. Students report feeling comfortable and confident using them (Bomhold, 2013).



Educational use of smart phone technology

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Type of app	Very frequently used (%)	Frequently used (%)	Little use or not owned (%)
Social and communication	95.7		
Search engines		78.7	
Tools and productivity		75.0	
Games or music		65.9	
Sports or other entertainment		44.7	
Reference or libraries		36.9	
Hobbies			44.6
Casual reading			41.3
Finance and banking			40.5
Shopping			34.1

Table I. Percentage of students reporting frequency of use of apps, by app type

Figure 8. Educational use of smart phone technology

However, some studies have found that users overuse their mobile devices during their daily routine. It indicated that users commonly spent one hour per day on their smartphones, also characterized time difference for app usage. For instance, in the morning, news apps were used most frequently, while communication apps were commonly accessed throughout the day (Falaki, 2010 & Böhmer 2011). In addition, researchers have found some negative aspects of overuse in mobile apps emerged as well, such as the disruption of face-to-face social interactions, poor mental health (e.g., chronic sleep-restricted state or attention deficit disorder). Some features of smartphones may directly lead to smartphone overuse. For example, frequently

checking updated content (e.g., online social network updates) on smartphones negatively affects self-control, which may react on mobile device overuse circularly (Falaki, 2010 & Böhmer 2011).

According to prior studies, life patterns dictate how college students access smartphones daily. The most frequently used apps are for social and communicative purposes. Furthermore, we can see an increasing number of college students using mobile apps to find academic information potentially. Although several negative aspects emerge related to overusing smartphones, such as sleep deprivation and attention deficits, this will continue to be the reality for college students. In the long run, more and more feasible mobile sources will be available and more convenient to access.

CHAPTER 3. METHODOLOGY

This chapter aims to better understand how to incorporate cultural differences into current campus life, and to explore how users' needs are evoked or overlooked. I expected to collect both qualitative and quantitative data for future use. There are four stages in the research process: in the first stage, I decided to use various methods to collect data, such as an online survey, interviews, existing framework reviews, etc. During the second stage, I use "the empathy map" to identify the causes of the problem and a business model design in order to solve it. The third stage is the design process stage, during which identified problems and suggestions are used to develop a Hierarchical Task Analysis (HTA). In addition to that, a heuristic evaluation will be conducted to evaluate the design outcomes from stage four. In Chapters 4 and 5, I will review how the research was conducted in detail.

3.1 Methods to Identify and Allocate Sources

In order to understand users' pain points and needs, a mixed-method research approach was used to collect both qualitative and quantitative data. While quantitative

and qualitative research approaches each have their strengths and weakness, combining and integrating them is very effective. Qualitative research helps to identify the factors that affect these areas under investigation. Quantitative analysis can assess how these factors affect user preferences. In order to collect data from the international students at Purdue, I intend to generate an online questionnaire. The questions in the survey were designed to identify the most common challenges and difficulties that international students face, such as social, culture, academic and psychological, etc. Also covered are their expectations and the demands during the three aforementioned campus stages.

In terms of gathering qualitative data from the targeted user group, face-to-face interviews were conducted individually in a relatively private setting in order to create a comfortable environment that allowed the interviewee to share her thoughts freely. The interviews were the key parts for recording the story of a participant's experience, in order to get variety of information. On the other hand, by going into more detail on certain respondents' questionnaires, Interviews can also be served as follow-ups to study in depth (McNamara, 1999). Interviews allow for more in-depth responses, including capturing an interviewee's emotions and body language. The interview was audio- recorded with the permission of interviewees. I was also responsible for taking notes during the interview. In order to guarantee that the questions were unbiased, I asked for advice from professors who are experienced in designing interview questions. The basic structures of the interview questions are shown in the chapter 4.

Several online resource provide another approach to get updated information on international students' needs. On the one hand, I am interested in the information platforms available online, the focus of the service, and who the main users are. Moreover, the existing online forums and websites could assist me in determining if and what important information was missing. The online resource can be more quickly updated by user needs and trends. Therefore, an existing framework research will be very helpful and allows me to gather user needs and expectations. By comparing and analyzing the data from variety of mobile apps and platforms, this process leads me to a general impression of current available resources that help international students and their unmet needs as well.

3.1.1 Sampling

The target population of this study was international students at Purdue University. as Purdue University is the U.S. institution with second largest population of international students. I am interested to see which perspectives affect international students' abilities to adapt to new environments.

A collection of participants' data was gathered from an online questionnaire and interviews. Eventually, thirty-eight participants were recruited to answer the online questionnaire and five interviewees were recruited to conduct the face-to-face interviews. Therefore, a total number of forty-three subjects were analyzed.

3.2 Methods of Data Analysis

Data analysis methods can be defined as a practice to organize the data and highlight the useful information. This simple technique allowed me to identify factors, user needs, user expectations, and the value of existing apps. In order to keep track of the data, I used closed card sorting to analyze and organize the data, a top-down approach that involves analyzing data by sorting, and then categorizing with a predetermined set of category names. This methodology was the basis of my analytical approach.

3.3 Methods of Design Process

The methods used in the design process released a user-centered design that customers find useful, effective, efficient, and satisfying.

In chapter 5, a brainstorming session encouraged me to come up with thoughts and ideas. It also enlightened me to develop a rich array of creative solutions based on the identified problems. In addition, a structured and straightforward Hierarchical Task Analysis (HTA), was used to learn users' tasks. The process of HTA is to decompose tasks into subtasks at any level of detail (Annett, 2003). The HTA led me to objectively compare different directions for user problems. It also supported me as a useful step toward user experience design patterns that let me captured multiple implementations from a design pattern. Furthermore, I used wireframing to illustrate how these elements

will function, where they will live on the specific page, and how feasible they are. Following this ideation, a business model design was conducted to explore the view of how my app conducts business, how it delivers value to Purdue University and the market (Christoph & Rapheal, 2010).

3.4 Methods of Design Solutions Evaluation

On the other hand, a heuristic evaluation (Nielsen & Molich, 1990) was conducted to evaluate my design outcome. Five experienced evaluators examined the design interface and provided critique based on its usability heuristics (Nielsen, 1994). A heuristic evaluation form is attached as Appendix A. After refining the design outcome based on the suggestions during the first round of design evaluation, usability testing was used in user-centered interaction design to evaluate the design by testing with the target users (Neilson, 1994). A usability testing form is attached as Appendix B. The goal of testing is to minimize or eliminate frustrations for users by gathering data from representative users to expose design issues (Jeffrey & Dana, 2008).

CHAPTER 4. RESEARCH AND USER STUDY

4.1 Data Collection: Online Survey & User Study

A total of thirty-eight international students from Purdue University responded to the survey during two weeks. The respondents included twenty-four females and fourteen males (Figure 9). A majority of responses came from graduate students (sixty-six percent master students, twenty-one percent undergraduates and thirteen percent PhDs). Over fifty percent of respondents' self identified as Asian, and twenty-three percent as Hispanic. Lastly, about twenty percent surveyed responded with other ethnicities, like African American and Caucasian (Figure 10).

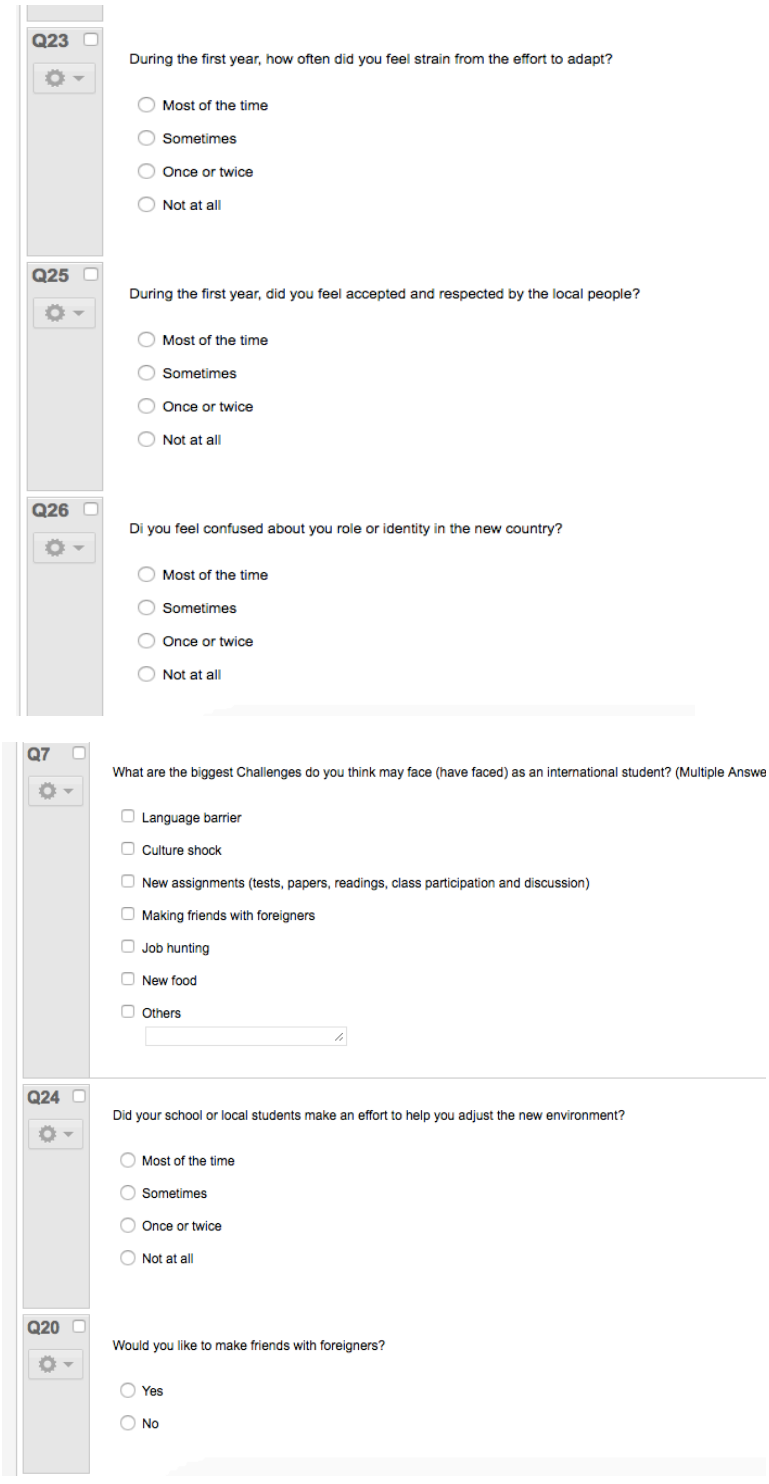

Figure 9. Online questionna

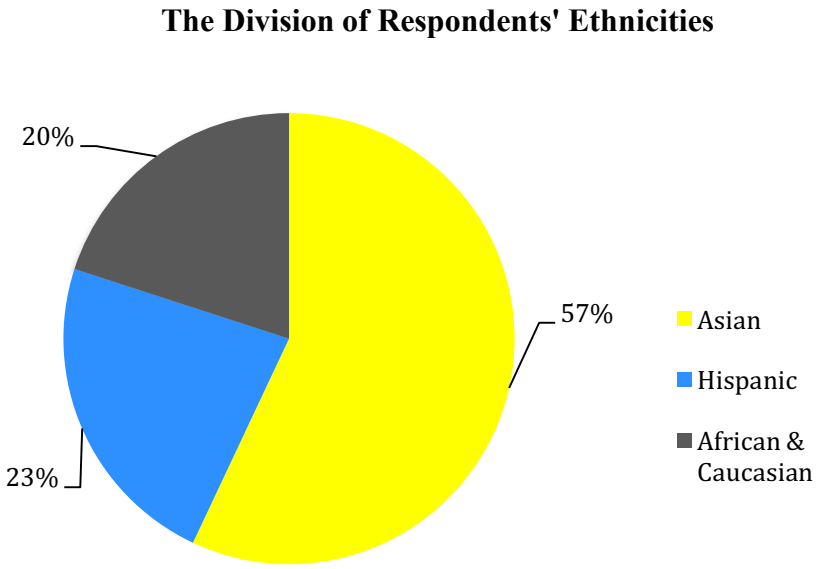

Figure 10. The division of respondents' ethnicities

Forty-one percent of respondents reported feeling excited when they first arrived to the United States. Twenty-seven percent of them chose "nervous" as their strongest emotion upon their arrival. Fourteen percent of respondents selected "lonely," eleven percent of them selected "confused," and eight percent of them chose other feelings, like "good" and "exhilarated" (Figure 11).

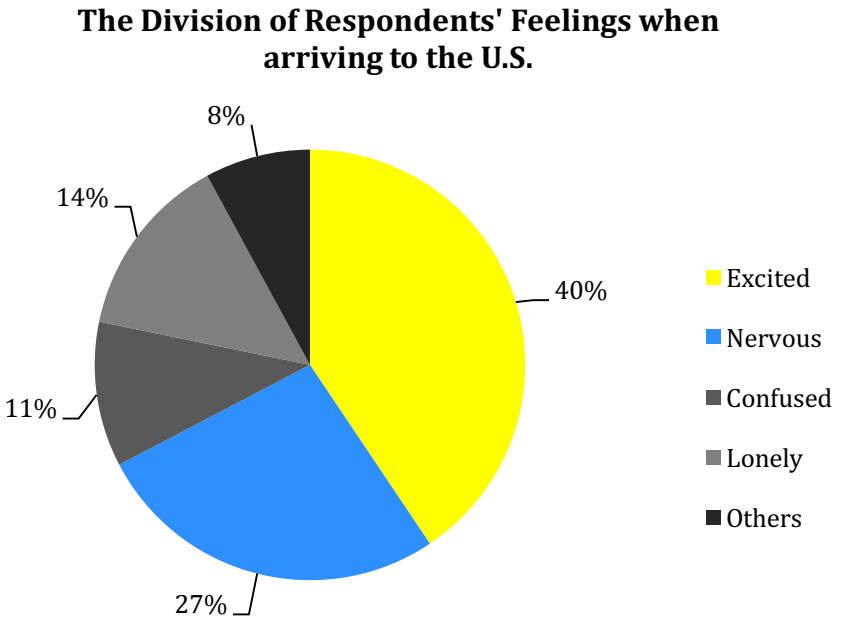

Figure 11. The division of respondents' feelings when arriving to the U.S.

When being asked, "What are the biggest challenges do you face (have faced) as an international student?" nearly sixty-three percent of respondents chose "language barrier." "Making friends with foreigners" was the second most common, at forty-two percent. "Culture shock" followed at thirty-nine percent. Next, about thirty-seven percent chose "job hunting." Twenty-four percent of respondents thought class assignments were the biggest challenge. Lastly, new food was selected by eighteen percent. The remaining five percent wrote "less places for fun" (Figure 12).

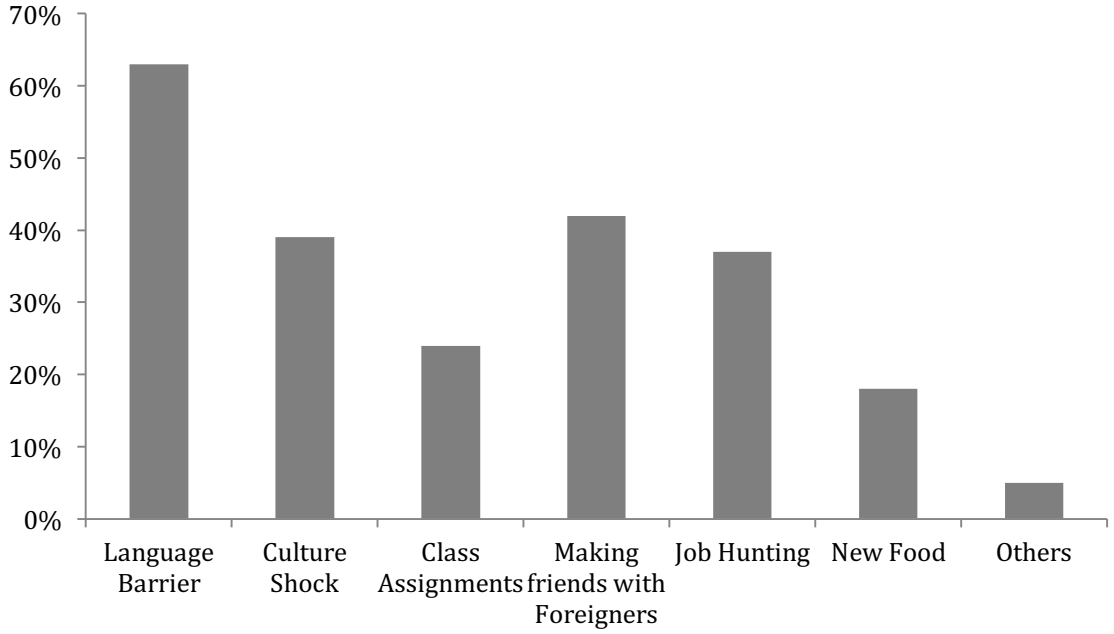

Figure 12. Breakdown of challenges respondents have faced

Sixty-two percent of respondents selected “sometimes” when came to the question: “Did your school or local students make an effort to help you adjust the new environment?” Twenty-seven percent answered “most of the time.” Five percent chose “once or twice” and five percent selected “not at all” (Figure 13).

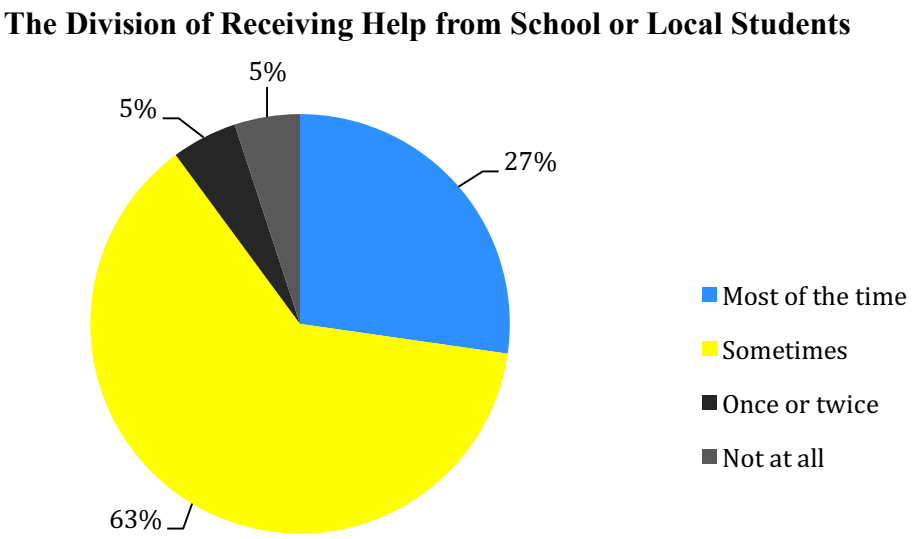

Figure 13. The division of receiving help from school or local students

In the survey, the ninety-five percent of responses showed an interests in making friends with other foreign students, while only five percent weren't interested in getting to know people from other countries.

However, when asked "What are the reasons do you think it is difficult to make friends with foreigners," seventy-four percent of those surveyed responded that they felt cultural difference is the main problem. Sixty-one percent cited language barrier, and twenty-one percent noted different interests as the most critical reason. The remaining reasons included living habits, religion, social media networking, and food, making up about eighteen percent, sixteen percent, eleven percent, and three percent of the total percentage, respectively (Figure 14).

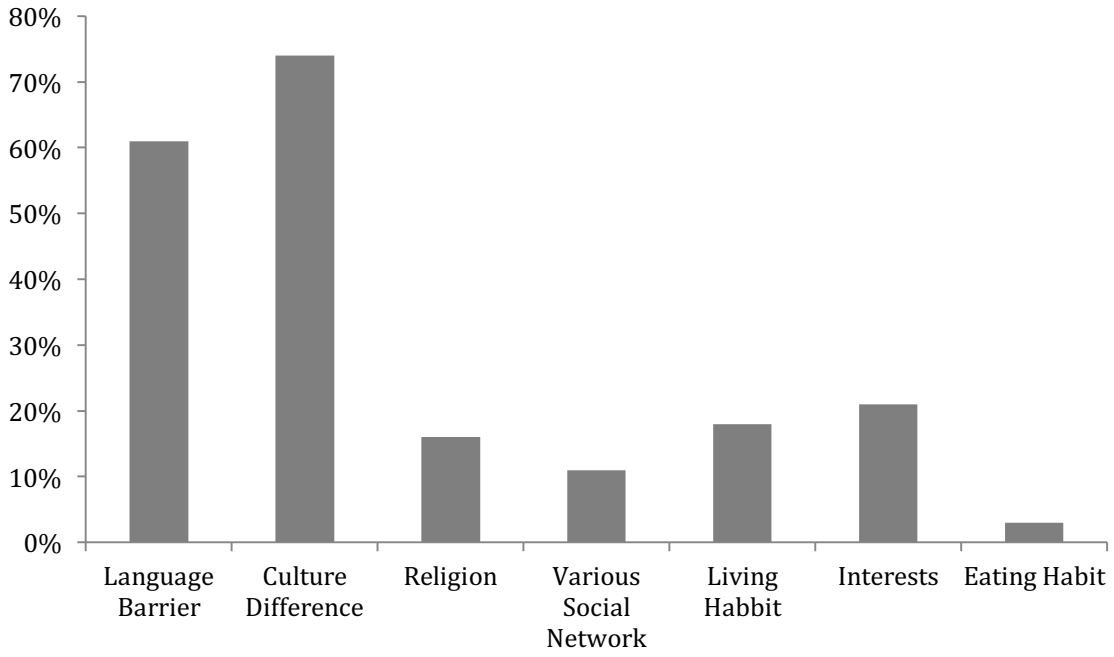

Figure 14. Breakdown of main barriers to making friends with foreigners

The final question was open-ended question: “According to your experience, what’s the best way to deal with culture difference on campus?” In the end, twenty-six answers were collected. Most mentioned “be confident,” “don’t be shy,” “talk,” followed by “attend different activities,” “hang out,” etc.

The purpose of the interview is to collect qualitative data that directly indicates the international students’ thoughts and feelings. A total five interviews were conducted during two weeks. The interviews helped me to become more aware of the situations they face, and gave me a better sense of their worldviews. In the study, I used a semi-structured interview questionnaire with about ten questions. During the interview, data was collected by interviews and audio recorded (Figure 15). The notes I took during

the interview highlighted the interviewees perspectives, which helped me to identify some of the key opinions during my data analysis. Being an international student myself helped facilitate my studies as well. My personal background, shared cultural traits, and similar experience may have encouraged the students to discuss their challenges and experience more honestly and specifically. For me, my shared background helped me to comprehend the depth of their experiences. In addition, all the interviews were conducted in the reserved university meeting rooms; each interview lasted for thirty to forty minutes.

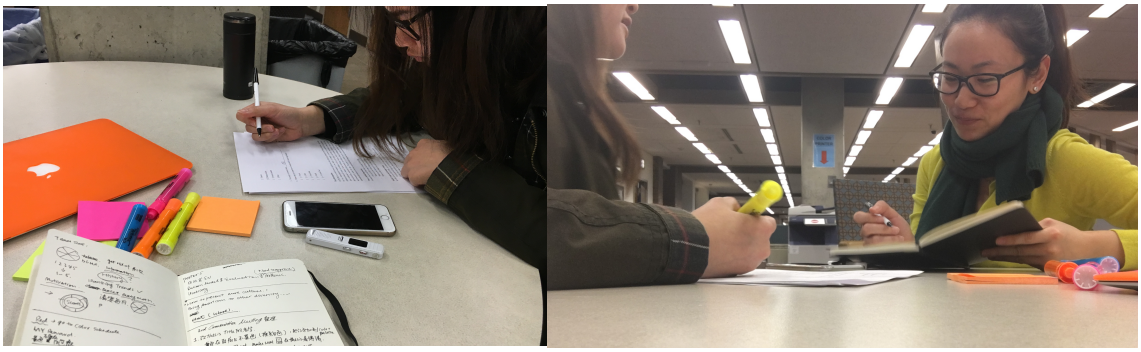

Figure 15. Interviewing the international students

A semi-structured questionnaire was used for the interview. In order to analyze participants' thoughts and experiences, the questions were sequential and increased in complexity. The interview questions were as follows:

1. How did you choose to come to the U.S.?
2. How long have you been in the U.S.?

3. How have you adapted to Purdue University?
4. Was it difficult for you to adjust and integrate into this campus environment? Have you fully adapted?
5. What are the biggest differences (challenges) you see between the university experiences here and in your home country?
6. Can you describe what you have tried to do to integrate yourself in the university? Did it work?
7. Did you feel accepted and respected by the local students?
8. Did any of the department of university or local students make an effort to help you adapt the new environment? How did it work?
9. Has your experience here helped you gain an ability to communicate effectively within and among diverse cultural groups? If so, can you cite specific examples?
10. What do you expect to see as an international student at Purdue?

The questions were classified into three main themes: (1) culture shock, (2) culture adaption, and (3) future prospects; each describes the challenges foreign students share at Purdue University. During the first part, the interviewees were asked about the surprise they encountered in the U.S. In the second part, the questions were intended to encourage the interviewees to share their personal experience regarding culture difference and challenges. The last part, also based on these shared purposes, helps me to explore the richness of experience and issues during their campus life at Purdue.

4.2 Limitations

I want to utilize my design to fit the specific context of Purdue University, because its total international student enrollment ranks the second largest among U.S. public universities, according to a report released by the institute of International Education in 2014. I think this might be an opportunity for Purdue University to study international students' needs and put those needs into practice. The interviewees were all international students were all from Purdue University. Hopefully, the opinions of these international students will be representative of the thinking of a majority of international students, and the findings will in some way be transferable to the experiences of other international students beyond Purdue University.

Christine Griffin (2004) mentions the differences on the strength of each research methods. She claims that quantitative research is more focus on phenomena analyzing, while qualitative research could provide the operation of social processes comprehensively. She also enumerated several limitations of qualitative research; for example, it can be high-priced and time-wasting on data analysis. Compared with quantitative research, qualitative research is a less serious research taken by other academic researchers, practitioners, and policy makers because it usually has smaller group of participants.

4.3 Data: Interviews with International Students

When being asked about why they chose the United States to pursue their education, many of the participants gave the similar reasons, “higher ranking,” or “higher -quality education,” A, one of the interviewees, came from China and is currently a graduate student studying Statistics. She told me that she chose to study in the United States because the U.S. government opens more opportunities for the foreign students to search for jobs in the U.S. after graduation. Others, like B, a second year MBA graduate student came from China, maintained that the American universities “have a higher academic rank of my program.” She also mentioned the prestigious professional recognition of her degree when she returns to China, “Well…the professional recognition of your graduation diploma from American Universities is always higher than the one from Europe, Australia and any other countries,” she said.

During the interview process, students mentioned the differences in the American culture and university cultures. When answering the question, “What do you like the most about the American culture?” A stated:

> For me, I think I like most about the culture in America is “don’t judge”. Everyone has their rights to believe something, what their like to wear and feel free to speak out their point of views. While it is totally different from what I experienced in China. I feel more comfortable in this atmosphere that I don’t need to care too much about what other people will say, just be myself and do what I should do.

In an effort to keep up with class assignments, the majority of the international students felt they had to study much harder than American students. B narrated the experience of her first semester:

> I was so anxious about my class progress and afraid I can't keep up with the other students. The biggest challenge was the language barrier, especially when reading the textbooks that required. It was like a nightmare to me because there are so many of the professional terms that I didn't understand. Nothing like the universities in China that they only have final exams, here they have homework, quiz, assignment, middle term exam and final term exam…I feel so stressful during first couple of months in my first year.

C, an HTM doctoral student came from Indonesia, related her own perspectives on the culture differences in the United States. She mentioned that she is always conscious of being an international student, and she feels very shy and uncomfortable communicating with American students:

> Each time I tried to chat with American students, I was quite scary …you know…I just don't know how to start a conversation with them because I don't know what topic to talk about, while ironically I was most likely a social girl in my home country, which is very odd…Most of the time, they will usually start the conversation.

When asked how their life in Purdue helped them to improve the skills to interact with diverse cultural groups, A gave a very helpful example about how she participated in an International Program (IP), hosted by The Office of International Students and Scholars (ISS). The program she registered for is called the International Friendship Program (IFP), offered to first year international students. It provides the opportunity to build friendships with a domestic individuals or local families living in the Greater

Lafayette area. A told me she was informed about this opportunity during the orientation week with a random flyer. Shortly after she registered, a local family contacted her. She described the first time they met each other was at a local Starbucks.

> Angela is a very nice American lady, she drove me around the town and took me to the most famous yogurt bar in town called Frozen Yogurt…I went to her place to have a Thanksgiving dinner with her family, they are all good people and we had a lot of fun…One time, I invited her to my place to have Chinese dumplings, and we talked a lot about the culture difference in China and in United States, which I think really helped me to adapt the new life here.

However, unlike A found an opportunity to make a local friend, B told me she usually went to her roommates when she needed someone to talk to. She noted that it is easier for her to share her experience with her roommates since they are from Indonesia and have similar cultural backgrounds:

> I have to manage everything by myself like buying food, cooking…It is a bit hard for me to stay here because, you know, I am so far away from my family. I have to solve all the problems (by) myself and sometimes I really wish I could have a friend to talk to, or help me with all these problems. Having a roommate also from my own country makes me really happy, at least I am not alone anymore and we cook some traditional Indonesia food together in the holidays…it makes me feel (to be at) home again.

The adaptions mentioned here related to many perspectives: language, academics, social lives, cultural habits, etc. Some students face these problems alone, while others share their experience with friends of the same- ethnicity. Very few sought help from university-based international integration program or psychological services.

The aim of this study discovers the personal experiences of international

students in Purdue University, is to offer design solutions that will lead to help international students adapt and integrate into their new environment. The solutions on how the international students can be helped to adapt the campus life in Purdue University will be discussed in the next chapter.

4.4 Data Analysis and Synthesis

Data analysis activities were completed after data collection. My detailed study included both qualitative and quantitative data. After structuring the data by interviews and online questionnaire, a top-down data analysis methods was used to sort the data into customer touch points. The benefit of this approach is that I was able to narrow down the number of touch points, and remain aware of the user needs by category.

Figure 16. Closed-card sorting

The first round of data was categorized appropriately through Closed-Card Sorting (Figure 16). Different category names were created based on the problems and user requirements. This helped to reveal key terms for the categories. The card sorting method was straightforward. It also provided with a significant amount of valuable data.

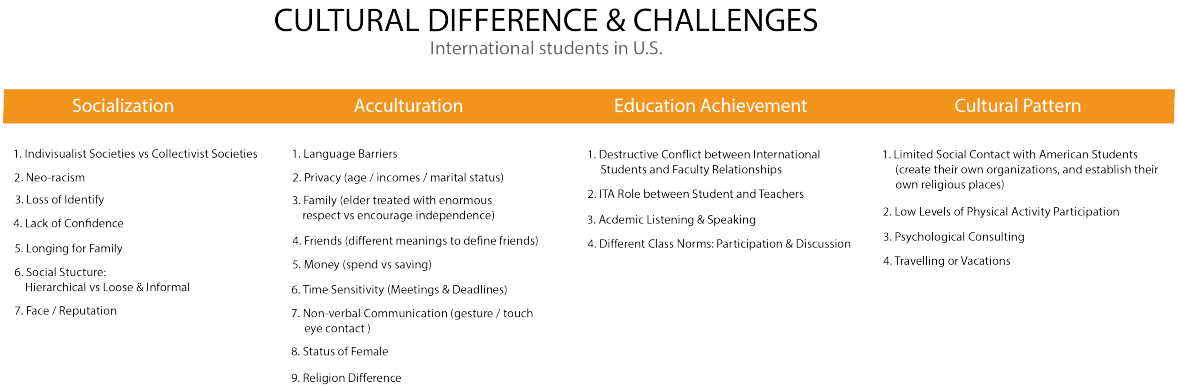

Figure 17. The touch points for international students

The general challenges that students are frustrated with include language barriers, culture differences, class assignments, making friends with foreigners, job hunting, etc. Each was labeled under four main categories: Socialization, Acculturation, Education Achievement, and Culture Patterns. After analyzing the findings, all the touch points were highlighted to reveal the needs of potential users (Figure 17). A graph helped my understanding of design direction and how to accommodate academic needs, which includes different class norms and procedures, and social networking building, which is associated with campus activities, interaction between college students, etc.

4.5 Case Studies of Existing Framework

In addition to the interview and survey of the targeted user group, it is also crucial for me to collect, evaluate, and analyze the existing online resources, especially apps. The way we live and interact is influenced by mobile apps that allow us to

communicate and share information more quickly and efficiently than ever before.

Many colleges and universities are developing their own apps for the students to utilize. However, it was rare to find a campus system that aims to solve or involves considerations of cultural differences, or the social integration of international students. Most university apps are more likely to be information platforms with lists of upcoming and ongoing events, or campus maps and tours. There is an opportunity here to add this new feature based on the existing resources. There are quite a few mobile-based resources or tools aimed at keeping users updated on campus happenings.

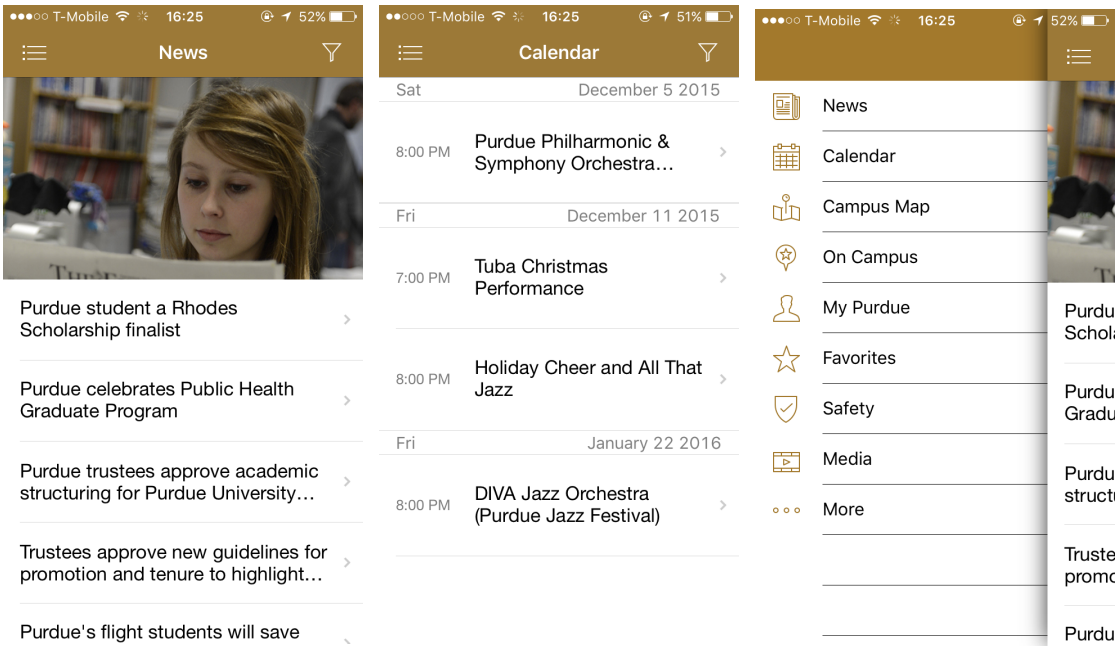

Figure 18. UI designs of Purdue University app

The Purdue University app (Figure 18) is specifically designed for Purdue students. It has several features that are very helpful and informative. The campus map is two dimensional, and can help students to find an open lab, learn is on the menu for dinner, and has push notifications enabled. The news feature lists ongoing campus events. The calendar feature collects all kinds of the athletic and seasonal events, and students can add Purdue events to their own calendars (Figure 19).

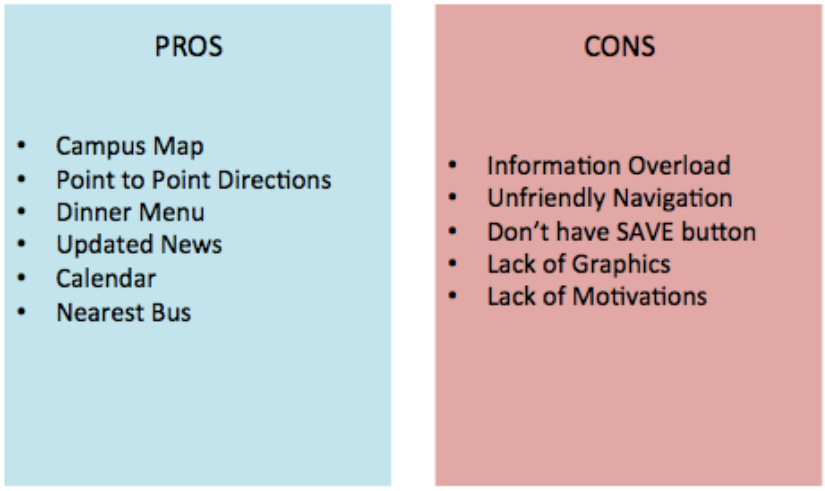

Figure 19. Pros and cons of Purdue app

However, all of the news and events featured in the app are presented in a text-based format, such as the format tends to provide an information overload that is hard to digest and less attractive. Another problem with the app is its navigation between the events and related website, which requires an additional step to move the users to the Purdue website browser and back again.

The following mobile apps are reputable resources with updated information and search that I considered as potential models: Eventbrite, QuizUp, and Challenged.

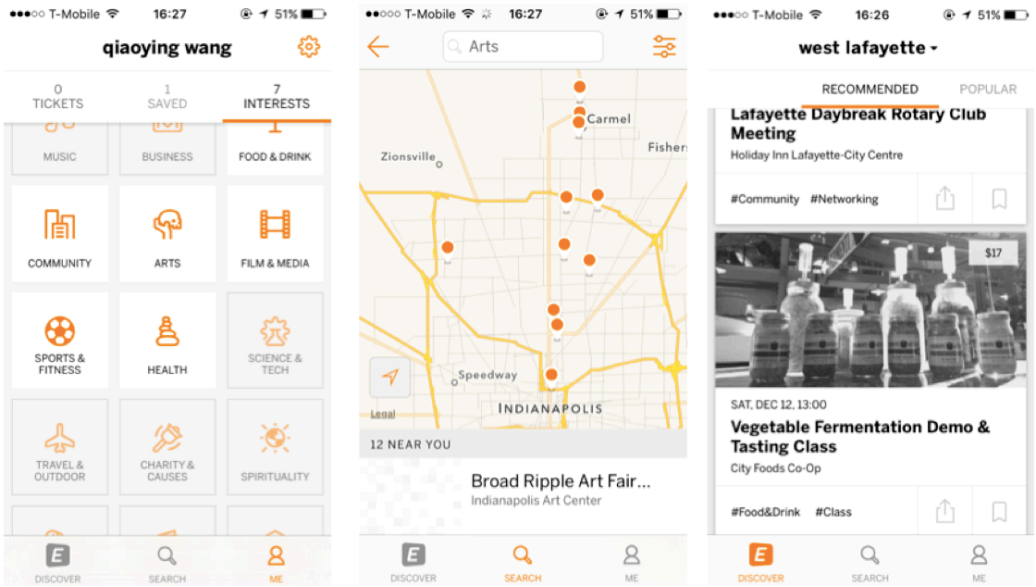

Figure 20. Main interface of Eventbrite

Eventbrite (Figure 20) is a newly-released, event-driven app that identifies popular or recommended events happening around the user. The user is able to see which events their friends are attending, register and pay for tickets to events, and easily read events details, such as maps and directions, etc. Evenbrite has great flexibility for any kind of event and is user-friendly. Whether looking to find an event nearby or add one to your saved events, the organization has pretty much every aspect of event logistics covered. Compared with the Purdue app, it presents the events information using posters, which helps in understanding the content. A preview map is available on

each event page, which gives user a brief idea of the location without linking to the map page. I also appreciate the way Eventbrite utilize the aesthetics of minimalism; therefore, the design emphasizes the event itself, rather than the formatting or graphics.

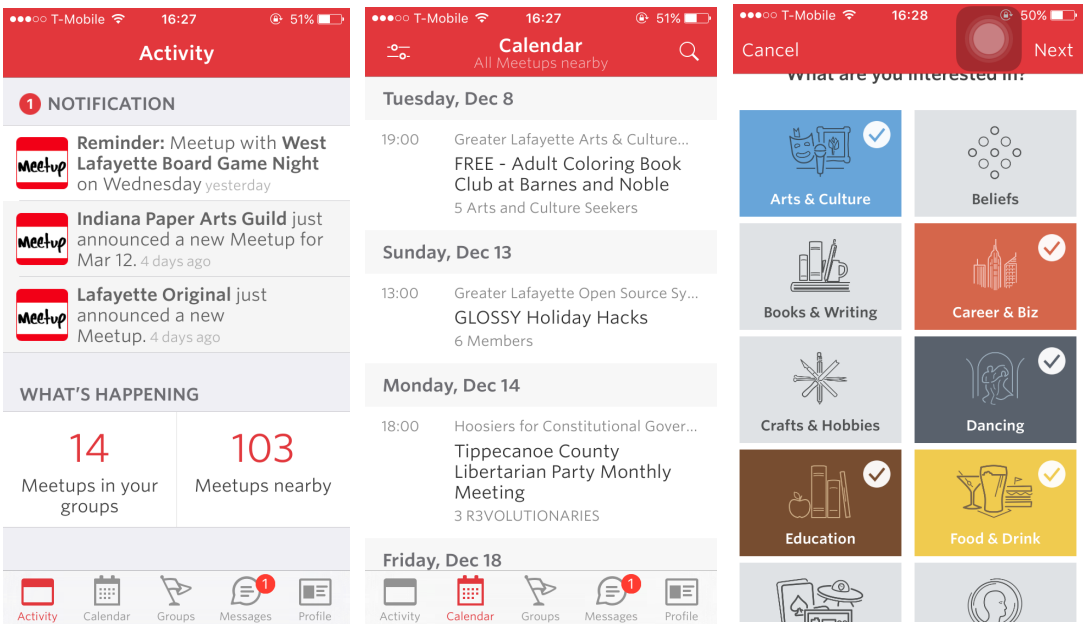

Figure 21. Main interface of Meetup

Meetup (Figure 21) is a social networking app that helps users to find out what is happening with groups of people nearby who share the same interests. With a focus on group gathering, the app includes important information such as dates, location, content, host, and participants. When searching, the system will suggest activities for the user based on the user's selected interests. The user can also easily browse their interests from a profile page by just clicking on and off.

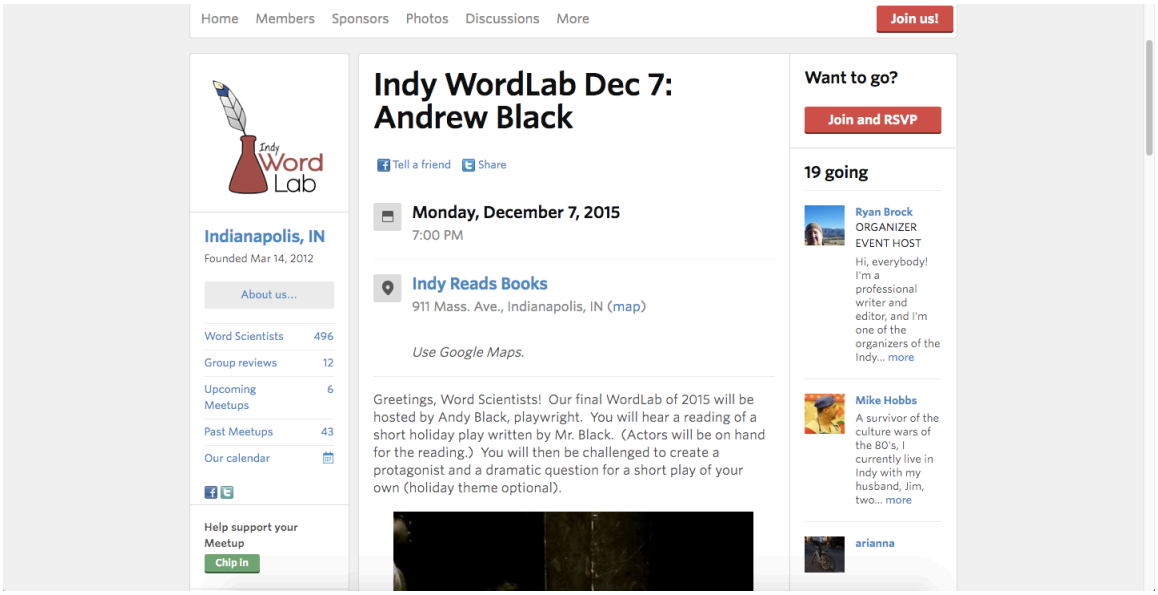

Figure 22. Website version of Eventbrite

In the web version of the Meetup app (Figure 22), more pictures and graphics are shown with the same activities. This contributes to users' immediate recognition of the activities. The web version employs large blocks with bright colors, a simple background, and a bold font. Compared with the mobile version, the web version provides three additional features: an introduction to the organization, the sponsor, and the participants in this Meetup. Although the site covers a much broader scope, the navigation is simple and usable, allowing users to accurately and quickly focus on their interests.

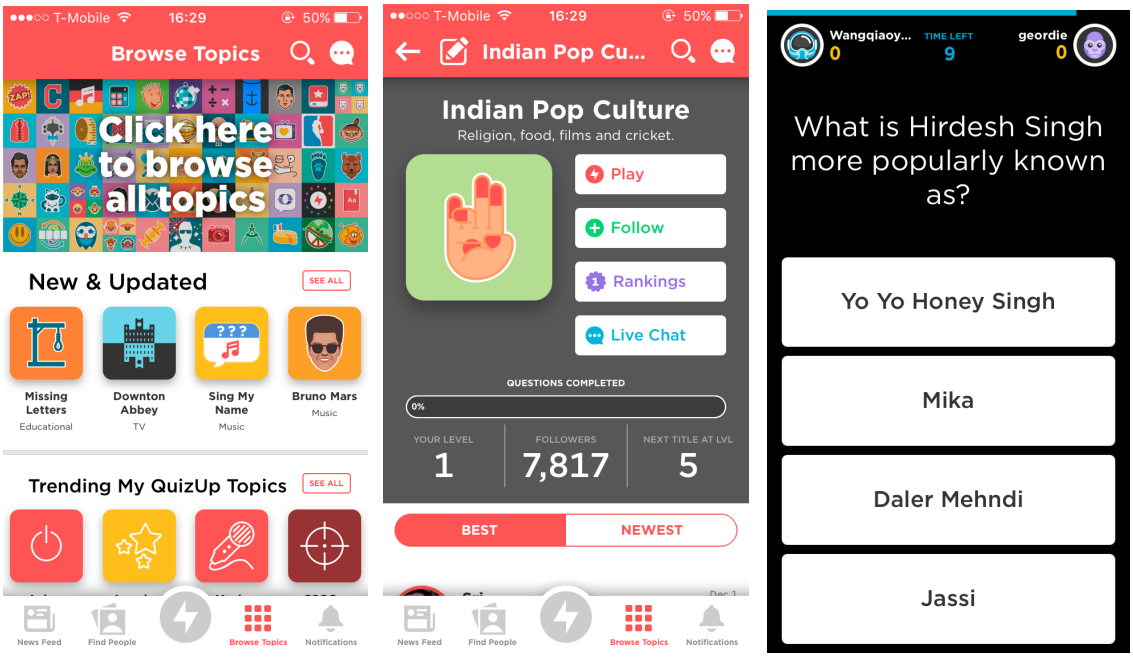

Figure 23. Main interface of QuizUp

QuizUp (Figure 23) is an award-winning multiplayer trivia game with hundreds of topics. Users can challenge friends on any topic in a brief, real-time match, or randomly play other users. There is an abundance and variety of trivia challenge topics. For a user who is interested in foreign customs, world religions and culture-related topics, the topics in QuizUp can be a tool for them to play with. Selecting a topic from the topics page is synced to user's previous QuizUp topics. The system also provides specific theme for each special events. After the November 2015 Paris attacks, QuizUp opened a special column named "The French Collection" with topics like French Art, The French Revolution, Wine, France National Soccer Team, etc.

Table 1. Valued features of existing resources

Eventbrite	QuizUp	Challenged
• Graphic Posters • Preview Map • Aesthetics of Minimalism	• Customized Search • Informative • Navigation Friendly	• Multi-Player Game • Challenge based • Various Topics • Special Events • Creative Interaction

Based on the analysis of existing resources compared to the needs of the international students as revealed in their interviews, it is clear that each app has their niche features and unique perspectives. For this thesis design, the design solution should be mutually supplementary and incorporate these resources merits to improve efficiency (Table 1). As a result, an app designed for Purdue international students should integrate those features in order to make it more interactive, such as culture-related topics, challenge-based games, customized search options, etc. Therefore, Purdue international students with a variety of interests and priorities can benefit from this campus mobile platform.

4.6 User Requirements Summary

In summary, I documented the user requirements so that they lead into the process for developing a mobile-based application. The user requirements were based

on summary descriptions of users' needs and expectations, as well as the highlighted features of other applications so that the system will benefit these users. Features that facilitate the interactive experience of the application usage might include the following:

- User should be able to easily use the application on campus.
- User should gain a sense of identify and motivation when using the application.
- The information provided by the application should contain four perspectives: socialization, acculturation, education achievement, and cultural patterns.
- The application should help users to develop more social contact with domestic students.
- User should be able to increase their participation in physical activity.
- User should become more integrated into the U.S. community and campus activities.
- The application should be a platform that delivers useful information to international students.
- The application should maintain users' interest and brand loyalty.

CHAPTER 5. DESIGN PROCESS

The research of the previous chapter provides a foundation for the design concept. This design process is based on work by Whitney Quesenbery (2003) that includes six stages: “envision, analyze, design, evaluate and refine, implement, and support.” The benefit of building the design based on an existing model is to ensure the results are integrated and cohesive. Even though the model itself is an outline, some of the steps may overlap or be dismissed when the process is applied to the design. By following these stages, my project design process effectively plans the life cycle of the project.

5.1 Brainstorming

I started a brainstorming session after determining and categorizing the user needs. In order to create multiple possibilities, different design concepts were created with different perspective in mind, the focus is on enhancing the campus experience of international students.

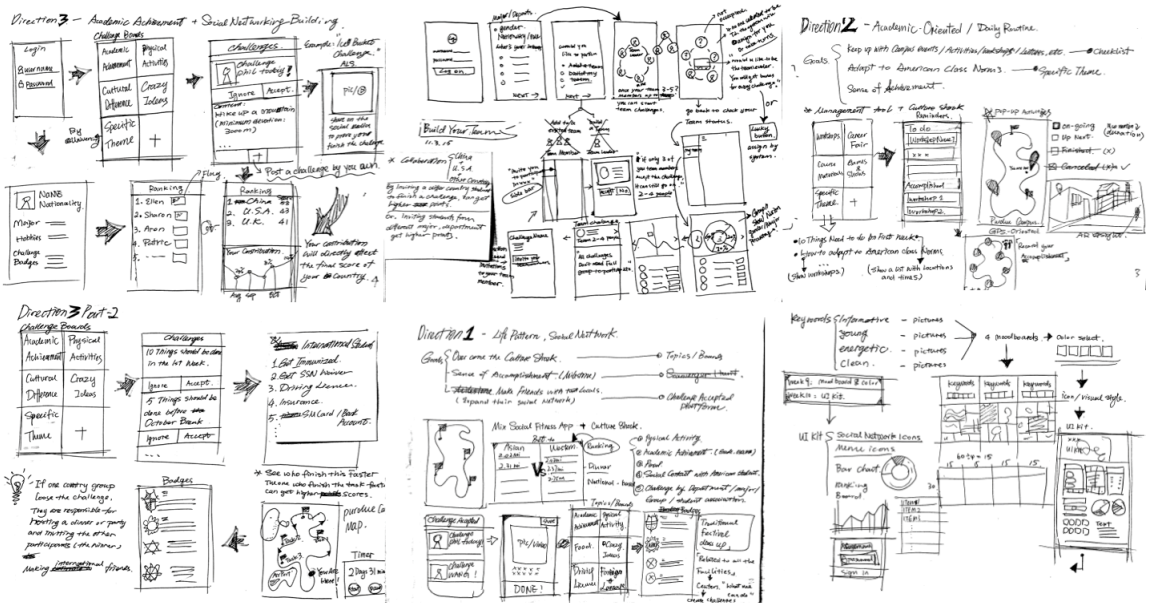

Figure 24. Brainstorming and sketches

In my first concept, the idea was related to students' life patterns. I considered a challenge setting that combines different topics, such as: physical activity, academic achievement, culture-related challenges, etc. I brainstormed a flat topic board concept (Figure 24) for the app's home page menu, as well as some related rewards systems, like ranking boards and badges.

Another concept was generated based on academic-oriented events on campus. The concept explored the possible campus experiences for international students via different concept representations. The system serves as a management tool that helps international students to adapt to American class norms, university basic routines, and schedules, many of which are unfamiliar to them. In the meantime, it also categorized the activities on campus into different sections. For instance, the pre-setting system

would have several named section like workshops, career fairs, lectures, special themes, etc. Once users reach a certain level, they would be able to click on the “add an activity” button to create an activity by themselves.

The feedback from these conceptual ideas led me to run a more developed feature design for the app. I took the advice from colleagues and extracted two main features from my previous concepts and merged them together, so the final concept I decided to go with has both social network needs and academic purposes. To fully conceptualize and enrich the current design concept, I started to explore the possibilities of the interface, and how to make the app visually friendly and appealing to users.

After developing the concept, I moved to an interface design to further refine the format and create an infographic to present team components and contributions. The data I wanted users to see includes: individual contribution, nationality, monthly team contribution, activity types, and proportions. To visualize the existing data, multiple formats and shapes were tested. This helped me to creatively work through the data and categorized it via arranging, sorting, placing, and shaping. The round shape represented the users as a whole team, and several small dots distinguish individual team members. To display the interaction between team members, I used curves, either in the center or on the outside of the circle. The intention of having a clearly presented infographic was the ability to clearly represent different levels of information a college student might access.

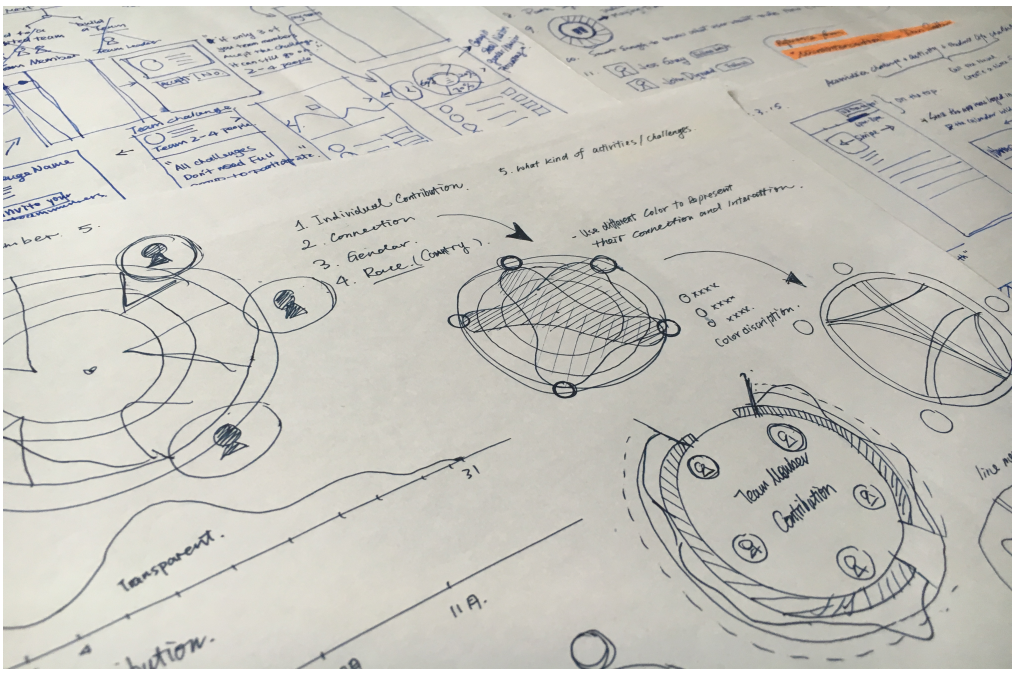

Figure 25. Infographic design sketch

5.2 HTA Chart & Color Scheme Pattern

Hierarchical task analysis (HTA) is not only a practical approach to study user experience, but also one that can be easily applied when revising based on an existing design or coming up a new concept (Peter, 2010). It serves as an effective way to organize content requirements and system documentation. I was able to quickly understand how users interact with a system. The structure of my HTA chart is outlined as Figure 26.

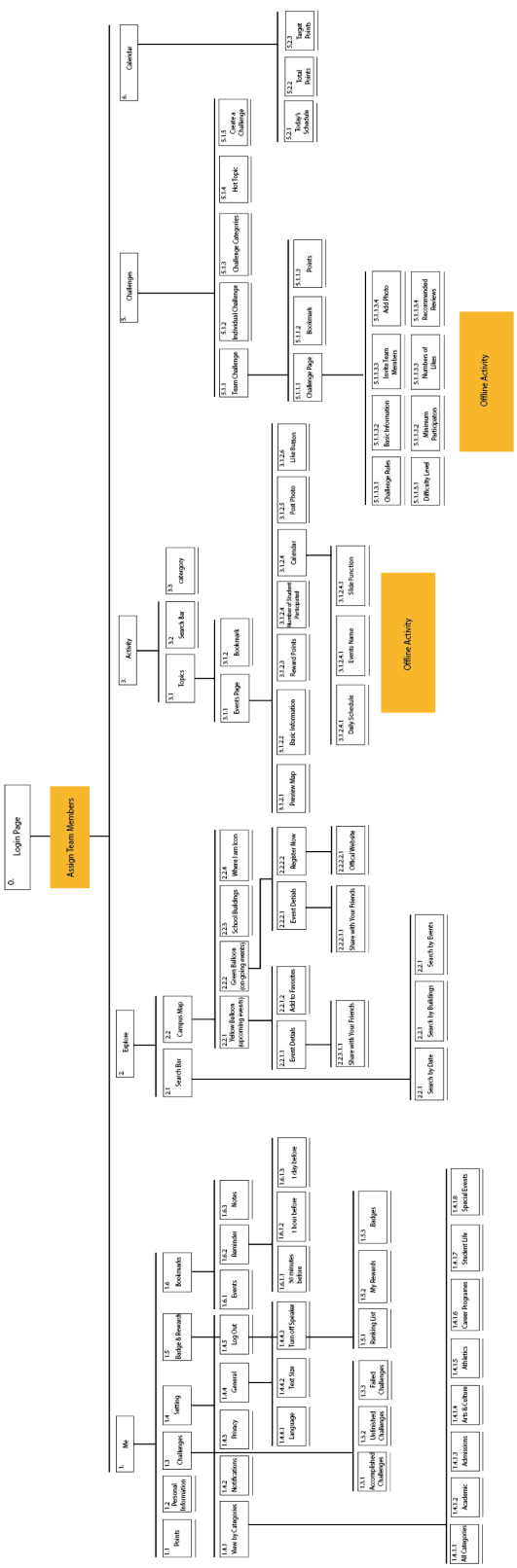

Figure 26. HTA chart

The main group of the target users are 18 to 25 years old international students at Purdue University. Ideally, the tone of the mobile application design color will reflect the youth of this demographic. When analyzing the scope of the color scheme, a mood board helped me to narrow down the selection. A mood board is a technique used to show the visual interpretation of the concept. It's a collection of textures, images, text, and colors related to a design theme. It helped me to communicate my thoughts and define the style of my project. Four keywords were generated based on the design style I wanted to reveal: fresh, modern, dynamic, and minimal. After selecting the keyword, I incorporated thoughts, inspirations, and related photographs into an image-based mood board. I also listed the materialized visual impressions and objectifications. I started to look for consistency between these elements. The results provided interesting directional color schemes to prevent a design scheme from moving too far in the wrong direction (Figure 27).

Figure 27. Mood board design

5.3 Wireframing

The next step in progressing towards a concrete solution was wireframing (Figure 28), which was applied to understand the structure of the information and to refine the micro-interactions in the system. A wireframe is a “two-dimensional illustration of a page’s interface that specifically focuses on space allocation and prioritization of content, available functionalities, and intended behaviors” (Garrett, 2010).

When developing the navigations between the information structures, I defined how the major functions behaved in response to users’ needs. The content elements showed pathways between pages, as well as interactive features like drop-downs, accordions with show-hide functions, and call-to-action buttons.

After conceptualizing the possibilities of the interface sketches in a sketchbook, the wireframe was conducted in Sketch, a professional digital design software. The entire tone was in different levels of gray to make sure that the visual representation did not conflict with the structure of the content and the information architecture. Scenario 1 represents how users navigates to their profile section and most of the personal related features underneath the profile page. In scenario 2, user will be able to use different approaches to explore activities on campus using the calendar, current location, or category. Scenario 3 provides a platform for the college students to interact with each other by participating in a challenge-based activity with rewards. In scenario 4, users can return to their profile page and check their current collected points available to exchange. Meanwhile, I tried to use an infographic to display the team components in "my team" under the profile page. To quickly get to the "check-in" function, users needs to scan their QR code to the staff, I created a QR code scanner on the right top of screen. This is a one-step action, so that user can quickly find it.

The objective of having a clearly defined wireframe was the ability to understand the multiple paths a user could possibly take. This step played a crucial role in moving from conceptual planning to the actual development of the design.

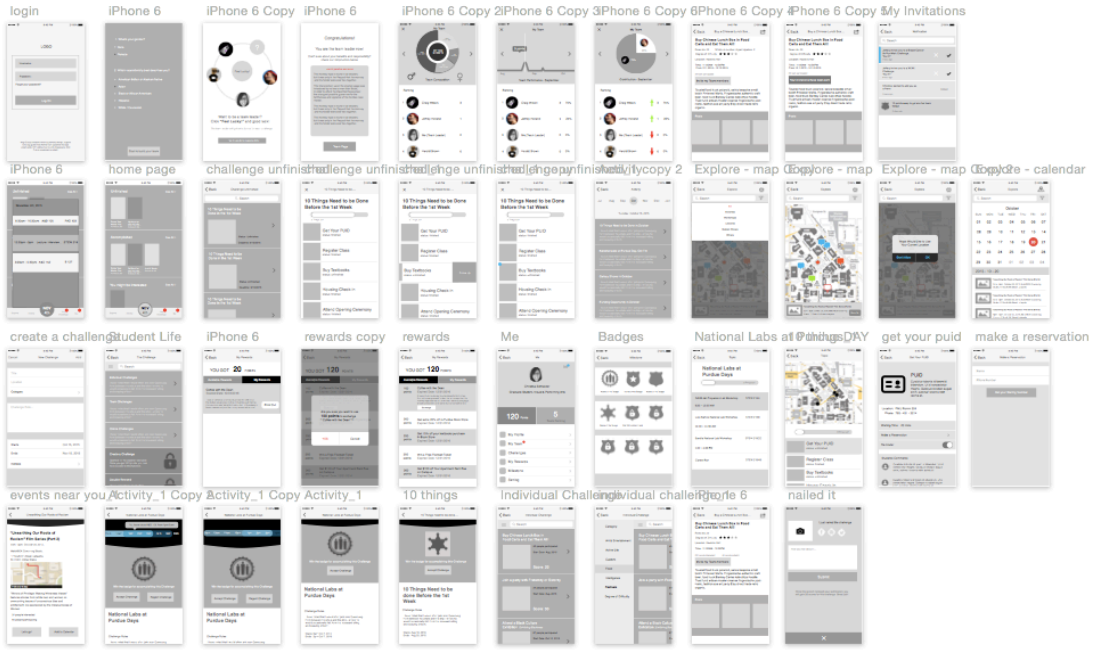

Figure 28. Wireframing in Sketch

In the first round, the main structure of the app interaction was illustrated (Figure 29). These prototypes were created and organized according to their main function and navigation process. The link between each interface was presented with a blue line, linking all the call-to-action buttons and areas, necessary to create such behaviors that makes it easy for the users to navigate the prototypes. Five experienced experts conducted a heuristic evaluation based on the prototype interface, which I will mention it in the following chapter. After that, another round of design refinement was developed based on the problem findings. I will emphasize those design features in the following sections.

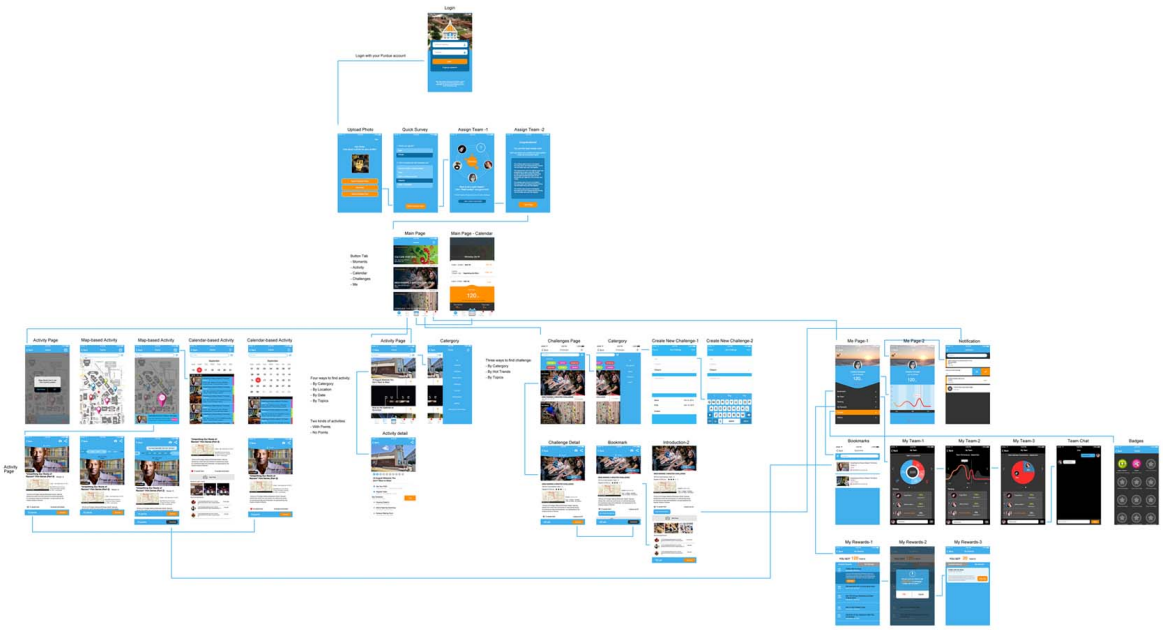

Figure 29. Prototypes of main structure

5.4 Business Model Design

A business model helped me to articulate my design into a startup business, which can be viewed as “a template of how a product conducts business, how it delivers value to stakeholders, and how it links factors to product markets” (Christoph & Rapheal, 2010). Or, as American management consultant Peter Drucker described, a business model presents the customer, customer value, and the value of the cost. The Business Model Canvas developed by Alexander Osterwalder, which is a simple graphical template, features nine essential components: “customer segments, value propositions, channels, customer relationships (such as self-service or personal assistance), revenue streams, key resources, key activities, key partnerships, and cost structure”. (Alexander & Pigneur,

2013). Each individual element above brings further consideration of a business' full scope, and presents how the pieces link together (Alexander & Pigneur, 2013). I believe a business model can best be described through the segments that show the logic of a design's intended value in the market. These nine components cover four main areas of business: customer, offer, fundamental facilities, and financial feasibility (Alexander & Pigneur, 2013).

To understand the target user of my app design, I started with an empathy map to synthesize my observations and draw out unexpected insights (Figure 30). It was originally created by Dave Gray and applied widely. An empathy map consists of a simple face surround by six sections: think & feel, hear, see, say & do, pain, and gain. It was applied to gain a deeper insight into my target user groups. With the use of pink Post-it stickers, I transferred my insights on the target group to each section. After I placed the sticker notes on the empathy map, I reflected on whether or not I had brought the user to life. After that, I sketched out the characteristics of my target group on the center of the face area.

Figure 30. The empathy map design

The Empathy Map led me to a user persona, with the customer segments of a business model canvas. After identifying the customer, I used the customer-driven pattern as my design base. This is popular approach in the business world and has been applied in many sectors (Figure 31). The key to this model is the close link between customers' needs and facilitated access, or increased convenience. Like other innovations starting from a single area, these developments affect other business model building blocks. The app is expected to be a non-profit application designed specifically for Purdue international students, who can download it from the Apple store for free and use their Purdue account to log in. There is no charge for app use. The app offers a

customized activity platform that enables students to get involved activities in campus activities. The business blueprint was generated to enhance the campus experience by encompassing the variety of international students' expectations mentioned during the previous sections, such as their place American campus culture, making friends with locals, etc. On the other hand, a points system with teams that earn points and exchange points, users' app engagement could be improved.

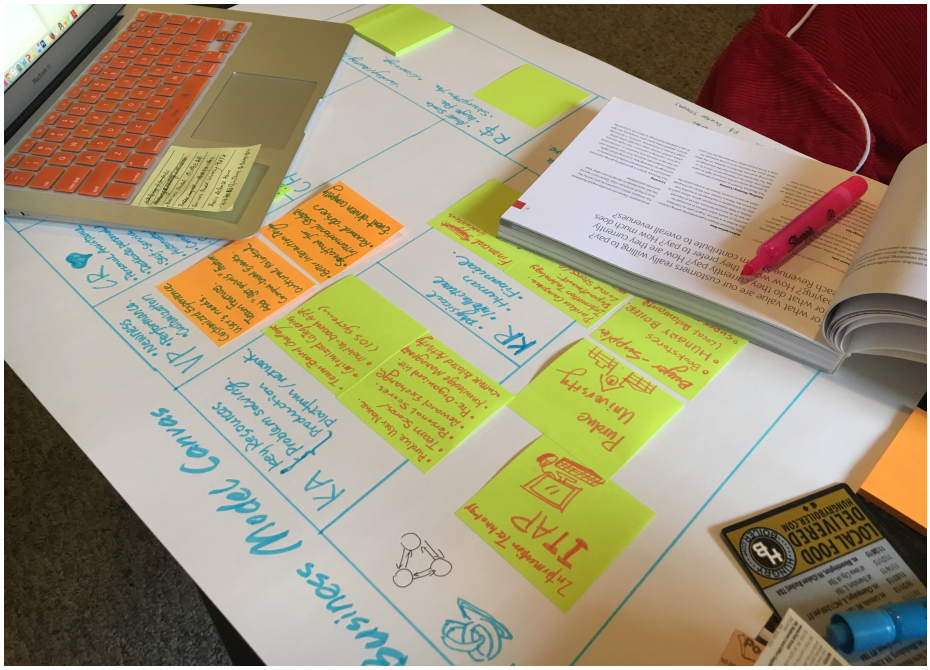

Figure 31. Business model design

When considering of customers, there are different types of customer segments. The one I referred to is a market segments with slightly different needs and problems. That means the majority of my market segment are foreign students at Purdue

University. The app aims to provide these students with the information and tools they need to immerse themselves in American campus life. The app provides domestic students with a platform to understand the diversity of culture and to build friendships with international students. Both segments have a variety of experiences and needs.

To summarize, the business model design clarified my thinking by assisting me to sort through the concept and make design process simple, relevant, and intuitively clear. Here I listed some key segments from my business model, including value propositions, cost structure, and key partners.

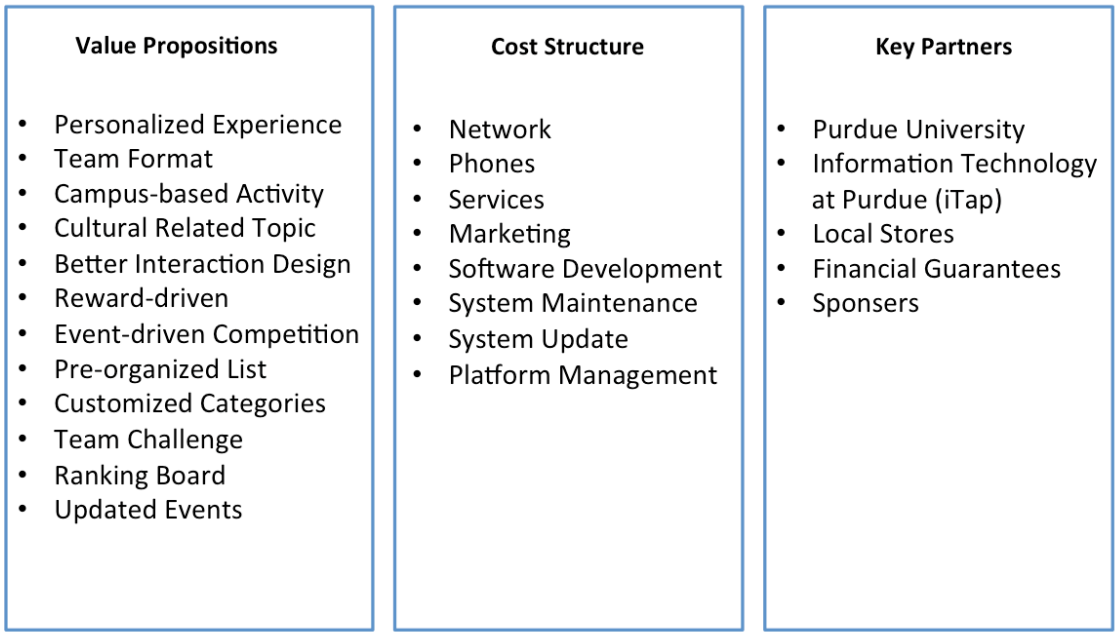

Figure 32. Segments of business model design

5.5 Visual Design

After enriching the user scenario, I started to polish the visual interface design. Compared with the web design of other interface, the design of a mobile device interface still has its limitations regarding the amount of information displayed. Also, because mobile devices have smaller screens, reading a large amount of information could cause a lot of scrolling and back and forth. To reduce that, multilevel or hierarchical mechanisms were applied to present information is a better understanding (Stephen, 2002). In the meantime, apart from the functionality and usability of mobile device application, other factors like aesthetics are part of design's affect on the interaction and whether or not users enjoy the experience. Karlsson and Djabri defines dynamic interaction can always motivate users' response positively (Karlsson & Djabri, 2001).

Based on the principles that learned from *Guidelines for handheld mobile device interface design.* Menus and side menus are handier and consistently utilized with between interface navigations. In the final visual design of activity main page (Figure 34), a slide-out side bar served as a filter or search category hiding on the right side. It could slide towards the screen center once user needs to filter the current activity information. The same motion allows users to navigate to the "to-do-list" page and mark one finished task as "done." The sliding motion was implemented as one of the main motion ideas in this design concept.

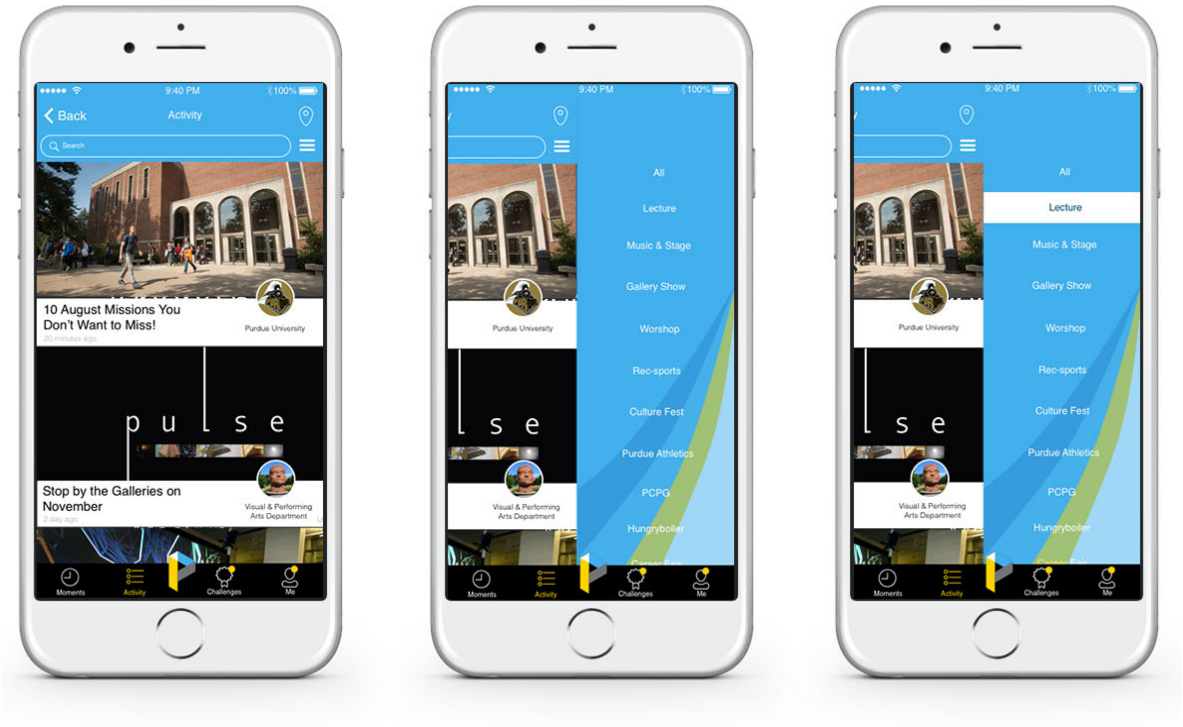

Figure 33. Applied hierarchical mechanisms in activity page layout

The psychology of logo design is one of the most crucial elements during the process of creating a logo. It's usually associated with how you pick the proper colors and the ways you combine them. The role of color in the psychology of logo design is essential. Choosing right color for my design theme allows the app to connect to a user's mind and emotions. Since the target user group is international college student 18 to 25 years old, I decided to bring bright energetic colors as the theme color. Sunny yellow is an attention getter and considered as an optimistic color that enhances human concentration (Johnson, 2000). Blue signifies a reliable and responsible form from a

color psychology perspective. Using white and dark grey as natural transitions between yellow and blue, the color contract ratio can be improved and the edges preserved as well.

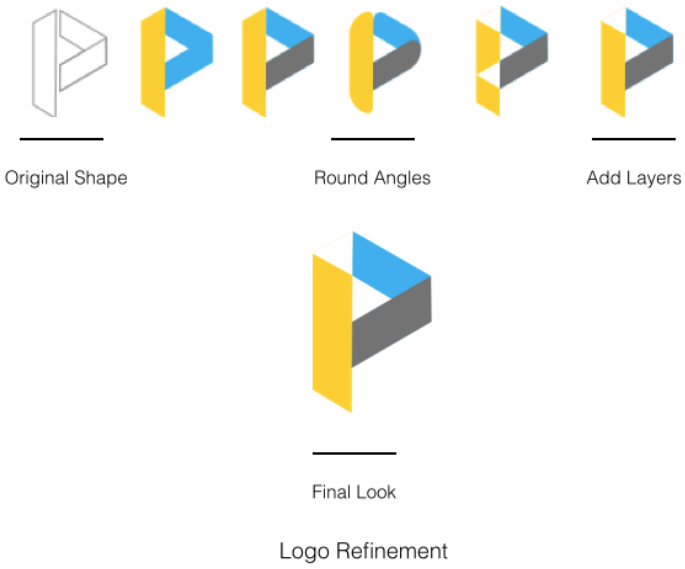

Figure 34. Logo design

The general purpose of this page is to indicate the essential categories of the application. Users may have the option to select the categories they are interested in (Figure 35). The topics that I designed meet the demands of users' needs, including: lecture, gallery show, music & stage, sports, culture fest, Purdue athletics, HungryBoiler, etc. Some of the topics provided depend on student information. For instance, if a student logs in as a graduate student from China, the system will identify the data and acquire related topics, such as PUCSSA (Chinese Students and Scholar's Association), or

PGSG (Purdue Graduate Student Government). The app aims to improve user experience by creating a customized platform that delivers relevant and targeted information to the user.

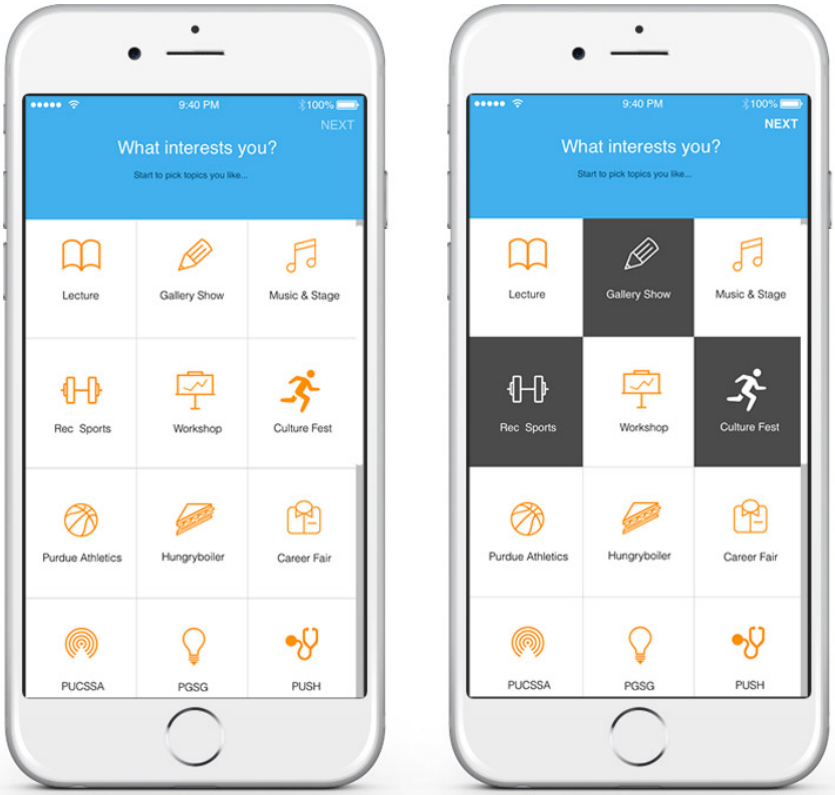

Figure 35. Choose your interests interface

As Figure 36 shows, the system should be able to assign team members based on the information provided, such as their nationality, which department they belong to, and gender identity. Linear-based circle patterning is used to indicate the searching status, which mimics radar scans. This is detected through GPS and the Purdue student

database. For example, if a female electronic engineering student who from China is looking for her team, the system will more likely assigns the students who are not from China and not from electronic engineering department to be her team members. The purpose here is to allow users to become more culturally diverse, and to encourage international students to develop cultural communication with domestic students.

Figure 36. Assign the team interface

One featured function is the campus map. Users should be able to check past, ongoing, and upcoming activities once they navigate to the campus map page. The

system will provide a list of related activities to users based on their current location. The category each activity belongs to is indicated with the icons. As seen in screen three on Figure 37, once a user clicks on the yellow bubble, a preview page will pop up from the bottom of the screen to display the content of the selected activity. Furthermore, this allows users to search for the current date, or a customized category. By providing multiple options and experience from the feelings of functions, visual and use, it is aimed to create a better user experience.

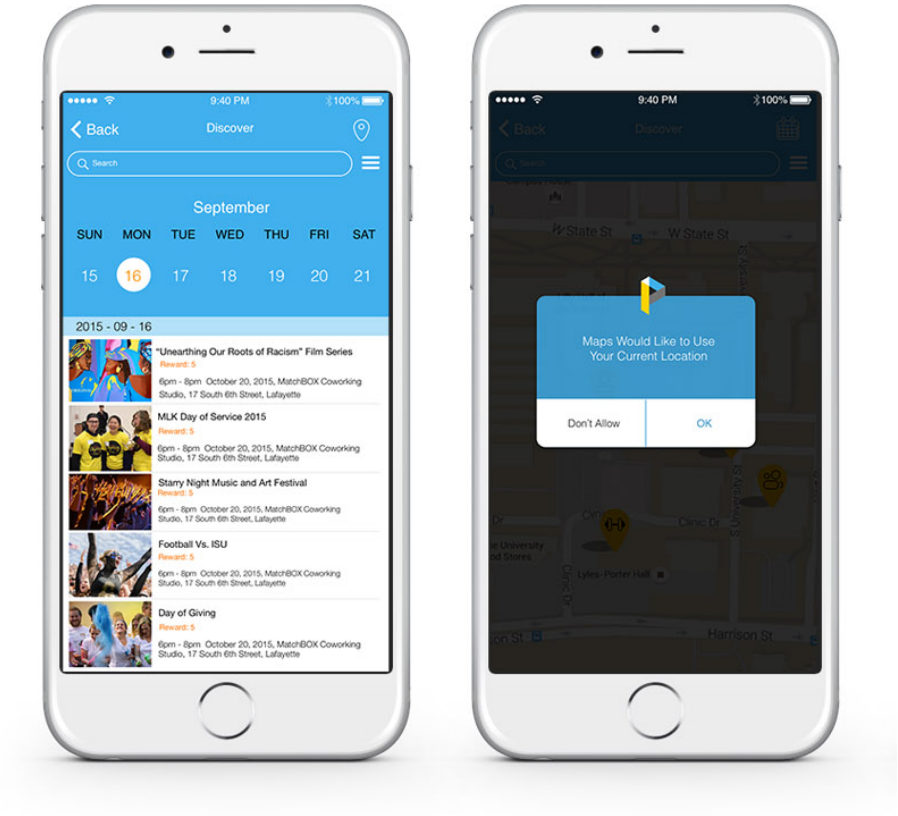

Figure 37. Different accesses to search on campus activities

The challenge feature allows users to participate in physical activities as a team or individually, such as indoor sports, outdoor sports, culture fest, etc. In order to increase their motivations, I designed a reward system so that they will receive certain points after finishing challenges. The users need to register for the challenge first; once they accomplish the challenge, a facilitator is responsible for awarding points. In the meantime, the points are added to the users' accounts and showed on their "my points" page. In addition, a fire-shaped icon indicates the difficulty level of the challenge. Student receive more points for higher level challenges that are complicated or require teamwork.

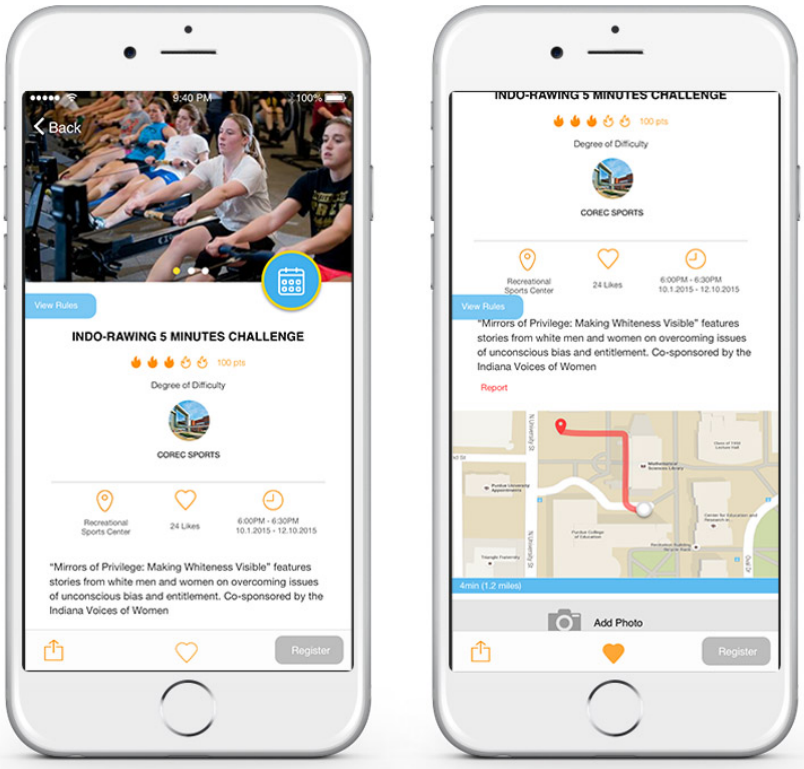

Figure 38. Team challenges interface

In consideration of how quickly the users can reach the calendar and check their availability, a calendar icon, along with activity information, is designed for the users to check their availability with one click. Once the users click on the calendar icon, located on the upper right side of the page, an expanded calendar pops up immediately and shows the daily schedule for that period of time (Figure 39). Moreover, users don't need to switch back and forth from the phone calendar to view their availability. Another feature of this page is the share feature. Users should be able to choose either share with their team or share with other outside social networking platforms, like Facebook, Twitter, WeChat or LinkedIn, etc. Adding a social sharing button helps users to promote the activity, and the application itself. It is also an effective way to attract and increase the number of users.

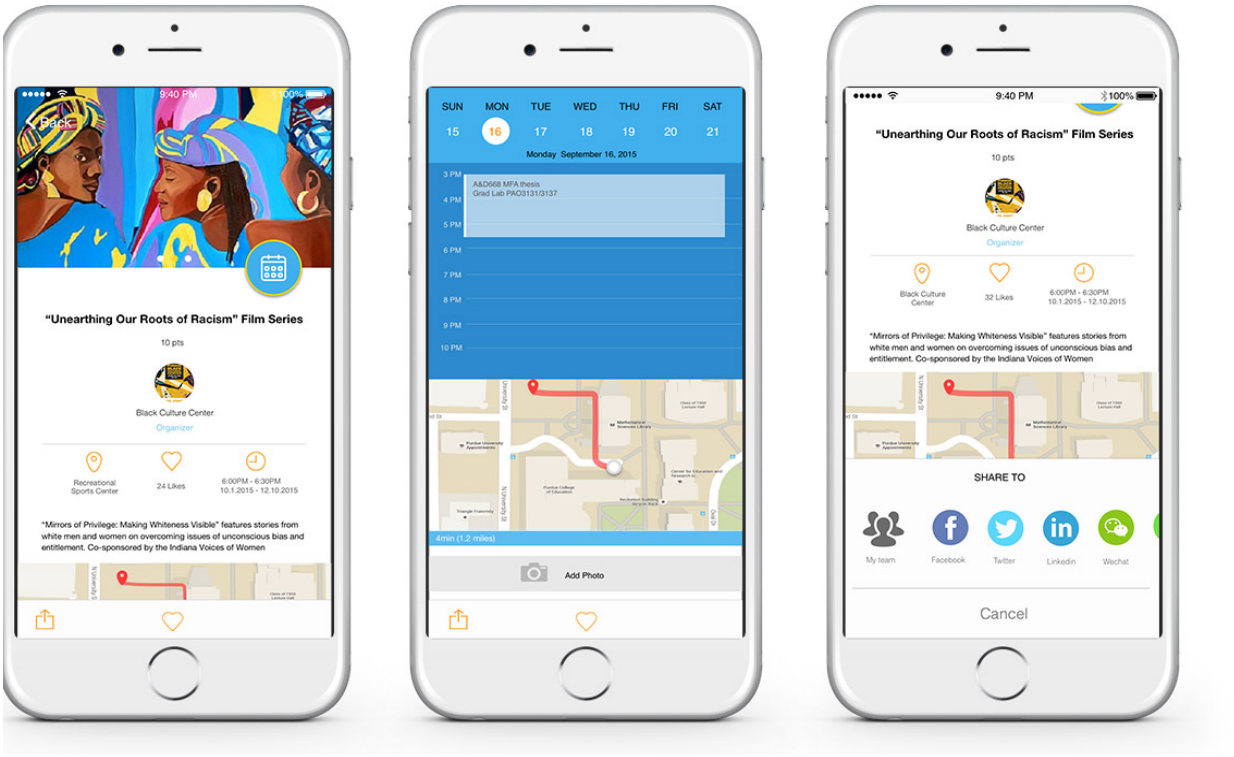

Figure 39. Check availability and "share to" function

For the user who doesn't have the time or attention to read much, a graphic visual representation of information is the best way to present complex information quickly and clearly. A ring-shaped pie chart was designed to present diverse information, such as: the number of team members, which country they come from, individual contributions for each month, and team total points for the current month. To develop the graph, a timeline was added in the bottom of the graphs so that user can recognize trends in team contribution based upon the date and dragging a white dot back and forth (Figure 40). The second screen illustrates the team rankings. I believe that this

competition component will encourage users' participation. Additionally, in order to make communication among team members more convenient, I designed a function called chat room. This could also be considered as a social network platform that gives team members a chance to share their personalities and establish friendships.

Figure 40. Use infographic to present team contribution

Figure 41 demonstrates the features that improve user satisfaction. This feature allows users to redeem their points for rewards that can actually benefit from. The purpose of providing rewards is to motivate them to routinely use the application.

Therefore, the rewards should meet the demands that users really need, such as: housing, dinning, transportation, communication, and entertainment, etc. Once users click on the reward option they wish to redeem, the system will automatically generate a QR code as a confirmation. Also, a confirmation email will simultaneously be sent to their Purdue email. Users will show the relevant businesses QR code on the phone or print it out. Each reward can only be used once; after that, it will be marked as “used.”

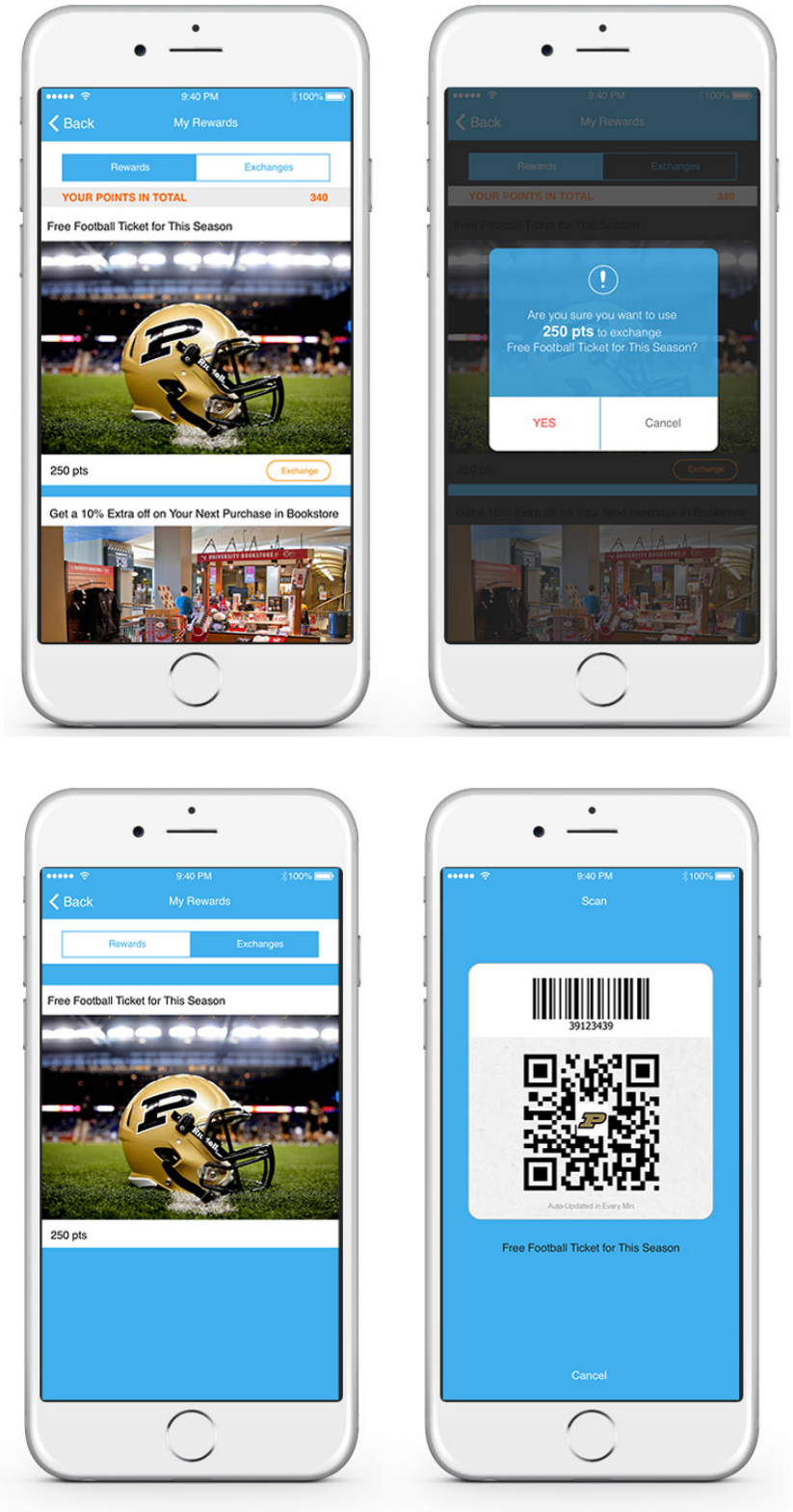

Figure 41. Exchange rewards interface

In summary, this chapter aims to fully communicate the interaction of the design, a prototype was created in InVision (Nadel, Valberg, 2011), of an online platform that transformed the app design into clickable, interactive prototypes and mockups for usability testing. Although some of the links between the pages were not quite complete, the full system showcased the main features users could interact with. Thus, the next chapter will mainly focus on how to conduct evaluations for the design outcome, and redesign suggestions based on the evaluation results.

5.6 Evaluation

To conduct the user usage evaluation study upon of Explore app, a total of 5 internal peers who have at least two years' experience with the IOS user interface design were invited to test and evaluate the app designs in the first round. All shave training experience carrying out heuristic evaluations (Table 2). For this evaluation stage, the focus was on the interface design and page navigation. I chose to adopt Nielsen's heuristics principle as my evaluation standard. The heuristics are: "visibility of system status, match between system and the real world, use control and freedom, consistency and standards, error prevention, flexibility and efficiency of use, aesthetic and minimalist design, help user recognize, diagnose, and recover from errors, help and documentation." (Nielsen, 1994). Each peer viewed and progressed through the printed interface and evaluated the characteristics based on the heuristic principles. A severity rankings scale

from 0 to 5 determined the severity of each interface compared to the principles above (The evaluation form is attached as Appendix A).

Table 2. Information from the evaluators

EVALUATORS	BACKGROUND	DURATION	PLACE	列1
Evaluator #1 YM	3 years expereinced interaction designer	31 mins	Purdue University	
Evaluator #2 WL	3 years expereinced interaction designer	35 mins	Purdue University	
Evaluator #3 JZ	4 years experienced graphic designer	25 mins	Purdue University	
Evaluator #4 HC	UX design expert and data visualization designer	40 mins	Purdue University	
Evaluator #5 KH	2 years expereinced interaction designer	45 mins	Purdue University	

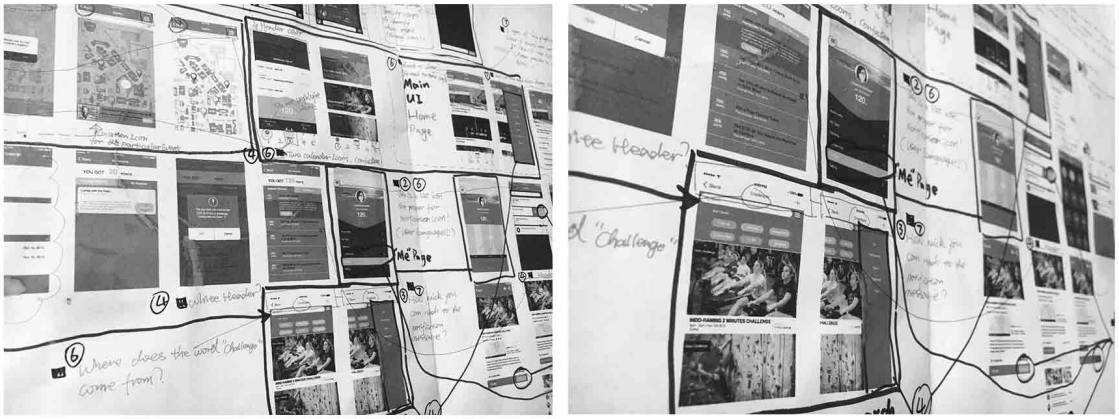

Figure 42. Heuristic evaluation of interface design

After finishing the evaluation, a total of five evaluation forms with comments and suggestions were returned to me within one week. Both quantitative and qualitative data were collected, including: severity rating scale chart, comments on each heuristic,

and other problems or spotlights they found, and design suggestions based on their expertise.

Based on the evaluation results, the data gathered from this round of study brought to my attention existing problems and helped me to develop and refine the design for second round testing. On the other hand, quantitative data analysis was conducted with calculating ratings that were assigned to each heuristics. The graph below shows the 10 problems identified by the evaluators and the number of evaluators that identified the problem.

		Hard to find problems							Easy to find problems		
					PROBLEM NUMBERS						
		8	9	10	7	5	2	1	6	3	4	
EVALUATOR #												
Evaluators finding	YM				■		■	■	■	■	■	6
Fewer problems	WL		■	■		■	■		■	■	■	7
	HC	■		■	■			■	■	■	■	7
Evaluators finding	JZ		■			■		■		■	■	5
More problems	KH				■	■	■	■	■	■	■	7
		1	2	2	3	3	3	4	4	5	5	
				(#Evaluators finding each problem)								

Figure 43. Problem matrix for Explore app design from five evaluators (YM, WL,HC,JZ,KH)

Table 3. Severity Ranking of Interface Design Problems

5	Problem 4	Lack of consistency on color usage and icon usage.
5	Problem 3	Couldn’t find a “cancel” or “quit” option for the challenges.
4	Problem 6	The relationships between interfaces are not clear enough.
4	Problem 1	Navigation issues to the explore page, doesn't have the option to review the challenge have been finished or on going.
3	Problem 2	Confused about some color and icon usage.
3	Problem 5	Lack of instruction tutorial and confirmation reminders.
3	Problem 7	Some pages don’t have shortcut access to the main menu.
2	Problem 10	Confused about some button functions.
2	Problem 9	Lack of pages of notification/confirmation somehow.
1	Problem 8	Content is too long and too small to read

After the design refinement was done, the interfaces were sliced and put into the InVision online platform to generate an interactive prototype for a second round of usability testing. This consisted of a similar format but with refined details and easy-to-use navigation links. The usability tests were conducted with a typical usability test environment (Figure 44). The setting was controlled, and there were no external

interruptions during the testing. The tests were recorded with video cameras and note taking. At the beginning of the tests, the users were given a brief introduction of the mobile app and the tasks involved. During the testing, the users were encouraged to think aloud so that I could write down their feelings about the feasibility of app usage. Three users, 22 to 25 years old, participated the evaluation; all were international students at Purdue University.

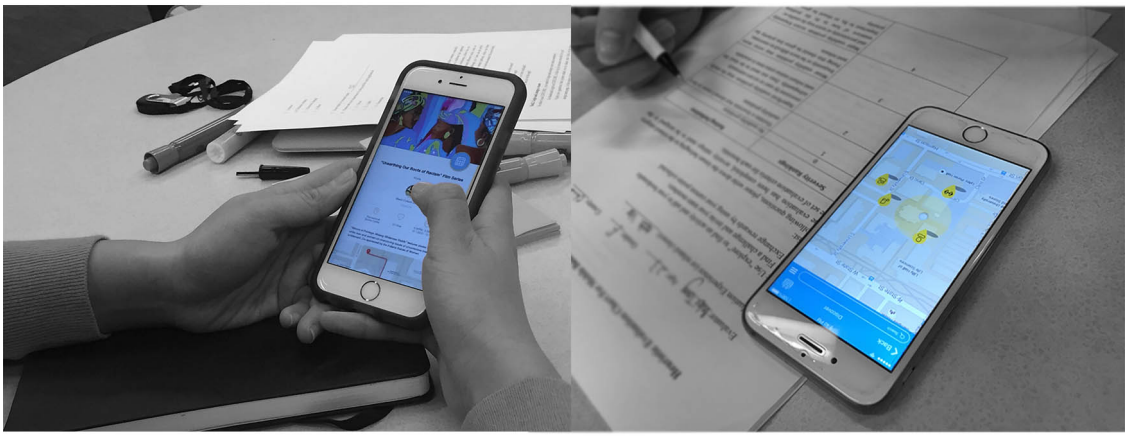

Figure 44. Usability testing

Users performed 5 tasks during the test. The tasks were designed to be easy and the goal was to acquaint users with the Explore app. The tasks are as listed below (a more detailed usability testing form is attached as Appendix B):

1. Initial impression
2. Login and receive a team
3. Find an on-campus activity

4. View my profile
5. Get scores and redeem rewards

5.7 Findings and Redesign Direction

An identical set of 30 usability findings were gathered, including the usability problems identified during the tests, and some usage problems from the user performance. The number marked for each problem represents how many times the problem was mentioned. Eight of the problems occurred more than once during the tastings. The eighteen usability problems are listed below and their frequency is also presented. The first ten problems in the list are considered as more critical, and regard the issues that prevented users to continue the tasks. Problems eleven to fourteen were severe problems that caused clear problems to users while completing the tasks. In addition, the last four were recognition problems causing recognition problems when using app for the first time.

1. Unclear whether the personal contact information, like phone number, email address, or social networking account could be reached or not. (1)
2. Difficulties finding the topic category when looking for something different. (1)
3. Unclear on the difference between “activity” page and “moments” page. (1)

4. Confused about the category relationship between activity and challenge. Will the challenge category be changed as well once it is changed on the activity page? (1)
5. Same as in calendar and map-based search, once changed the category preference, whether other category will be automatically changed as well. (1)
6. Don't understand what "featured" means in challenge category. (1)
7. Confused about the level difference among the challenges. (1)
8. Unclear step to register a challenge, and don't have next page to access when clicked on "register." (1)
9. Too many steps if want to share one activity to other outside social platform. (1)
10. Does not explain clearly what's the reward for being the first three teams on team rankings, what's the punishment for being the last three teams. (1)
11. Cannot modify the interests after navigating to the homepage. (2)
12. Difficulties in going back to the homepage once the daily schedule window was popped up. (2)
13. Unclear on how does the points work. Why are some activities are less valued and others valued more? (2)
14. Don't provide the function to search rewards by types. (2)
15. Unclear where to find saved events, no instruction. (3)

16. Difficulties in recognizing what icons stand for on the map interface. (3)
17. Unclear whether the event will be saved and where to find it after clicking on the “like” button on event page. (3)
18. Unclear on how the points distribute to team members, evenly or hierarchically by each contribution? (3)

The following design suggestions, derived from the problems that occurred during the usability testing, are provided to develop future design for user experience, and successfully apply this application in practical usage.

(a) Keep the user interface as clear as possible. Some of the features, like searching and filter, could create a too complex and confused interface, which directly influenced user experience.

(b) Provide clues or hint for each step. Quite a few problems mentioned had to do with unclear feedback or which action was next. To fix that, the feedback for each step should be more obvious, with animated instructions or highlighted arrows so that draw users’ attention.

(c) Provide instructions for the first time users. Many features, such as “my points,” “my rewards,” and “team rankings” were unfamiliar to users. Instead of letting the users fly by the seats of their pants, designing instructions could reduce the possibility that users might give up on the app altogether.

(d) Using proper terms for featured function. The neglect of using proper terms will directly affect user experience of the app, which then leads to a communication barrier. For example: one user mentioned that she didn't understand what does "featured challenge" means.

(e) Establish more motivations for users' involvement. Some users mentioned that expect more fun functions, competition, and games in the app. For the existing feature, one suggestion is to have rewards for the first three teams on the team rankings and have punishments for the last three teams.

On the other hand, a system scale form (Table 4) was given to the users to rate each of the statements based on their experience of the Explore app (attached as Appendix B). The scale is from 1 to 5: 1 stands for strong disagree, while 5 stands for strong agree. The usability scale results are shown in Table 4 below. Overall, the responses from three users were positive. These users expressed their expectations of the app and were looking forward to use it in the future. In terms of the function, they responded positively to how the various functions were well integrated. The results presented in this section apply to the Explore app testing to identify usability problems and user demand to better serve user experience development.

Table 4. System scale result form

	User #1	User #2	User #3
1. I think that I would like to use Explore frequently.	5	4	5
2. I found Explore unnecessarily complex.	4	3	3
3. I thought Explore was easy to use.	4	4	5
4. I think that I would need the support of a technical person to be able to use Explore.	1	2	1
5. I found the various functions in Explore were well integrated.	4	3	4
6. I would imagine that most people would learn to use Explore very quickly.	5	5	5
7. I found Explore very cumbersome to use.	1	1	1
8. I felt very confident using Explore.	5	3	4
9. I needed to learn a lot of things before I could get going with Explore.	1	1	2

5.8 Reflection

This section builds how the design of reflection meets users' requirements by showing them as findings and evaluation of the design work. Besides, those reflections also have reference value for future works.

A general objective of this thesis and the design project was to enhance campus experience for Purdue international students, as a goal to achieve it through design. The following chart explains how the design solutions reflect on user requirements by point

following chart explains how the design solutions reflect on user requirements by point listing (Table 5).

Table 5. Design reflection chart

User Requirements	Solutions
1. User should be able to easily use the application on campus.	• User allow to log in with their Purdue account. • System will automatically generate information based on users' background.
2. User should gain a sense of identify and motivation when using the application.	• System should be able to assign team members based on the information provided. • Recommend relative organizations and associations.
3. The information provided by the application should contain four perspectives: socialization, acculturation, education achievement, and cultural patterns.	• Socialization can be reflected in activity and challenge function. • Acculturation can be reflected by providing a diverse cultural team opportunity • Education achievement can be reflected in some of the activities in terms of lectures, workshops, career fair, etc. • Cultural patterns can be reflected by designing a daily routine for the users.
4. The application should help users to develop more social contact with domestic students.	• A challenge feature encourage users to get to know domestic students in person by participating different kinds of challenges. • Always assign at least one domestic student by teams.
5. User should be able to increase their participation in physical activity.	• A challenge feature allows users to participate in physical activities as a team or individually. • User will receive certain points after finish challenges.
6. The application should be a platform that delivers useful information to international students.	• System provides a list of related activities based on user's current location, interests, or calendar. • A customized category is generated based on users' interests.
7. The application should maintain users' interest and brand loyalty.	• Team chat room gives team members a chance to share their personalities and establish friendships. • Redeem points for rewards

One of the most important features is providing a social networking platform for international students through interaction design. Many of the solutions I came up with contain those four perspectives: socialization, acculturation, education achievement, and cultural patterns. Some of them are well developed such as a challenge feature

encourage international students to get to know domestic students in person by participating challenges in group; team chart room gives team members a chance to share their personalities and establish friendships. A possible shortcoming of the design outcomes in terms of the activity range because running multiple activities and challenges in the system can be seen as a huge project. Developing a perfect fully functional system need to be user-friendly, which also require a large amount of facilitators and developers to ensure the system development. Possibly further looking towards building automated process, which could have provided automatic identification, automatic approving system. So in that way, this project design makes to reduce the labor cost, and enhance benefit of the app to a certain extent,

CHAPTER 6. CONCLUSION

This study has practical value for international students who pursue studying at North American universities. The objective is to enhance their campus experience by providing an integrated design solution. The thesis topic was inspired by my personal experience as an international student at Purdue University. Most of us experienced adjustment difficulties due to a lack of awareness of cultural difference, social rules, and other challenges. As an interaction designer, I have a strong sense of delivering value to users by first understanding their needs. To confirm these findings, a literature review built the background knowledge of the research problem from two perspectives: social justification and conceptual justification. Given the potential benefits of the interaction between international students and domestic students, a mixed research approach was conducted to collect both qualitative data and quantitative data to gain a deeper understanding of international students' needs and expectations. The data analysis demonstrated that challenges existed among international students pertaining to socialization, acculturation, educational achievement, and cultural patterns.

By helping international students to fit in well into the academic and social

culture of the North American campus experience, the design solution should be aimed at increasing users' awareness of how cultural difference can be integrated into social activities, and how to meet international students' specified needs by providing various customized functions, in order to help them build their self-confidence and achievement for future success. Finally, given how mobile apps have begun shaping the way we live, I hope this user study result and the design solution can effectively benefit international students by creating a better user experience that motivates them to participate in North American campus life.

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APPENDICES

Appendix A: Heuristic Evaluation Chart For Mobile Based Application Design

Evaluator:_____ Age:_____ Gender:___ Country:____

Evaluation Experience (or related classes):_____

Task1: Use “explore” to find an activity and add to your bookmarks.

Task2: Find a challenge and invite your team members.

Task3: Exchange rewards by using your current points collected.

Checklist:

In the following questions, please write down the issues belonging to the related category. After the evaluation has been completed, severity ratings need to be assigned to the complete set of evaluation criteria for each heuristic.

Referred to Jakob Nielsen’s Severity Ratings for Usability Problems:

Severity Rankings	Rating Definition
0	No usability problem
1	Violates a heuristic but doesn’t seem to be a usability problem.

2	Superficial usability problem: may be easily overcome by user or occurs extremely infrequently. Does not need to be fixed for next release unless extra time is available.
3	Minor usability problem: may occur more frequently or be more difficult to overcome. Fixing this should be given low priority for next release.
4	Major usability problem: occurs frequently and persistently or users may be unable or unaware of how to fix the problem. Important to fix, so should be given high priority.
5	Usability catastrophe: Seriously impairs use of product and cannot be overcome by users. Imperative to fix this before product can be released.

Referred to Jakob Nielsen's 10 Usability Heuristics:

#	Review Checklist	Severity Ranking	Comments
1	Visibility of system status 1： The system should always keep you informed about what is going on.		
	Visibility of system status 2：The system should always give you appropriate feedback within reasonable time.		
2	Match between system and the real		

	world： The system should speak the users' language, with words, phrases and concepts familiar to the user, rather than system-oriented terms.		
3	User control and freedom： Users often choose system functions by mistake and will need a clearly marked "emergency exit" to leave the unwanted state without having to go through an extended dialogue. Support undo and redo.		
	Do you have any learnability problem (language, understanding)		
4	Consistency and standards： Users should not have to wonder whether different words, situations, or actions mean the same thing. Follow platform conventions.		
5	Error prevention： Even better than good error messages is a careful design, which prevents a problem from occurring in the first place. Either eliminates error-prone conditions or check for them and present users with a confirmation option before they commit to the action.		
6	Recognition rather than recall： Minimize the user's memory load by making objects, actions, and options visible. The user should not have to remember information from one part of the dialogue to another.		
7	Flexibility and efficiency of use： Accelerators -- unseen by the novice user -- may often speed up the interaction for the expert user such that the system can		

	cater to both inexperienced and experienced users. Allow users to tailor frequent actions.		
8	Aesthetic and minimalist design : Dialogues should not contain information, which is irrelevant or rarely needed.		
9	Help users recognize, diagnose, and recover from errors : Error messages should be expressed in plain language (no codes), precisely indicate the problem, and constructively suggest a solution.		
10	Help and documentation : Any such information should be easy to search, focused on the user's task, list concrete steps to be carried out, and not be too large.		

Appendix B: Usability Testing Script

Introduction

Thank you for your willingness to participate in this evaluation on improving EXPLORE. The goal for this session is to gather information about how students use the app so I can improve the experience for potential users.

This test is not intended as a test of your personal ability. I want to understand how you like the app design and how it can be improved. The entire session will require around half an hour without interruptions. Please refrain from using your cellphone during the test.

During the test you will be given a set of tasks to perform on the pre-setting iPhone 6s, with a scenario to explain why you are doing these tasks. As you work, feel free to perform whatever actions you think are appropriate. Also feel free to talk about anything you encounter (we call it “think aloud”), especially any problems you have during the tasks. Let us know your questions or comments at any time.

I may record the test session with your permission. Please note that any information I collected in the test will be anonymous and aggregated. Therefore, you and your response will not be identifiable from our results.

Before we begin, please read and sign the consent form.

Demographic Survey

Please take a few minutes to answer the following questions to help me understand your background. No information from this survey will be linked to you in any way.

Participant Number: _____

1. Your age: _____

2. Your gender: [ ] Female [ ] Male
3. Your nationality: _____
4. Please indicate which year you are currently in as a student at Purdue University:

   [ ] Freshman

   [ ] Sophomore

   [ ] Junior

   [ ] Senior

   [ ] Master student

   [ ] Doctoral student

   [ ] Other

5. Your major or research area: _____
6. Please rate your experience of using mobile based application

   [ ] 1 - Never

   [ ] 2 - Little

   [ ] 3 - Somewhat

   [ ] 4 - Much

   [ ] 5 – A Great Deal

Test Instruction

EXPLORE is a mobile-based application that Qiaoying designed for Purdue students, especially for new international students to use daily on campus. It serves as a platform that gathered different kinds of events on campus, such as on campus activities, workshops, culture fest, etc. Also combined a campus based challenge feature, which contained different topics, such as physical activity, academic achievement, and culture related challenges, etc. Users can get points and rewards by using this app. The goal is to build an on campus platform, which can help international students to be more socialized and integrate into American campus life more freely.

Task 1. Initial Impression

Assume this is your first time of using EXPLORE

- Can you tell me the first thing you noticed on the screen?
- What are your initial impressions of the app?
- What are the buttons or texts that you feel confused?
- What are the things you can do in this app?

Task2: Login and assign a team

In order to use EXPLORE, you need to login and assign your team members.

- Go ahead and login on EXPLORE. Is the log in process smooth for you?
- Finish two questions that system asked you to select and click on the button on the assign team page. Is the assign a team process smooth for you?

Task 3. Find an on campus activity

Now that you have logged in, imagine you want to find a campus activity you are interested.

- You are walking on the campus and planning to do something interesting, go to activity page and go through all the updated activities on campus.
- You want to search the activity that you are interested in, go to filter page and select one category.
- Once you find one activity that you interested, is it easy to go though the activity information? Is the information clear enough for you (date, location, etc.)?
- Do you think the activity category covers all the activities on the campus?

Task 4. View your profile

Find your profile and view it.

- Do you understand all the information?
- How many score do you have?
- Can you figure out how to exchange those score to rewards?
- Do you know where to see the notification if someone send you a challenge invitation?

Task 5. Get scores and exchange rewards

Imagine you participated an activity and now need to get your score from the event host.

- Show your digital QR code to the stuff member, she/he will scan the code by scanner, in the meantime, you will get certain score in your record. Is the scan process sooth for you?
- Once you get score, can you easily navigate to the current score status and

check your current score in total?

- Do you have difficulty to figure out how to exchange your current score to rewards?

Final Questionnaire

Open Questions

- What is your overall experience of the EXPLORE app design? Do you have any other comments or suggestions?
- Could you imagine the potential demand using EXPLORE on campus? Why or why not?
- Are there things you wish EXPLORE could do that it doesn't do currently?

System Usability Scale

Please complete the System Usability Scale (SUS) questionnaire as a measure of your overall experience of EXPLORE app design.

Referred to Sauro's Mesuring Usability with the System Usability Scale (SUS):

System Usability Scale					
Please rate each statement based on your experience of EXPLORE					
	Strong Disagree 1	2	3	4	Strong Agree 5
1. I think that I would like to use EXPLORE frequently.					
2. I found EXPLORE unnecessarily complex.					
3. I thought EXPLORE was easy to use.					
4. I think that I would need the					

support of a technical person to be able to use EXPLORE.					
5. I found the various functions in EXPLORE were well integrated.					
6. I would imagine that most people would learn to use EXPLORE very quickly.					
7. I would imagine that most people would learn to use EXPLORE very quickly.					
8. I found EXPLORE very cumbersome to use.					
9. I felt very confident using EXPLORE.					
10. I needed to learn a lot of things before I could get going with EXPLORE.					