

Engage Gamification into Campus Counseling for International Students

A User Research for A Service Design

by

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ABSTRACT

In recent years, with the increase in the number of students studying abroad, the psychological problems of international students have attracted more and more attention. At the same time, due to the stigma and stereotypes of mental illness, international students have encountered difficulties in using campus psychological counseling services of overseas universities. Gamification is a concept that applies the elements of games to non-gaming fields. It is being widely used in various fields. This study aims to conduct a user research for designing a better experience and service design for international students using campus psychological counseling by using gamification. The study was conducted using an extensive literature review as well as quantitative and qualitative research methods including a focus group, an online survey, and an interview to explore the main sources of pressure for international students and their perception on campus counseling service. Furthermore, this study tried to explore the feasibility of online services and how gamification be applied to the services. The results showed that international students have been reported to have psychological pressure on some special issues, and few international students used campus counseling. International students who have used campus psychological counseling services also expressed their dissatisfaction with campus psychological counseling. Additionally, the study showed the feasibility of online services and the acceptance of core drives of gamification. The conclusion can be summarized as a user research for future service design in the campus counseling system, which includes expected functions and some gamified ways of online services. Because the results showed that online services cannot replace face-to-face consulting services, how to combine online and offline services and how to let gamification reach its full potential will be further discussed.

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CHAPTER 1 INTRODUCTION

1.0.0 Introduction

In recent years, the mental health of young people has increasingly attracted people's attention and become an important public health problem in society. Students leave their hometown and family to go overseas to get an education when their mental state is unstable. They not only need to learn to get accustomed to life, but also learn to balance the pressure from life, study, and interpersonal relationships. In addition, this generation of young people grow up along with the Internet, they are suffering from the anxiety of social networks, but at the same time they can learn and accept new things quickly.

The study aimed to explore the relationship between the pressure of international students, the impact of human-computer interaction design, and depressive symptoms in order to provide a better human-computer interaction experience for people with mental health problems, so that better coping strategies for depression can be proposed in the future.

1.0.1 International Students

As globalization makes people more willing to move, more and more students choose to study outside their own country. For public health professionals and school counselors, it is an important health issue for overseas students to successfully adapt

to changes in their lives, meet academic requirements and maintain emotional health. Students from other countries face a completely different living environment, education system and culture when they study abroad. Therefore, it is difficult for them to adjust their thinking style and daily life, the stress response of the curriculum, and interpersonal relationships. Several sources of stress encountered by overseas students include cultural, environmental, interpersonal, emotional and academic adaptation difficulties. For international students, there are often adaptation problems associated with lifestyle, mental health and financial hardship. Among the students studying abroad, nostalgia, fear of failure, frustration and loneliness are the most frequently reported problems. Given the mild depression and fear of failure, it is still necessary to understand the full extent and causes of psychological barriers among young overseas students. (Chou et al, 2011)

1.0.2 Depression

With the rapid development of the social economy, competition has become stronger and the interpersonal relationship has become more and more complicated.

Adolescence and early adulthood are periods in which many changes occur in life, such as leaving home, going to college, or finding a new job. For many people, this is an exciting time. However, they may also be moments of stress and fear. In some cases, these stresses and fears can cause mental illness if not well understood and managed. Whether it is mental illness or psychological disorder or depression tendency, there is a tendency to expand and aggravate among young people. A recent

trend which researchers often find is that people with depression are getting younger and younger.

As a social group with high intelligence and pursuit, students are more vulnerable to depression in the new education system and employment situation. The World Health Organization (2017) has pointed out that a quarter of Chinese college students have admitted to having symptoms of depression. Academic, interpersonal, love, family, and employment pressures may become predisposing factors for college students' depression. Among them, international students are a more special group. They have the choices and distress of personal development, academic achievement, interpersonal relationship, etc., which are faced by college students at this special age, and they must also face the loneliness of a person in a foreign country. Problems such as cultural conflicts, language barriers, huge tuition fees and academic pressures, all of which inevitably translate into their enormous psychological pressure.

1.0.3 Design

The study is aimed at young people, and now the main group is called the Gen Z. A broad range of information is accessible to the general public conveniently and can be accessed through a variety of digital products and platforms (Barlow et al., 2005). Because of this, Individuals can also learn about their own condition and initiate self-directed behavioral improvements to improve and strengthen mental and emotional stability, health promotion and prevention approaches and engage in therapy activities

without engaging a health care provider directly in a face-to-face environment (Wilson, 2017).

Good user experience design and ergonomics play a key role here. How to help young people with depression through good interaction is the main purpose of this research. It will discuss several aspects of user experience design, including the visual effects of interfaces, the impact of interactions, gamification and more. This study will understand the user's needs through some research methods to generate design principles about user experience.

1.1.0 Justification

According to the World Health Organization report (2017), half of the mental illnesses began at the age of 14, but most cases were not detected and treated. Depression is the third leading cause of adolescents' disease burden, especially when depression persists to a moderate or severe level, which can cause serious health problems: patients of depression suffer profoundly, and their work, study, and family functions are also affected. Damage, more and more examples of school dropouts or even dropouts due to depression in recent years. In extreme cases, depression can lead to suicide. Suicide kills nearly 800,000 people every year and has become the second leading cause of death in individuals between the ages of 15 and 29.

The World Health Organization (2017) defines depression as “a common mental disorder, characterized by sadness, loss of interest or pleasure, feelings of guilt or low self-worth, disturbed sleep or appetite, feelings of tiredness, and poor concentration.”

What is worrying is that for depression, whether it is the patient or the public opinion, there are still many prejudices. Students and even their parents will have a “shame of sickness”, and some even seriously refuse to seek professional help. Appropriate treatment of depression is the key to the treatment of depression. Depressed patients are unwilling to go to the hospital because of the presence of depression and social discrimination that follows.

Depression is a curable disease, which is the same as many physical illnesses. It can be rehabilitated by effective and timely treatment, and it can be aggravated by our fear and delay. In the process of treatment, drugs are needed, as well as care and companionship. It is also important for people around them to understand and treat them correctly. Active treatment of depression is not only good for the individual, but also has a significant improvement in the economic burden on society.

Furthermore, depression may be long-lasting or chronic, thus impairing the capacity of individuals to operate at work or school, or to cope with everyday life. Diagnosis and treatment may be performed effectively by non-specialists as part of primary health care, and when diagnosed as mild, people may be treated without medications, but when depression is moderate or serious, diagnosed individuals can require professional supervision and medication use (WHO, 2017).

Depression therapies approaches are various. For example, antidepressants may be an effective type of therapy for moderate-severe depression, but when the cases are of mild depression, they are not the first line of treatment. Antidepressants should not be used as a first-line therapy for children and adolescents (in this case, cautiously using antidepressants (WHO, 2017)). Experts recommend that friends and relatives be involved in the treatment of people suffering from depression, in addition to using medications.

However, treatment by psychological counseling is a commonly accepted form of therapy, and psychological counseling centers have been developed in many universities in the USA. There are many types of psychological counseling, and the most mainstream approaches include psychoanalysis therapy, cognitive behavior therapy, and humanistic therapy. Among them, cognitive behavior is a widely used approach in university psychological counseling center, and it has been proven to be useful for a series of problems such as depression, anxiety, and other psychological diseases.

International students are far away from their families and their original friends, so it's hard for them to get support from others when they have mental health problems. Listed below are the various pressures and problems that students studying abroad can encounter:

- a. Abrupt changes in the environment
- b. Being away from the original friends and family
- c. Cultural conflict
- d. Heavy learning tasks
- e. Employment challenge

- f. Economic pressure
- g. Safety pressure

According to the concept “Gen Z” proposed by Sparks & Honey (2014), the current college students are born in 1998 and after, they know the world could change in an instant. Most of them are tethered to their screens and forty two percent of teens say they don’t intend to cut back on their online time anytime soon.

In New York, psychologist Dr. Suzanne Lachmann is seeing digital stress in some of the teens she treats in her practice. “Being constantly connected is cultivating a level of anxiety – you have to be accountable to someone or something that isn’t actually there in your space. If they don’t immediately respond, their world falls apart,” Dr. Lachmann said.

Generation Z grew up in a period of full digitalisation. They rely on the internet and they are accustomed to finding solutions to problems on the web alone. Spark and Honey (2014) said “In an instant everything existence, tomorrow’s grown-ups will have to find new ways of coping; digital detox will become their new therapy. If it doesn’t work, Gen Z will find a way to fix it.”

In a traditional way, Clinical depression is diagnosed by an patient through a structured or semi-structured interview administered by a professional clinician. Besides standardized interviews, some self-report rating scales are often used for assessing the severity of depressive symptoms. Examples include the Beck Depression Inventory-II (BDI-II; Beck et al., 1961), the Center for Epidemiologic

Studies Depression Scale (CES-D; Radloff, 1977), and the Patient Health Questionnaire-9 (PHQ-9; Kroenke et al., 2001). Generally speaking, these measures are not intended to be used as diagnostic devices, but are typically used in a) research settings to evaluate the extent of depressive symptoms in a group of participants; b) clinical settings to test and classify individuals at risk of depression; and c) clinical settings for individuals who have already been diagnosed with depression to monitor depression; Both measures vary in their ability to measure the various symptoms associated with depression, and the duration of the symptoms (Sharp and Lipsky, 2002).

Traditional methods remain the mainstream method of diagnosis and treatment of depression, but for a new generation of young people, they may be more inclined to self-diagnose and self-report on the Internet. With the easy availability of health information online, people can now completely bypass medical practitioners and find information, guidance, help and even treatments on the Internet (e.g., pharmaceuticals, herbal remedies) (Bass, 2003).

Online digital interventions and mobile applications for support, collaborative care, and treatment are utilized increasingly and successfully for mental health advantages (Andersson et al. 2014). In order to optimize this method of diagnosis, the researcher should understand how the person interacts with digitally provided treatment programs and the particular barriers people with mental illness encounter within the digital setting.

E-mental health services may support and encourage an outlet for individuals to engage with the care on their own, either in the form of self-help or as direct therapy. Without the limitation of face-to-face contact with a mental health clinician, individuals are encouraged to learn about their own condition and to implement self-directed behavioral improvements to develop and strengthen mental and emotional tolerance, health promotion and prevention approaches, and to participate in specific therapies designed to minimize their personal experience of distress or discomfort (Wilson 2017).

In terms of human-computer interaction (HCI), there are many effective, interesting and safe ways to be applied. In order to increase the probability of users adhering to resources or services, the borrowing of design features and methods from the games world, traditionally known as gamification or gameful design, has become increasingly common in the past decade (Johnson, 2016). Gamification is “the use of game design elements in non-game contexts” to make systems or processes “more fun and engaging”.

Gamification is the use of gameful elements for the purposes of nongame. Although the word was often used interchangeably (Seaborn, 2015) with the closely related category of serious games (video games created for a primary purpose other than player enjoyment(Michael,2005)), all principles are examples of functional games involving the application of real world design concepts and qualities. Gamification has attracted significant attention from the health research community, despite being a fairly recent example of interactive gaming, for its ability to improve engagement with health initiatives and inspire behavioral change (Cugelman, 2013).

Gamification has been applied in many fields such as education and management, and it has often been proven to be effective, and there are many examples of applying it to mental health currently.

For example, a game project called SPARX based on a type of psychological therapy called “Cognitive Behavior Therapy” (CBT). The game guide users to learn how to deal with negative thoughts and emotions in the fun and easy way. This project has been proved to be effective as a standard care for teenagers who want to seek help for depression.



Figure 1.0 SPARX

Another example is Depression Quest, which is an immersive game of fiction where users play as someone who has depression. The users are given a set of events in their daily life and they need to learn how to try and control their disease, relationships, work and future care. However, there are some negative comments in the review of this game, including that it will make depression patients feel more depressed, and a lot of text reading makes people tired.

There are also non-gaming mobile applications that use gamification. Like Peak, an app for brain training. It helps users to train their cognitive skills to enhance their abilities of self-management. This application also uses gamified elements to allow users to exercise their brains unconsciously while playing games, which is also based on a lot of research on the relationship between game and mental health.

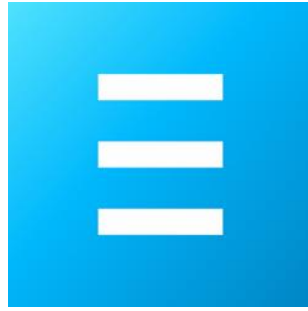


Figure 2.0 Peak

Given that there are now many gamified applications of mental health, its feasibility has been proven by many studies. However, the seriousness of depression itself is difficult to combine with notions of gamification because people with mental health problems may turn a blind eye to some features of the gamification itself that requires self-reporting and self-management. Gamification may not increase people participation- unless specific elements of gamification, such as social comparison and progress feedback, are also present in other behavior modification mechanisms such as the creation of persuasion structures (Oinas-Kukkonen& Harjumaa, 2009) in order to avoid the identification of false positives.

1.2.0 Scope & Limitations

In this study, helping to establish a user-friendly and easy-to-use system to provide self-management intervention for young people with mental health issues is the goal of this research. The research will study the pressure source of international students focusing on the Gen Z thinking characteristics of this age group. Social media and the Internet have an impact on them, but these won't be the focus of this study. The pathological causes of depression itself will not be discussed, because this is not a thesis for the Master of Psychology degree, but existing diagnoses and treatments will

be studied to consider their feasibility in digital implementation. In terms of user experience, this research will focus more on finding interesting and effective ways, such as better human-computer interaction and gamification for mental health. The visual effects of the websites and the applications as part of the user experience will be mentioned in this study but will not be the focus of this research.

The main research objective is to help international students everywhere, however, most of the students who have been investigated are in North America. Foreign students studying in different countries face different problems and it is acknowledged that geographical differences may bring different research results. Additionally, psychological topics such as depression were often not disclosed, which impacted the interviews and investigations by the researcher although the recruitment field emphasized the ensurance of respondents' privacy.

1.3.0 Glossary or Definitions

HCI: short for "Human-computer interaction". A multidisciplinary field of study focusing on the design of computer technology and, in particular, the interaction between humans (users) and computers.

UX: short for "User experience". The overall experience of a person using a product, such as a website or a computer application, particularly in terms of how simple or enjoyable it is to use it.

Depression: A mental illness characterized by a feeling of extreme despondency and dejection, usually with a feeling of inadequacy and remorse, frequently followed by lack of energy and a disruption of appetite and sleep.

Mental Health: The state of a person with respect to their psychological and emotional well-being.

SNSs: short for “Social network service”. An online forum that people use to build social networks or interpersonal relationships with others who share common personal or career interests, hobbies, experiences or real-life connections.

Counseling Service: Counseling is a collaborative activity between the counselor and the client. Registered psychologists help clients identify expectations and possible approaches to emotional turmoil-causing issues.

Cognitive Behavior Therapy (CBT): A type of psychiatric therapy that has been proven to be successful for a number of issues including depression, anxiety disorders, alcohol and substance use issues, marital problems, eating disorders and serious mental illness.

Self-management Interventions (SMIs): Multi-component behavioral approaches that emphasize the control and management of actions and incentives (rewards). Central elements of self-management strategies include: (a) self-observance of a desired behavior; (b) self-recording; and (c) the provision of a reinforcement.

Gen Z: short for “generation Z”. In the second decade of the 21st century, the generation reaching adulthood regarded as having been familiar with the Internet from a very young age.

Gamification: The application of elements of game design and game theory in non-playing contexts. It can also be defined as a collection of activities and processes by using or applying the characteristics of the game elements to solve problems.

1.4.0 Topics That Need to Be Explored in This Research

The research will use review literature, interviews, and surveys to understand what pressure international students have and how they cope with these pressures. Second, the research will discuss the current situation of campus counseling services and potential forms and functions of online medical services. Third, the research will discuss what gamification features can be applied in the service for mental health. A thorough study follows on this topic.

1.4.1 User Experience Design and Service Design

This study will have an insight of participants' feedback on campus counseling services and how they feel about the user experience. The study will discuss an ideal approach to the services including the online service. Because the participants are skilled internet users, they may have higher requirements for the user experience of applications and websites.

1.4.2 Campus Counseling Services and Self-management Interventions

This study will have an insight of how young people with mental health problems seek medical help and how therapists treat them in the campus counseling center.

1.4.3 Pressure in International Students

This study will identify the source of mental pressure for international students and their attitudes and beliefs regarding their mental wellbeing.

1.4.4 Gamification

This study will have an insight of how gamification can be applied in the field of mental health and what gamification features can be applied in the mental health field

CHAPTER 2 LITERATURE REVIEW

2.0.0 Introduction

Mental health has been a widely discussed issue over the years. Depression is a potential threat to health, especially for international students who don't have support from families. Unfamiliar nations and culture, away from existing social networks, the dual pressures of homework and future employment. These factors make international students known as "high-risk groups" of depression. Online digital tools and mobile apps are rapidly and effectively used for mental health services for assistance, collective care, and treatment. (Andersson et al., 2014)

Specifically, the aim of this literature review is to introduce the reader to the three main subjects that will be studied in this research: International students, Mental health and Design. Because there are many areas involved in this research, and some relevant research has been conducted, the researcher is interested to understand a wide range of human experiences above these topics to find a research gap while reviewing the existing literature. It was considered that both qualitative and quantitative sources can answer the research questions. Whitmore and Knafl's (2005) model for integrative review of the literature was followed to guide the review methodology (Whitmore & Knafl 2005).

In this chapter, the researcher will review the conclusions and research results of previous studies along with some quotes from experts. This chapter will be structured as a guide with five relevant topics. The guide will explore why depression in

international students is related to design, and what factors of design can potentially help mental health and counselling. Then in the next topics, the previous research methods and results will be discussed so as to have a more comprehensive and profound understanding of this research.

2.0.1 A Guide to Mental Health

A rising number of foreign graduate students have been enrolled in US higher education in recent years. The number of international graduate students increased by 32 percent from 296,574 to 391,124 between academic year 2010/11 and 2016/17. (Institute of International Education [IIE], 2017). With the globalization of education, many universities regard international students as a very important part of the student community. International students have been seen as beneficiaries of development aid (Barber et al., 1984) in the past, but now they are gradually regarded as a means of income generation of universities (Lee et al. , 2006), a potential source of skilled migration upon completion of studies (Tremblay, 2005) as well as a factor of intellectual capital enhancement for the host country (Chellaraj et al. , 2008). As a result, attracting international students has been an important agenda for many universities.

However, there have been many suicides of international students in the past few years. Although the causes of suicide of international students will vary from individual to individual, there are always some common reasons to follow. One of the most commonly mentioned is stress-induced depression. A survey (Han et al., 2013)

released by researchers at Yale University in 2013 found that 45% of Chinese students at Yale reported symptoms of depression, 29% reported symptoms of anxiety, and only 13% of American college students reported depression and anxiety. Similar input has been obtained from other college surveys including the Australian and British colleges. (Han et al., 2013)

While many students can complete their studies with few struggling, others may encounter different problems. Such students faced financial stress, assistantship, employment, schoolwork, and were in multiple positions (Oswalt & Riddock, 2007), as well as resolving various problems within academics, such as psychological adjustment and social behavioral adjustments to the U.S. academics (Zhou, Frey & Bang, 2011).

As stated in the chapter 1, diagnosis and the treatment of depression may be rendered effectively by non-specialists as part of primary health care, and when diagnosed as mild, people may be treated without medicines, like some counseling including “talk therapy”. When depression is moderate or severe, diagnosed individuals can need medical supervision and medication use (WHO, 2017a). The American University Psychological Counseling Center is the most common student service center, in which have social workers, consultants, and professional psychologists in this institution. Generally, if students feel troubled, they will go to this institution for consultation and make an appointment in advance. However, it is often ignored or refused by international students due to cultural differences and language barriers.

The healthcare domain has seen a rapid increase in self-monitoring and management of health by embracing gamification and dangerous games. Numerous systematic studies have measured their efficacy in facilitating specific improvements in health behavior due to the ability of serious games to inspire, connect, and entertain (Charlier et al., 2015; Lau et al., 2017) and reducing a broad range of disorder-related symptoms (DeSmet et al., 2015).

Web-based technologies have become generally embraced and acknowledged as a cost-effective way of providing typically face-to-face validated and successful evidence-based therapies, such as cognitive behavioral therapy (CBT), to enhance mental health and results of wellness (Andersson & Cuijpers, 2009; Amstadter et al., 2009; Barak et al., 2008; Morrell et al., 2016; Reynolds et al., 2015).

Sebastian Deterding stated that “Gamification is the use of game design elements in non-game contexts” (Deterding, Dixon & Khaled, 2011). This means that instead of making interactive, full-fledged games as in "serious games," gamification is intended to influence the actions and motivation of users through gaming-related interactions (Hamari & Koivisto, 2013).

Gamified e-Health systems provide a way of assisting people with mental health problems and conditions such as anxiety, stress and depression. In addition to increasing knowledge and comprehension of such mental health problems, gamified devices may include cognitive therapy to relieve tension or modify depression and anxiety through showing avatars and, among other things, providing rewards (Dennis & O’Toole, 2014). The paper also describes the different ways in which technology

can be used to assist in the treatment of mental disorders, and the importance of participating in treatment.

The main purpose of researchers using gamification is to increase participation. In addition, there are examples of training users by incorporating cognitive behavioral therapy into the game. However, no review document clearly demonstrates that what features of gamification can effectively improve this goal and is appropriate for people with mental illnesses.

Below is the 1st level conceptual framework. The framework states that the three main themes in this study are “International Students”, “Campus Counseling” and “Mental Health”. “Stress” is related to international students and their mental health. “Online intervention” is a potential way for international students who go to campus counseling. Campus counseling centers arrange therapies for students’ mental health problems. The purpose of this study is to create a better service of campus counseling for international students with mental health problems, and “Design” is the key to reach the purpose, that’s why it’s at the center of this framework.

Conceptual Framework Diagram 1

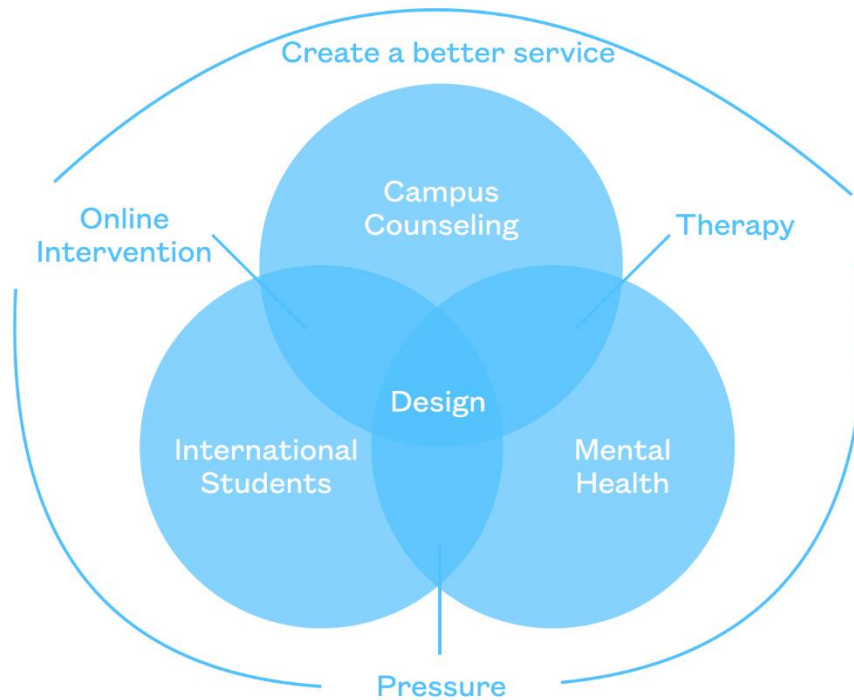


Figure 3.0 Conceptual Framework I.

2.1.0 International Students

International students are described as '... persons temporarily residing in a country other than their country of citizenship to participate as students in international educational exchange.' (Lin & Yi, 1997). All along, coming to the United States to pursue higher education has become the choice of more and more students. Research (Chou et al, 2011) shows that the United States is the most popular country for international students, resulting in the highest number of international students in the United States. These international students contribute to the cultural diversity of the school and the globalization of education. Moving to the United States to obtain a higher education degree has a great impact on their lives, which may be positive or negative.

Based on the research conducted by Sandhu & Asrabadi (1994), international students are a high-risk group who have more psychological problems than their U.S. peers.

2.1.1 Asian International Students

Fang (2013) stated that Asian international students express more stress than others. Asian international students comprised the largest percentage (43 per cent) of foreign students in the United States of all graduate student groups (IIE, 2017). Nevertheless, due to Eastern-Western cultural gaps, they were also the most difficult party to acculturate to US graduate schools (Li, Wang, & Xiao, 2014).

Asian international students include those from China, Japan, North South and South Korea who shared Confucius's ethical philosophy, Buddhism, and traditionally a growing style of writing (Reischauer, 1974). According to the report by Li, Wang and Xiao (2014), “Asian international students are facing a bigger challenge than other international students’ groups when acculturating U.S. culture.”

While Asian students claim that they seek help from American friends and teachers, their primary social help still comes from their parents and other foreign students' peer-based network in the U.S. (Bertram, Poulakis, Elsasser, & Kumar, 2014).

Moreover, because of the various social norms and language problems, encounters with Americans, whether they occurred in everyday life or academic, have been challenging for Asian international students. (Liu, 2009; Mori, 2000). Asian international students, for example, think the friendship with Americans is superficial

because of the individualist belief in American friendship (Ra & Trusty, 2017). Additionally, Liu (2009) stated that “a lack of English proficiency of Asian international students decreased the quality of their communication with Americans.”

Significant differences exist between the education systems of East Asia and the United States, including teaching methods, style analysis, and assessment systems (Xiong & Zhou, 2018). English was the biggest challenge faced by East Asian graduates in research (Zhang & Goodson, 2011).

Because different cultures show different behavioral characteristics. The book titled *Culture and Personality* by Victor Barnouw (1985) notes that Chinese college students are introverted and distant compared to Americans but also lack a sense of security and concern about their actions and ability. This is understandable because there is a large amount of literature showing that Chinese are more introverted than Americans in social and they are demanding of themselves (Yang & Bond, 1986; Wei, Ku & Russell, 2008). Besides, the stereotypes of Chinese are usually hardworking, persistent, and successful (Bond, 1991).

According to Khoo (2002), Education and achievement are status symbols within Asian societies. The social pressure drives Asian students in their studies to a degree of perfectionism. However, what occurs when failure happens is guilt and social isolation. Poor English skills are also a big stressor and can pose serious difficulties and obstacles for many Asian international students while trying to excel and work (Lin & Yi, 1997).

International students from Asia show more acculturative tension but use mental health resources less frequently than their American peers or European counterparts (e.g., Fang, 2013; Hyun, Quinn, Madon, & Lustig, 2007; Mori, 2000; Ra, 2016). As a result, foreign Asian students can face severe psychological distress, physical illnesses, and adjustment problems if they are subjected to prolonged cultural stress. (Constantine, Okazaki, & Utsey, 2004).

2.1.2 Problems Faced by International Students

There are many and complex issues for international students. (Khoo et al., 2002; Sue & Sue, 1990). There are several common issues: adaptation to the new world, academic disparities, language problems, disputes between fellow citizens, the influence of changes in the home countries, male-female cross-cultural relationships, mental disturbances, financial difficulties, concern about immigration authorities, stressful relationships with local people, racial prejudice, coping with new independence, struggling with the loss of family or friends back home, choosing where to stay after graduation, anxieties about going home, overcoming culture shock, misunderstandings and isolation, and uncertainty and depression. (Khoo et al., 2002; Leong & Chou, 1996). However, depression has not received much attention in Chinese culture and even in Asian culture. Many people think of suicide as a sign of weakness or irresponsibility.

The problems encountered by international students in their life abroad summarized by Barletta and Kobayashi (2007) are as follows:

(1) Adjustment to New Culture

According to d'Andenne and Mahtani (1989), though disorientation is that the normal method of adaptation to cultural stress, it's the negative side of cultural adjustment. Symptoms like psychological strain, rejection, confusion, a way of loss, surprise, anxiety, and feelings of impotence become manifest and leads to withdrawal and depression (d'Andenne & Mahtani, 1989). Addressing disorientation will have positive edges if students are inspired to adapt and compound cultural experiences in a very positive manner (Ward et al., 2001).

(2) Academic Difference and Language Problems

The important positive connection between academic challenges and cultural change indicates these issues (Lin & Yi, 1997). Their research (Lin & Yi, 1997) in the United States revealed that it was very difficult for international students to adapt to the English language and the method of education in a foreign country.

(3) Cross-Cultural Male–Female Relationships

In certain cases, such as social and interpersonal contexts, misunderstandings may occur in daily interactions (Pedersen, 1991). The differences between Asian and European cultures make it difficult for students to deal with classmates or teacher-student relationships in daily life.

(4) Mental Disturbance

Students from around the world face social isolation, loneliness, depression and anxiety. These are considered typical mental disorders, as well as a part of the culture

shock and adjustment discomfort that international students face (Pedersen, 1991). On the other hand, Lin and Yi (1997) stated that the support structures changing and lack of familiarity with a new culture and traditions could lead to social isolation, which leads to international students' homesickness issue. This is also the focus of this research on international students.

(5) Financial Difficulty

One of the main issues for international students is the financial stresses (Khoo et al., 2002; Lin & Yi, 1997). This tension will make it difficult for students to concentrate on their studies when stressing about these matters and financial strains (Barletta & Kobayashi, 2007).

(6) Racial Discrimination

Klineberg and Hull (1979) reported that "approximately 70% of international students either experienced or knew someone who experienced discrimination." Sodowsky and Plake (1992) further indicated that "Asian international students perceived more discrimination than did European international students."

(7) After Graduation

International students often feel anxious at determining whether to remain in the host country or return to their home country at the end of the study (Oropeza et al., 1991). They particularly aren't sure which is the best place to use their qualification (Khoo et al., 2002).

(8) Reverse Culture Shock

According to Gaw (2000), international students come from a range of backgrounds that are incredibly diverse, growing up in increasingly mobile and culturally dynamic settings. Hence these students appear to experience the reversal culture shock re-adjustment process as they share the common experience of returning their country (Gaw, 2000).

2.1.3 Pressure Coping Theory

Park et al. (2017) notes a lack of studies on the coping strategies for East Asian international students. It has been found in a small number of literatures that creating social and cultural ties in real life or on the internet has helped foreign students adjust better to the new life (Ra & Trusty, 2017; Ye, 2005). Academic and social experiences with American peers ease Asian international students' negative feelings including homesickness (Zhou et al., 2011). In addition, some physical activities are also open to foreign students (Brunette, Lariviere, Schinke, Xing & Pickard, 2011). One coping technique is the use of forbearance (Wei, Liao, Heppner, Chao, & Ku, 2012). Many students will choose self-digestion and self-consolation when faced with depression caused by difficulties, so that this emotion will slowly change over time. Chen (2004) studied middle and high school students, developing a 3-dimensional model of coping with principles such as passive coping, maintenance coping, and active coping. Seeking social reinforcement, along with problem-solving, cognitive rehabilitation and contrast, falls into the successful coping framework.

Xiong and Zhou (2018) conducted a qualitative research about Eastern Asian graduate students' socio-cultural and psychological adjustment. Six themes are reported in this

research: 1) difficulties caused by cultural differences, 2) lack of support in a foreign environment, 3) lack of emotional support, 4) financial stress, 5) use of external resources, 6) development of self-adjustment strategies. The specific reasons for the negative emotions of some students in their study abroad life have been described under each topic. Useful coping strategies were reported includes psychological and behavioral self-adjustment strategies (Xiong & Zhou, 2018). This research showed some strategies were initiatively adopted by graduate students with better psychological quality, older age, and mental maturity when face of stress and depression. Students cope with the same situation in different ways because of different life experiences. Many students may take this as a challenge to be met while others have become defensive or shrinking in themselves. (Khoo et al., 2002)

2.1.4 Millennials and Generation Z

Millennials, also known as Generation Y or the Net Generation, are the generational population that follows Generation X directly. Typically, the word Millennials refers to individuals that entered adulthood after the turn of the 21st century (Strauss & Howe, 1991). Millennials grew up in a growing online and socially networked, electronic-filled environment. They are the generation which received the greatest attention in marketing.

According to Heller on Forbes (2015), Generation Z is the post-cohort of Millennials, identified as those born from the mid-1990s to the early 2000s. It constitutes 25

percent of the U.S. population, making the group more numerous than either Millennials or Baby Boomers (Heller, 2015).

Seemiller and Grace (2016) report that “these Digital Natives comprise the dominant generation of students currently entering college. In their study, Gen-Zers described themselves as loyal, thoughtful, compassionate, open-minded, and responsible - a rather affable self-description.”

Gen-Z students apparently prefer flipped courses and rely on YouTube as their primary source of self-instruction (Seemiller & Grace, 2016). Since they see themselves as problem-solvers, who prefer working alone, they may appreciate jigsaw formats in which individual students seek online information to contribute unique elements to a larger project (Mohr, 2017). Generation Z students spend on their mobile phones an average of 9 hours a day (Pew Research Centre, 2014).

In a recent presentation, “Engaging Generation Z Students,” Vickie Cook (2015) confirms that “Gen-Z post-secondary students tend to desire frequent educational opportunities that use technology and visual media.” Besides, another feature of Generation Z is that they adapt to instant feedback (Bharti, 2014).

People in these two eras represent the freshmen and graduate groups in universities, so it is necessary to study their personality characteristics. Obviously, people in both eras grew up in the period of information explosion and technology development. In Generation Y and Z, people are more dependent on technology. Gen Y represents the millennial generation, the current college student group. Because of the forward-

looking nature of the research, researchers will focus more on Gen Z (future college student group).

Generation Z is accustomed to "new" technology and has a low tolerance for people who are not able to understand the ever-changing infrastructure (Gale, 2015). Based on these personality traits, researchers have found that for generation z, network intervention combined with technology can prove to be effective.

2.2.0 Depression

Depression Defined

According to the "Diagnostic and Statistical Manual of Mental Disorders", Fifth Edition (DSM-5, 2013), depression is outlined as a state of "sad, empty, or irritable" mood, in the middle of bodily and psychological feature changes, and aversion to the activity which will affect a person's capability of performing. Individuals with depressed mood describe themselves as "depressed, sad, hopeless, discouraged, or down within the dumps" (DSM-5, 2013, Pp. 163). Depression is one of the foremost common psychological conditions afflicting adolescents worldwide (Centers for unwellness management and bar, 2004). Adolescents aged eighteen to twenty-nine years recently have the best prevalence of Major affective disorder (MDD) than all different age teams, and early adolescent females (11-14 years old) expertise around threefold higher prevalence than males (DSM-5, 2013).

Risk factors of MDD include temperamental factors (e.g., negative affectivity), environmental factors (e.g., stressful life events, poor academic performance), genetic

and physiological factors (e.g., family history of depression), and comorbid conditions (e.g., substance use, anxiety, and borderline personality disorders, etc.) (DSM-5, 2013). Functional consequences of MDD derive from individual symptoms and range from mild to severe. Some individuals with MDD are unable to attend to basic self-care needs, have more pain and physical illness, and experience decreases in physical, social, and role functioning (DSM-5, 2013).

Depression is one of the most common issues presented to foreign students seeking support from university counseling services (Yi, Lin & Kishimoto, 2003). Wei et al. (2008) recorded that over the cutoff point on clinical depression measures about 30 percent of Asian international students score above.

2.2.1 Self-management & Self-report

The diagnosis of depression is basically self-reported. The Baker Depression Scale-II (BDI-II; Baker, Steele, and Brown, 1996) is a self-reporting indicator used as an item-by-item indicator of the severity of depression.

Self-management components are essential to most therapies discussed in the reviewed papers. Components of self-management include business planning, task tracking, self-monitoring, and diaries. The structure hypothesis is that components of self-management which involve strategies for behavioral change are more successful than those which do not (Morrison et al. 2012).

Efficient methods were found to be self-reporting or self-monitoring and were widely used in the studies included in this integrative study. Renton et al. (2014) conducted a

study of depression recovery network services and found that almost all of the services implemented the mood monitoring self-assessment function.

A log data analysis (Whitton et al., 2015) found that daily or weekly symptom monitoring was one of the most commonly used elements for consumers of a web- and mobile-based treatment for depression, anxiety, and stress. Results of a self-reported online questionnaire study for online depression care (Richards et al., 2016) showed that the mood tracking rating tool was a favorite tool among users.

2.2.2 Process in Cognitive Behavioral Therapy for Depression

The methods of depression therapies are various. “For example, antidepressants could be an effective approach to relief patients who are in moderate to severe depression, however, they are not suitable for people who are in mild depression. Also, Antidepressants should not be used as a first-line treatment for adolescents” (in this case, cautiously using antidepressants (WHO, 2017b)). Experts recommend that friends and relatives be involved in the treatment of people suffering from depression, in addition to using medications.

To combat depression, non-drug therapies such as meditation, psychotherapy, or counseling (Association, 2010) and carefulness-based approaches (Strauss et al., 2014) are used. In addition, technologies such as serious games, mobile systems and gamification have been used to promote mental health, which is why gamification can also be used to promote increased social engagement.

A well-standardized, effective treatment for major depression is cognitive therapy (CT) (Strunk & DeRubeis, 2001). Recent work has shown that CT is at least as effective (DeRubeis et al., 1999, DeRubeis et al., 2005) and may have more lasting effects on pharmacotherapy (Hollon et al., 2005, Hollon et al., 2006).

The therapy relationship is characterized as the collaborative and affective connection between patient and therapist. Bordin (1979) expanded a description that divides the partnership into three components: aim, mission, and bond. Objective refers to a shared agreement on the specified objectives that are the objective of the intervention; mission includes an agreement on the current approach to achieving the goals, and bond represents the establishment of a supportive therapist-patient relationship characterized by shared love and trust.

Furthermore, the present results indicate that facilitation or inhibition of therapist adherence by patients is a significant early determinant of improvement in the following session since this facilitation predicts early improvement of symptoms in care. It can be inferred that the relationship between the consultant and the patient is very important for the treatment of the patient.

2.2.3 Online Intervention

The development of the Internet has had a profound impact on society over the last decade, developing new cultures, redefining relationship patterns and diversifying and expanding social connections (Rideout, 2002). Evidence indicates that young people

feel encouraged online and that a degree of anonymity is offered, which means that they are more relaxed about sensitive or humiliating issues.

Mental health e-Clinic is a real-time primary care clinic combined with existing face-to-face facilities, providing end-users with a minimum of immediate online clinical evaluation; immediate generation of a results dashboard and customized wellness plan with targeted interventions; and automated triage and escalation protocols to respond effectively to serious and dangerous cases (Ospina-Pinillos et al.,2018).

A national survey of Internet users (n=7014) in the United States found that people with stigmatized disorders, including depression and anxiety, were much more likely to use the Internet to obtain health information and interact with clinicians about their condition than those with non-stigmatized conditions (Berger, Wagner & Baker, 2005). In an Australian study of participants (n=3998), the authors stated that internet sites ‘that maintain obscurity could also be most well-liked by people who opt to or notice themselves managing mental disease alone’, suggesting that internet sites could also be a very important medium for participating with individuals experiencing psychological state difficulties or in danger of mental health issues however WHO aren't nevertheless seeking face to face skilled facilitate (Leach et al., 2007).

Early studies indicated that increased usage of the Internet could lessen social participation, as it reduced the time young people spent offline with others. However, the Internet has also been shown to improve group engagement and promote online and offline social networks as well as established social links (Webb, Burns & Collin, 2008).

Also, there is a contradiction in the literature that explores the relative psychosocial benefits and risks to individuals. Some studies show a correlation between Internet use and Internet addiction, which is expressed as antisocial behavior and may be correlated with weaker social skills, lower self-esteem, and trust (Harman et al., 2005; Lo et al., 2005; Yen et al., 2007). Nevertheless, Australian research conducted in adult communities indicates that the Internet may play a significant role in increasing literacy in mental wellbeing and that the stigma associated with seeking support. Griffiths et al. (2004) found that a web-based cognitive-behavioral intervention and a web-based depression awareness system resulted in substantial decreases in stigmatizing attitudes to depression among people with high rates of depressive symptoms in a randomized study trial of Australians (n=525).

The usage and effect of a dedicated health information platform for adolescents were explored by a study of adolescents (n=2054) from three junior high schools and one senior education in the USA. The use of the website has been shown to be positively correlated with school health center visits, guidance counselors and referrals to health professionals (Santor et al., 2007).

From the above studies, it can be seen that online intervention has a positive effect on adolescent depression patients, including anonymous elimination of discrimination, reducing stigma of depression, and increasing participation. The Internet is also often seen as a way to gain social support. According to past studies (e.g., DeAndrea, Ellison, LaRose, Steinfield, & Fiore, 2012; Valenzuela, Park, & Kee, 2009), college students are growing their life satisfaction, social support, and college adjustment through social networking. This implies that social networking services are most

likely a resource for international East Asian students who can promote and cope with social support.

2.3.0 Campus counseling system

A previous survey by Yale University (Han et al., 2013) found that although there is a large percentage of Chinese students who have psychological problems, only 27% of them know that mental health counseling services are available in schools, and only 4% of those have actually used them.

Considering the nature of therapy theories, often focused on Western constructions of human behavior, normality, and abnormality (Sue & Sue, 1990), counselors need to identify and discuss the cultural concerns of clients in order to provide successful therapy. Counselors should also have some knowledge of the cultural context of the client, as well as being open to cultural issues.

Of all the resources, consultants have been reported to be very useful, and previous research has shown that good relationships with consultants to reduce adaptive stress and to increase the mood improvement benefits for international students.

2.3.1 Utilization Assessment of Campus Counseling Services.

Psychological problems are reported as widespread among college students in the quantitative research study conducted by Harrar, Affsprung, and Long (2010), but

college counseling centers see only a small percentage (29 percent) of students benefit from counseling services. Only 7 percent of students reported being in treatment at the moment, and it would appear that a significant percentage of students were distressed and not receiving treatment (Harrar, Affsprung & Long, 2010).

In another research study conducted by Hyun et al., (2006) the authors studied on a small subsamples of the graduate student population and found that compared with medical students and residents, graduates drop out of study much more often (Toews et al., 1997) Untreated mental health issues are a major cause of graduate dropout (Turner & Berry, 2000; Wilson, Mason, & Ewing, 1997)

Analysis of self-reported use of mental health services by respondents showed that, while in graduate school, 30.9 percent of graduate student respondents reported having used any type of mental health services. Twenty-six percent of respondents reported having used therapy services on campus, and 10.5 percent reported using services off-campus. 5.7 percent of respondents reported using both on-campus and off-campus therapy facilities (Hyun et al., 2006).

Awareness of mental health services is high but not universal among graduate students. Nearly one-fifth of graduate students are unaware that the campus offers mental health services. In addition, graduate students are less likely to receive mental health information through face-to-face interaction from peers or their counselors.

Instead, students are more likely to check for information themselves, from the website of the University Health Center, or to obtain information by flyers of orientations or university health centers. Graduate students are unlikely to meet in

locations like residence halls or student centers and do not visit their administrative program office daily.

2.3.2 Factors Affecting Students' Use of Psychological Counseling

Recent results indicate that psychosocial factors have a strong impact on the mental health conditions and the utilization of mental health services. Graduate students who are in the fields of science and engineering, those who demonstrate more meaningful relationships with their faculty advisors and those who are married are far less likely to use counseling services. Students reporting more positive relationships overall to their counselors are less likely to report mental health needs.

Students who encountered significant emotional issues over the past year and had more supportive experiences with their counselors were more likely to use mental health services. Such findings highlight the importance for graduate students of factors such as a relationship with one's mentor, pedagogical environment, and social support. Findings also suggest that in some academic disciplines, cultural perceptions and stigma against the use of mental health resources may contribute to a lower usage by graduate students.

Cultural and linguistic factors may also serve as obstacles to the use of counseling services. The findings of this study reveal that although international and domestic students do not differ significantly in their reporting of mental health needs, their patterns of utilization are significantly different.

There appears to be a similar need for mental health services in the general population but substantially different patterns of receiving and using mental health services.

Asians, African-Americans, and Hispanics, for example, are less likely to use mental health services than white adults (US Department of Health and Human Services [HHS], 2001).

2.3.3 The Web-based Tool for Counseling

People can now learn about their conditions and initiate self-directed lifestyle improvements to improve and strengthen mental and emotional stability, health promotion, and prevention approaches and participate in therapeutic activities without engaging a health care provider directly in a face-to-face environment (Wilson 2017).

To date, the schools have assessed very few online anxiety reduction services (Calear and Christensen, 2010; Clarke et al., 2015). In the study conducted by Calear et al. (2016), researchers tested the acceptability and viability of the Australian high school (N=225) students' internet intervention system named Anxiety and Worry. The Anxiety and Worry e-couch system is comprised of two main sections: psychoeducation and evidence-based anxiety toolkits consisting of Cognitive Behavioral Therapy (CBT), relaxation, and physical activity. (Calear et al., 2016) The outcome showed that this curriculum was appropriate to staff and students and that it was feasible in the school setting. Less than half of the students said they are willing to keep going and 10 percent said they'd recommend it to others.

However, this research is aimed at high school students. The age and region of this research (Calear et al., 2016) are different from those of this thesis, and there are no indicators in the return visits showing that e-couch can significantly improve students'

psychological anxiety. The researcher believes that this study can prove that students have a high degree of acceptance of electronic intervention, but students may have a bias on questions about satisfaction. Considering it, more studies should be looked up.

2.3.4 Some Rules for Counselors

Although international students are less likely to seek help with personal issues (Khoo et al., 2002), counselors can be very helpful in helping them cope with life abroad. Consequently, counselors need to consider cultural problems and thoroughly clarify the form of support counselors may offer to international students.

According to Wei & Ku and Russell (2008), perceived discrimination is a specific stressor which contributes to depressive symptoms over and above perceived general stress, suggesting that counselors working with students who are members of a stigmatized community should carefully assess the role of perceived discrimination and the distress associated with it (Wei et al., 2008).

According to researchers (e.g., Mitchell, Greenwood, & Guglielmi, 2007; Zhang & Dixon, 2003), international students — including international Asian students — have reservations about the use of professional psychological assistance in universities and universities. Such studies have shown that Asian foreign students are more likely to be unaware of the availability of psychiatric resources and unfamiliar with the American system of counseling services than other students (Fang, 2013).

Furthermore, Brinson and Kottler (1995) found that foreign students may be hesitant

to collaborate with therapy practitioners due to cultural and linguistic barriers, many of whom come from Western culture backgrounds and are unilingual. Consequently, therapy practitioners need to be culturally responsive and improve both their cultural self-awareness and multicultural skills (Winterowd, Adams, Miville, & Mintz, 2009).

2.4.0 Human-Computer Interaction in Web-based Mental Health Care

Human-computer interaction (HCI) refers to the human-computer interaction in the scientific field. Online digital services and mobile apps are widely and effectively used for mental health benefits of counseling, integrated care and treatment (Andersson et al. 2014; Feather et al. 2016; Schueller et al. 2017).

Web-based mental health resources include health promotion, self-directed and low-intensity mental health support (e.g., ReachOut! (Burns et al., 2007); regional online counseling services (Rickwood, Webb, Kennedy & Telford, 2016); organized online self-directed therapy (e.g., MoodGYM(Christensen, Griffiths & Korten, 2002)); and others providing a combination of assessment and formal online therapy,

The NMHC called for a reform of the Australian mental health program, including the incorporation of e-mental health with face-to-face programs, similar to previous studies. Innovations in the use of technology during the assessment process have potential because they may go some way to resolving reported capacity problems in youth programs (Rickwood et al., 2014).

In line with the three main components of the NMHC: person-centered design principles; modern network architecture; and moving resources to more secure and reliable operation and support "upstreams" (Ospina-Pinillos et al., 2018).

At this time, the degree to which HCI can affect the effective initiation and receptiveness of treatment adherence for people with different mental health conditions is largely unknown. Hence, it is important to understand how patients behave like a computer system user and how this affects their positive or ineffective experience with the software, and by extension, with the treatment itself.

2.4.1 Elements and Design Principles

Creating user-friendly and easy to use applications is a common theme in the comprehensive literature on web-based mental health counseling.

Usability testing is also carried out to pilot the acceptability and functionality of a computer system. Individuals with mental health disorders are frequently exempt from routine accessibility testing of electronic healthcare services due to particular cognitive issues that are likely to exist within this population (Morrison et al. 2012).

Renton et al. (2014) analyzed 32 services that were identified via a web search that addressed depression and found that most of the interventions were multimodal, with seven provided by text alone (Renton et al. 2014). Researchers concluded that because cognitive disabilities were prevalent in their target audience, a recommendation to concentrate on text spacing, multimodal distribution, and cognitive impairment-specific programming was of particular importance for successful communication.

- Element 1: “Homepage Triage” (Ospina-Pinillos et al., 2018)

Young people proposed that the home page should be a 'welcoming space' where young people would feel 'comfortable' without compromising the site's credibility and professionalism. (Ospina-Pinillos et al., 2018)

Wozney et al. (2015) interviewed young people in Canada and their results established the need for adaptation to their implementation plan including the introduction of a virtual guided tour along with more specific guidance such as additional internal links on their website to improve user navigation (Wozney et al. 2015).

- Element 2: “Online Physical and Mental Health Assessment” (Ospina-Pinillos et al., 2018)

Young people said they felt confident conducting an online evaluation of their physical and mental health and getting direct input on their performance (Ospina-Pinillos et al., 2018). Initially, the majority also suggested that they preferred shorter questionnaires (about 15 min in duration) (Ospina-Pinillos et al., 2018).

- Element 3: “Dashboard of Results and Progress” (Ospina-Pinillos et al., 2018)

Immediate feedback on their results was essential upon completion of the assessment. We also mentioned understanding this would increase motivation to respond as best as possible and answer all questions. Young people said they needed reliable reviews (Ospina-Pinillos et al., 2018).

- Element 4: “Waiting Room, Booking System, and Video Visit System” (Ospina-Pinillos et al., 2018)

Young people demanded the use of a booking system to make timely appointments with clinic-affiliated youth health practitioners (Ospina-Pinillos et al., 2018).

- Element 5: “Personalized Well-Being Plan That Includes Links to Evidence-Based, and Health Professional–Recommended, Apps and E-tools” (Ospina-Pinillos et al., 2018)

All participants reported having a customized wellness plan (generated from their assessment results) that included tailored automated suggestions on how to improve their health and wellbeing (Ospina-Pinillos et al., 2018).

- User Interface

Young people and health care professionals agree that the system should be "safe and tidy," showing short, succinct content and making good use of space. Most participants favored having icons rather than text, and they also favored exploring the program themselves rather than having long instructions. Young people were strongly discouraged by the use of stereotyped images of "happy" or "sad individuals" (Ospina-Pinillos et al., 2018).

Tiburcio et al. (2016) conducted web-based self-help testing in Mexico among a sample of people with comorbid conditions of substance abuse and depression and found that those users preferred additional images and colors as elements of usability.

Danaher et al. (2012) performed interviews in a focus group to support usability testing of a web-based therapy for postpartum depression symptoms in the United

States and Australia, and their results are consistent with results by Tiburcio et al. (2016) of a preference for photos and colors to improve user experience.

The emphasis on a design's layout layer should be targeted to a specific target group of users, and variations between user groups will occur. The basic configuration of images, colors, amount of text, font size and color should suit the appeal of the user, as this can be important to the positive participation, continuity and confidence of the user. This is significant when implemented in an electronic mental health response environment because ensuring that the design of the surface layer is appropriate will provide an essential basis for users to engage successfully in the intended intervention and its anticipated duration.

2.5.0 Gamification

Over the last few years, the idea of "gamification" has become increasingly popular. Gamification, conceived in the digital media sector, only started to be implemented on a wide scale in the second half of 2010 (Deterding, Dixon & Khaled, 2011). To build brand recognition and increase customer engagement, Zichermann developed a marketing guide focused on game mechanics (Zichermann & Linder, 2010).

Although serious games and gamification continue to be used for reasons other than their intended use of entertainment, their implementations vary significantly.

Although serious games often referred to as 'a purpose games' deliver pure gaming experiences through gameplay rules, game engines, and mechanics, gamification aims to build game-reminiscent experiences through a combination of game mechanics and game experience design (McKeown & Health, 2015).

Gamification has also been implemented in many fields, including education (e.g. to promote student participation (de Sousa Borges et al., 2014), industry (e.g. employee participation and consumer satisfaction enhancement (Herzig, Ameling & Schill, 2012)) and environmental sustainability (e.g. to inspire and facilitate engagement in environmentally friendly practices (Froehlich, 2015)). The application of gamification to the digital healthcare field has been of great interest.

Likewise, another study performed by Gamecho (2015) and other researchers examined a home-rehabilitation program for the elderly. This device relies on animatronic biofeedback, which lets users gain more control over their involuntary physiological functions through linked electrical sensors. Feedback as a gamification feature may contribute significantly to improving the attention and interaction of the users.

Many of the treatments mentioned in the reviewed articles were placed in the framework of an interesting, pleasant, engaging, convenient, important, useful, and personalized desire for them to be. For this to be done, tailoring the content to the needs and desires of the user is a required design function. Typically, tailoring is accomplished by setting specific targets, selecting dynamic characters, designing game elements and choosing suitable and available delivery types. The Morrison paradigm theory is that adjusting to multiple variables is more efficient than tailoring to a single variable (Morrison et al. 2012).

Using digital games is one of the techniques for reducing problems associated with change that foreign students face. So far, interactive games have been gradually used for pedagogical purposes (Gee, 2003), including information system teaching (Martin, 2000) and second language teaching (Kongmee et al, 2011). Digital games allow players to engage with knowledge through entertainment and participate in learning activities. The barrier to learning is lowered by the infusion of the dimension of fun. This is because if learners are happy and inspired, they are more likely to learn (Li et al., 2013; Prensky, 2001).

The technology has been used to promote mental illness care such as CBT applications (Watanabe et al., 2015), severe games (Hookham et al., 2016), and gamified applications (Paim and Barbosa, 2016), for example. Papers, where depression was the topic, used gamification to boost people's adherence and dedication (Ahtinen et al., 2013, Wahle et al., 2016, Bolier et al., 2013, Brown et al., 2016). Some gamification features have been used to give patients a better care experience (Bolier et al., 2013), e.g., ratings, milestones, and progress rates (Brown et al., 2016). Most works showed users appear to like gamification features and serious games, but the works did not prove successful gamification.

2.5.1 Game Mechanics

Unraveling the amorphous idea of fun in video sports, a theoretical construct that involves three major factors, namely immersion, challenges and social interaction (Bisadi & YK Chua, 2014).

Immersion refers to the degree of a player's absorption and interaction with a game (McMahan, 2003). Deep engagement is a psychological condition that arises when there is a primary emphasis on the relevant collection of actions or events in the game (Witmer and Singer, 1998). Immersion cannot be accomplished unless the players have sufficient control over the game. Game management should be simple to understand, simple to customize (Gee, 2003; Johnson & Wiles, 2003). To make players believe they are managing the game routine, players have to be given the freedom to make decisions and maneuver easily in the game (Pagulayan et al., 2003).

Challenge refers to the game-imposed difference between the abilities of a player and existing demands. The presence of some levels of difficulty, straightforward objectives and sufficient rewards are key ingredients for a game to be considered challenging. The difficulty levels of the games should be varied and slowly increased to retain their interest, based on the growth of players. The difficulty level of the games and their workload will suit the abilities of the players. Inappropriate levels of difficulty cause players to either be nervous or apathetic. Appropriate pace must be considered to keep the players involved (Pagulayan et al., 2003). Besides, completing difficult tasks and surpassing rivals stimulates the players and leads to satisfaction and a sense of accomplishment and there should be a set of straightforward and simple goals at each stage of the games.

In addition, players must be sufficiently and equally rewarded for their efforts to maintain their interest in the game (Pagulayan et al., 2003; Brown and Cairns, 2004). Rewards (e.g. points, achievement badges, and leaderboards) are seen as a key gamification technique for users who perform the necessary tasks (Park & Bae, 2014).

Some of the forms in which competition is encouraged set goals and make the tasks available to other users (Park & Bae, 2014). Another important gamification pillar is the leveraging of social networks to improve user engagement and interaction (Palmer, Lunceford & Patton, 2012).

A further aspect adding to the enjoyment is social contact. Social interaction takes the form of rivalry, collaboration, and communication within the framework of a game (Lazzaro, 2009), each of which accounts for a different player profile. Players who choose to work together to boost their place in the game should find appealing cooperative elements (Salen and Zimmerman, 2004). For example, cooperative activities such as virtual communities play an important role in creating fun in online multiplayer games. Cooperation also has a beneficial impact on learning, enhancing performance, problem-solving and reasoning skills (Johnson et al., 1986).

Some game mechanics' effectiveness, as opposed to others, is mainly due to their role in simultaneously yielding fun, competitiveness, and self-evaluation (Dan, O & Lai, 2013). Consequently, social apps, incentives and progress monitoring have proved to be effective mechanisms in generating positive results on users. In line with the research carried out on gamification in non-health-related contexts such as education (Dicheva et al., 2015) and software engineering (Pedreira et al., 2015), there is overlap in terms of the game mechanics most commonly used. Tracking and monitoring progress help users remain focused on their goals and stop negative thinking (Dan, O & Lai 2013). Points satisfaction is the core component of gamification, particularly the visibility of progress and the leaderboards. The success of users is often driven by the number of points earned, which are then used to include

a leaderboard ranking. In terms of satisfaction, however, points may be less desirable and meaningless.

2.5.2 Eight Core Drives of Gamification

A multitude of game elements are being incorporated into gamified e-Health and serious games applications. Eight of the 10 gamification features analyzed in Brown's literature review (Brown et al., 2016) were found in use: story/theme, progress, feedback, goal setting, rewards, competition, badges/trophies, and points. No research included leadership standards or sports. The majority of procedures used only one gamification function (n=58); three were the highest number used in any one project. Of the interventions using only one gamification function, the most frequently used story / theme was (n=33), followed by success (n=10), target setting (n=6), bonuses (n=6), and feedback (n=3). Of those using more than one characteristic (n=24), 19 used two characteristics, and five used three features (Brown et al., 2016).

Regarding the motivation of attracting users' continuous participation in the game, Chou (2019) mention the eight core driving forces of gamification in the book "actionable gamification" published in 2019. The eight core drives of gamification are listed below:

- Epic Meaning & Calling (Chou,2019)

Epic Meaning & Calling is the core drive wherein a player thinks he is doing something more than himself or he has been "picked" for doing it. A symptom of that is a participant who devotes a great deal of his time to retaining a discussion board or

helping to build stuff for the community (like Wikipedia volunteers or open-supply projects).

- Development & Accomplishment (Chou,2019)

Development & Accomplishment is the internal push for advancement, skills growth and ultimately obstacles overcome. Here the word "challenge" is very significant, as a badge or trophy without a challenge is by no means meaningful. This is also the core drive which is the simplest to build for and is where most of the PBLs concentrate more on: points, awards, leaderboards.

- Empowerment of Creativity & Feedback (Chou,2019)

Empowerment of Creativity & Feedback is while users have interaction in an innovative cycle where they must workout things over and over once more and try diverse combinations. Not handiest do human beings want methods to speak their creativity, however they also want with the intention to see the effects of their creativity, get hold of feedback, and react in turn (like portray and Lego).

- Ownership & Possession (Chou,2019)

This is the motivation that activates people, as they trust they own something. When a player feels he/she possesses things, he/she innately wants to make higher and personal even greater of what he/she owns. This offers with numerous virtual merchandize or virtual currencies inside structures as well as being the primary core incentive for trying to collect money.

- Social influence & Relatedness (Chou,2019)

This core drive combines a few of the social elements that motivate human beings, which includes mentoring, acceptance, social reactions, companionship, rivalry, and envy. When a user sees a friend who is good at some capacity, or who possesses

something exceptional, the user is inspired to attain the same level. This Core Drive is also well-known, as many agencies region a number of emphasis on leveraging their social techniques online those days.

- Scarcity & Impatience (Chou,2019)

That is the drive to want more because you cannot get it. Most games have mechanics of appointment (come back 2 hours later to get your reward) – the fact that people are unable to get it right now motivates them to think about it all day. This is the core drive Facebook used when it first started: it was just for Harvard at first. It then opened up to a few other prestigious institutions, and eventually to all universities.

- Unpredictability & Curiosity (Chou,2019)

In general, this is a harmless push to want to find out what is going to happen next. If users do not know what will happen, then their brain is engaged, and you always think about it. (like people reads novels or buy lottery) Unpredictability & Curiosity though it was underestimated by many as the catalyst behind points, badges, and mechanics of the leaderboard in general.

- Lose & Avoidance (Chou,2019)

This core drive is focused on preventing the occurrence of anything negative. It may be to prevent losing preceding work on a small scale. It may be to stop acknowledging, on a larger scale, that everything you have done up to this stage was pointless because you are leaving now.

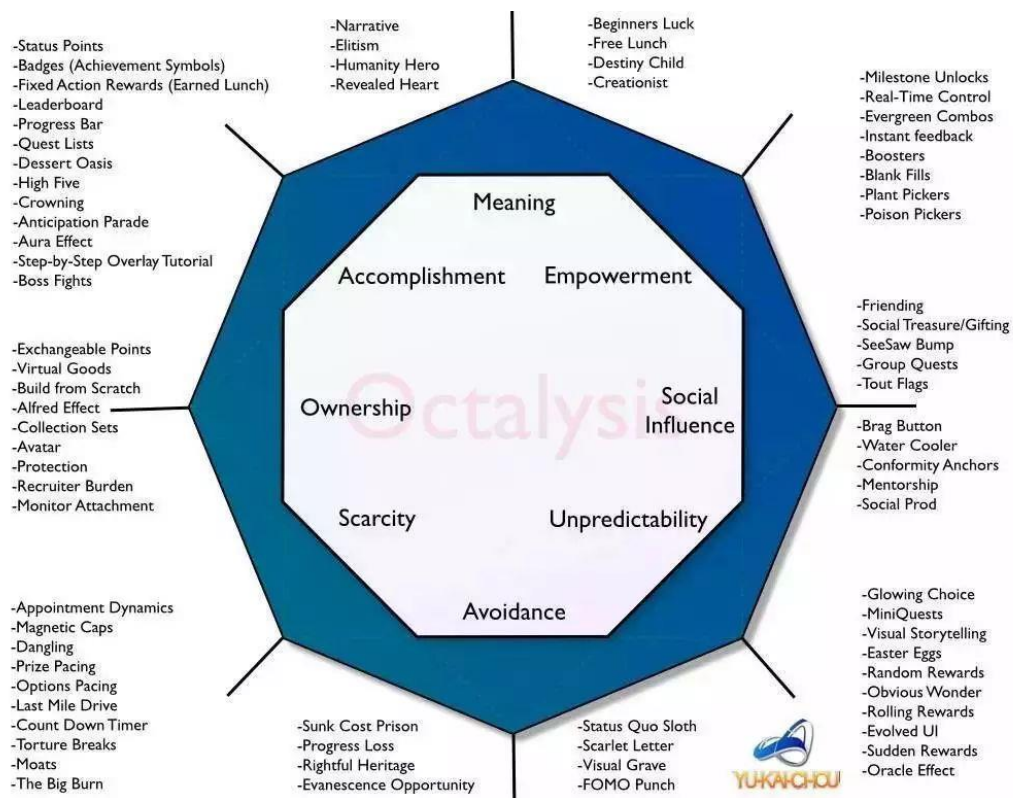


Figure 4.0 The Octalysis of Gamification (Chou, 2019)

2.5.3 Challenges and Benefits in Gamification Application in Mental Health

One of the major problems is the long-term sustainability of the gamification impact on consumers of the phones. Researchers suggest that the apparent short-term impact on the motivation and interaction of users is unlikely to be maintained, as the interest and excitement of users in game-like features continue to decrease over the long term (Garde et al., 2015; Craven et al., 2014; Ahtinen, Huuskonen & Häkkinen, 2010).

In addition, it has been reported that some gamification frameworks provide a valuable reward for an operation that needs no significant effort and/or vice versa (Stinson et al., 2013). In order to effectively overcome these challenges, game elements need to be built for practical in-system purposes by providing them in

response to efforts which users find essential. The active rate can rise from 30% to 90% if the design and accessibility of the prototype can be improved (Landback et al., 2009). The game should be inclusive of users' ethnicity and customs (Shepherd et al., 2015).

Different research studies (Garde et al., 2015; Brauner et al., 2013) suggest that comprehension of the gaming mechanisms that inspire and engage players is crucial (Brauner et al., 2013). For these motivational needs to be realized, gamified approaches should provide a well-structured and varied rollout of game elements.

From a general viewpoint, gamification approaches and methods and severe games applied to depression treatment do not vary from those used in other health care applications (Brown et al., 2016) or even in other non-health related applications. The details of depression treatment are linked to the concept of what assist behaviors should be considered in a serious game or should be gamified.

Conceptual Framework Diagram 2

This 2nd level conceptual framework is based on the 1st one, and the literature review helps broaden the topics. Under the topic of international students, the features of Asian international students, the problems faced by them, and “Generation Z” are discussed. Under the topic of mental health, self-management & self-report and depression are discussed. Under the topic of campus counseling, the need assessment, the rules of counselors and the factors affecting students use it are discussed. Under the intersected topics, there is also literature to support them. And in the core of the

framework, the design is extended to topics including HCI (human-computer interaction), gamification, and design principles.

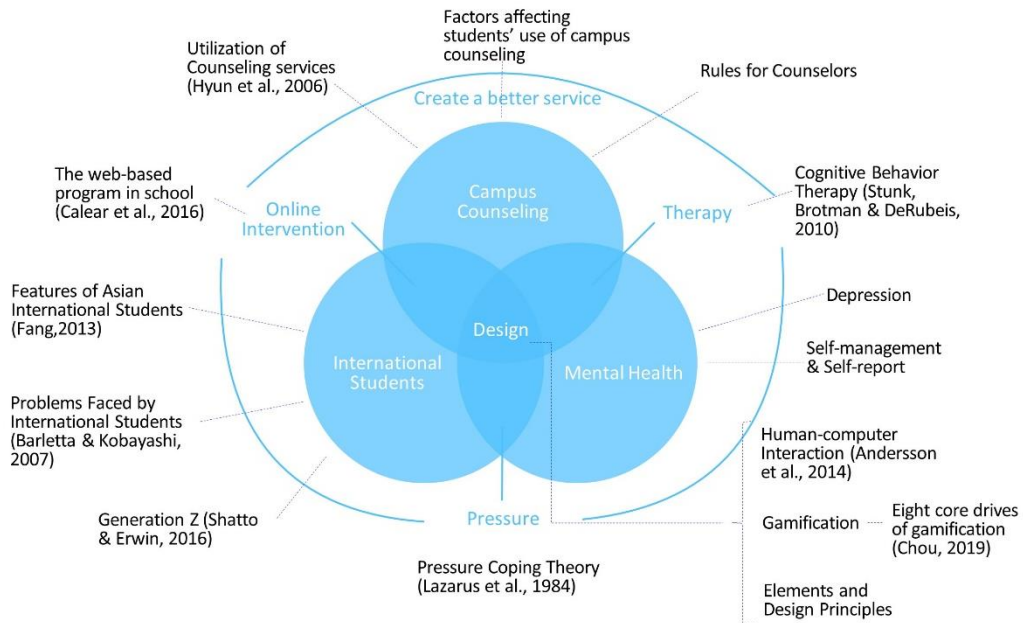


Figure 5.0 Conceptual Framework II.

CHAPTER 3 METHODOLOGY

3.0.0 Introduction

The purpose of this research is to help campus counseling build a user-friendly and easy-to-use service system to provide support to international students with psychological problems. The result of this research provided some evidence and principles to institutions when they want to establish digital interventions for depression and the development of some mobile applications. The system works for all students but the reason why international students are chosen as the main object of this research is because of its particularity. Based on the research conducted by Sandhu & Asrabadi (1994), International students are a high-risk group, and they are with more psychological issues than their peers in the United States.

In this research, the researcher focused on specific people first, once the researcher had the knowledge of the basic needs of people, the potential solutions were discussed. The research is in terms of mental health services, the researcher considered that the problem itself is highly stigmatized and unconscious. During the research process, the researcher used another language to talk about mental health and its challenges, and to prove that people are not alone when encountering difficulties.

As mentioned earlier, the researcher is focused on helping people to be able to discuss mental health more openly. The researcher investigated the sources of stress from international students, the specific process of campus counselling, and the elements of

online interventions for mental health therapy. From these investigation results, a psychological problem have been transformed into a design problem, and the researcher discussed with the group and designed jointly to understand which elements and design principles in design are effective in improving the system.

3.1.0 Research Topics & Research Questions

The research questions are based on topics included in the conceptual framework (figure 1). Here are the topics under this research: international students, mental health, campus counseling and online interventions. Under these topics, it comes to several questions and three of them are chosen to be the main research questions: What are the sources of pressure for international students? What is the current situation of campus counseling? How does design create a better user experience for online interventions for mental issues? Answering these questions could provide an insight about International students' perceptions of mental health and what challenges and possibilities campus counseling has. It also indicated the market of developing digital interventions for campus counseling. Furthermore, the researcher has a hypothesis about the effectiveness of gamification in the system. The results could be insightful for school campus counseling in developing strategies that could help students use the online service and provide designers and developers evidence when establishing the system.

3.1.1 Current situation, Pressure Source and Difficulties of International Students and Explore Their Potential Needs.

- ◆ How is the satisfaction of international students with their life abroad?

There have already been articles showing the international students express more stress than others (Fang, 2013). During the process of answering the question, the study found out how international students are satisfied with their life abroad. The result helped the researcher evaluate the feasibility of the counseling service.

- ◆ What are the pressure sources for international students?

The problems faced by international students have been listed by Barletta & Kobayashi (2007). During the process of answering the question, the study will find out the mental situation of international students and how they think of the pressure they faced. The result will help the researcher figure out their potential needs.

- ◆ How do international students cope with their stress and depression?

Park et al. (2017) reported a lack of research on East Asian international students' coping strategies. Students deal with same situation in different ways due to different life experiences. Answering this question can help the researcher know what international students' motivation and initiatives when facing mental issues, and the results showed what their support is.

3.1.2 Current Situation, The Perceptions of Campus Counseling.

- ◆ How do international students think about campus counseling service?

There have already been articles showing that only a small amount of college students benefits from counseling services. During the process of answering this question, the researcher was able to find out how international students like the service and the influence of campus counseling services to them.

- ◆ What are the international students' experiences of campus counseling services?

There were a lot of details included in the experiences of international students using counseling services. The results can help the researcher analyze the problems in the psychological counseling process.

3.1.3 Establish of Online Intervention System

- ◆ What do international students think of online mental health care?

There have already been articles showing that young people are receptive to online applications. Although face-to-face treatments are still mainstream, there are more and more services available online. By answering this question, the researcher was able to know people's attitude towards online treatment and how they use online treatment.

- ◆ What function do international students think should be included in the online service system?

The result can help build the system and in the process of answering the question, the researcher was able to find out what people truly need in the online system and how the online system can help them.

◆ What factors of design should be considered in the online system?

There have already been articles showing that design is everywhere in the online system, including the service process, the human-computer interaction, the visual communication. The question cannot be asked directly but in the process of answering it, the researcher was able to highlight what people's basic needs are and how to improve their user experience.

◆ What factors of gamification can be applied on online mental health services?

There have already been articles showing gamification has been applied to education, business, environment sustainability and health care. Considering the particularity of mental health, the impact of gamification is still unknown. Answering this question can have an insight of the effectiveness of gamification, the discussion above this topic was able to explore what factors of gamification can be applied to the counseling service system.

3.2.0 Approach

Three research methods were conducted in this research study. Investigating the user experience requires a proper qualitative analysis method. The users' story is summarized into raw data through qualitative analysis, and then the descriptive analysis is used to draw conclusions for reference.

In this research, the researcher conducted the methodologies including a literature review, a combination of qualitative and quantitative research methods. The qualitative research methods may include semi-structured interviews (O’Leary, 2004) and focus groups (Langford and McDonagh, 2002), the quantitative research method is online survey (O’Leary, 2004).

This study employed quantitative research approach to have insight in what current situation of international students is, including their pressure and their attitudes to campus counseling and online treatment. Then qualitative research approaches were conducted to draw the current counseling services and the future counseling services.

There were quantitative research methods including a questionnaire survey to gather information from a medium base of participants. The survey was conducted online and was disseminated through links to social media. Then, the researcher interviewed several students to determine their potential needs. The audio recording devices were used to record interactions.

3.3.0 Online Survey (O’Leary, 2004)

Online surveys (O’Leary, 2004) were used to gather information from a medium base of participants, which the number of respondents were 62 (n=62) and the factors can be evaluated and be measured to each degree. The questionnaire likely consisted of both open ended and close ended questions. The factors can be evaluated and be measured to each degree.

Using online surveys allows researchers to have a general and comprehensive understanding of the target group. The results of the data can represent the views of most people, and under the condition of anonymity, people are more willing to answer frankly to psychological problems. Obviously, some questions are mentioned in semi-structured interviews, but they are more in-depth user stories. At this stage, faster and more convenient online surveys can make the problem more intuitive and representative.

Questionnaire (for international students):

1. Age, Gender, Major
2. How long have you been living in the U.S.?
3. What is your source of funding for your study in the U.S.?
4. How much do you satisfy with your life here? (0 Not at all-5 very satisfy)
5. What do you do when you are stressful?
6. Have you used the campus counselling?
7. If you have used the campus counselling, how much do you satisfy with the service? (0 Not at all-5 very satisfy)
8. In what circumstance do you want to use the campus counselling?
9. What application do you use to release your pressure?
10. If there is an app for your stress management, do you accept to do follow-up?

3.3.1 Semi-structured Interviews (O'Leary, 2004)

The interview is semistructured (O'Leary, 2004). Semi-structured interviews in qualitative research are widely used (Edwards & Holland, 2013). It can result in rich data being generated including observational data (Bjørnholt & Farstad, 2014). Semi-structured interviews are frequently the only source of evidence for a qualitative research project (Adams, McIlvain & Lacy, 2002). In this study, the interviews were organized around a set of open-ended questions, with other questions emerging from the step-by-step dialogues. International students with personal experience about mental issues and campus counseling. The researcher recruited 8 students (n=8) who have faced psychological problems and tried counselling on campus and interviewed them. In the interviews with them, the researcher's words were more cautious and led them to discuss their story frankly.

In this session, the focus group was not used. Because at this stage, no exact design needs to be discussed by group. Group interview helps interviewees to gain a broader spectrum of experience but prevents them from investigating the subject as thoroughly as possible. (Chirban, 1996, Johnson & Wichern, 2002). In this process of research, the researcher would like to insight the current situation of how people use the counseling service and explore the potential needs of the target group. Some in-depth personal interviews may be the best way to get the insight.

Interview Questions (semi-structured):

1. Please let us know you. How old are you and How long have you been in America?

2. Let us talk about the life here. What challenge have you faced in your life or study? How much hours do you study per day? What do you suppose your life here look like?
3. What do you do when you feel stressful and depressed?
4. What do you think when mentioning about campus counselling?
5. What makes you want/ do not want to walk into the campus counseling?
6. What problem do you think campus counseling has?
7. What do you think can solve the current problem?
8. What do you want to know before counseling? What do you want to get after counseling?
9. Let us talk about online counselling service. Have you ever used some service online to release your stress? Could you describe your expectation for the online service?
10. Introduce gamification core drives, then discuss it.

3.3.2 Focus Groups (Langford and McDonagh, 2002)

Morgan (1997) mentioned that the focus group approach is very popular in the social sciences and health. focus groups have various participants sharing their experience or knowledge about a specific topic (Barbour & Kitziinger, 1999, Morgan, 1997, Owen, 2001). Growing focus group reflects a group of like people, without distinct individuals, and is not a short cut for simultaneously gathering data from multiple people. (Duggleby, 2005).

Focus groups are used to investigate participants' needs and feedback when using the online service. There were six participants (n=6) in the focus group, aged between 18

and 30, and the gender was balanced. This is an effective way to investigate user feedback and get knowledge of the factors affecting their experience in online treatment.

The researcher believes that users can participate in design at this stage, so this focus group is more like a collaborative design workshop. The researchers used a variety of different forms, such as creating portraits of people, drawing storyboards, etc., and let participants make suggestions on the topic from the user's perspective. In this session, the participants built a persona of international students and expressed their experience and knowledge about campus counseling. Then they discussed about the ideal counseling services and the potential functions of the online services. At the last, the participants had a discussion about gamification, argued about each core drive and vote for the eight core drives of gamification (Chou, 2019).

3.4.0 Sampling Strategy

As the research is mainly focusing on a specific and professional field, snowball sampling (Goodman, 1961) is preferred. During the questionnaire phase, the researcher posted the link of the survey to social networks with target groups and spread to groups with the same characteristics through reposting by others. The interviews also started from the campus, through the diffusion in the social circle, more qualified participants were reached. Recommendations can also be obtained in the process of recruiting student groups, because this is often more convincing. It can also help to find who have the feasibility to participate in the potential new service.

3.5.0 Analysis Method

The grounded theory (Strauss & Corbin, 1990) approach uses a form of data analysis called theoretical coding (Auerbach, Carl & Louise, 2003). The data was logged and evaluated throughout the research process, systematically organized, and entered into a database. Data analysis was synchronized with data collection and the privacy of the data will be fully insured during the collection and analysis process. In the data analysis part (chapter 4), the illustrative data was from surveys and the sorted codes from the interviews were gathered in tables. Descriptive statistics will be used to summarize the qualitative data and the descriptive data will be shown as charts. The data will be presented as visually as possible.

3.5.1 Method Justification Table

The table below shows research questions and relative methods and justification:

Research Question	Research Methods	Justification/Rationale
What are the sources of pressure for international students and what are the coping strategies when they face stress and depression?	Online survey, Semi-structured interviews.	Using online surveys allows researchers to have a general and comprehensive understanding of the target group. The results of the data can represent the views of most people, and under the condition of anonymity, people are more willing to answer frankly to psychological problems. At

		<p>this stage, faster and more convenient online surveys can make the problem more intuitive and representative.</p>
<p>What are the treatments for mental issues in school counseling?</p>	<p>Semi-structured interviews</p>	<p>In this part, no exact design needs to be discussed by group. The group interview allows interviewers to get a wider range of experience but prevents exploring as deeply into the individual (Chirban, 1996, Johnson, 2002, Rubin & Rubin, 2005). In this process of research, the researcher would like to insight the current situation of how people use the counseling service and explore the potential needs of the target group. Some in-depth personal interviews may be the best way to get the insight.</p>

<p>How does design create a better user experience for online interventions for mental issues?</p>	<p>Semi-structured interviews. Focus Groups.</p>	<p>The research for design is focus groups and interviews, and it is more credible through continuous discussion, feedback, and modification. Moreover, the use of online surveys to display several interactive actions is not intuitive, and the fact that the respondents do not feel the sense of participation makes the survey meaningless.</p>
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Table 1.0 Research Justification/Rationale

CHAPTER 4 ANALYSIS OF DATA

4.0.0 Introduction

The research contains one online survey, one interview, and one focus group. The research proceeded well and as a result there is one voice record of focus group, 6 face-to-face interviews and 2 online interviews (n=8), 60 online surveys from several different schools (n=60). Information about participants are as follow.

The research consists of quantitative research methods and qualitative research methods and there are always discussions around three topics in each method, so the results will be presented in different research methods. The questionnaire is designed based on hints that the researcher got from focus group and interviews.

4.0.1 The Composition of Participants

- Interview

Grade	Amount	Major
Freshman	3	Business
Sophomore	1	Business
Junior	1	Design
Senior	2	Business, Urban Planning

Graduate	1	Education
Total	8	

Table2.0 Participant composition in interviews

● Survey

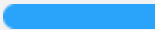
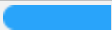


Grade	Amount	Percentage
Undergraduate	34	 54.84%
Graduate	24	 38.71%
PhD	3	 4.84%
Other	1	 1.61%
Total	62	

Table3.0 Participant composition in survey

● Focus Group

Grade	Amount	Major
First-year graduate student	2	Chemistry
Second-year graduate Student	3	Design
PhD Student	1	Engineering

Total	6	
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Table 4.0 Participant composition in focus group

4.1.0 Data Analysis of the Focus Group

4.1.1 Establishment of the Virtual Character

During the session of focus group, the challenge was to engage participants to share their personal experiences of depression that they've been through, allowing the researcher to develop an empathy map and get an intimate understanding of the mental status of international students. The researchers distributed some post-it notes to the participants and asked them to jointly create a virtual character Xiao Ming based on their own experience.

In the process, researchers tried to use objective language to allow participants to discuss their personal experiences. In addition, it is important to understand the complex psychology of participants when referring to depression from the perspective of their family members / supporters. The researchers asked participants to construct this virtual character from several aspects, such as the person's basic information, hobbies, sources of stress, and things to do when feeling depressed. They established a figure (figure 6.0). this event encouraged participants to contribute and share without revealing their private information and prepared for the group's follow-up activities. Participants projected their thoughts, feelings and experiences on virtual

characters when posting post-it notes, and this activity sparked some discussion as well.

The results are organized as an empathy map showed in figure 6.0, which is divided into four parts. When it comes to hobbies, “playing video games” was posted five times, while it was posted just once when it comes to the things that they will do when depressed. In addition, “workout” and “shopping” were posted under the hobbies while they were not posted under the depression condition. Meanwhile, “sleep” was posted three times under the condition of depression, but it was not mentioned in the hobbies. As one participant shared his experience, “when I feel upset, I don’t want to meet friends...I just want to have a day off and sit by the river...” There is adequate evidence showing that participants have different states when they are depressed and normal, and most likely, they will take measures to isolate themselves when they are depressed.

When the researcher asked about participants’ pressure, “study”, “graduation”, “work” and “financial pressure” are posted 4 times, in the meantime, “language” and “interpersonal relationship” are posted 3 times. The researcher thinks participants are thinking more realistic things since they are graduate students, so they are more mature than undergraduate students, that’s the reason why the result of the focus group is different from the result of interviews.

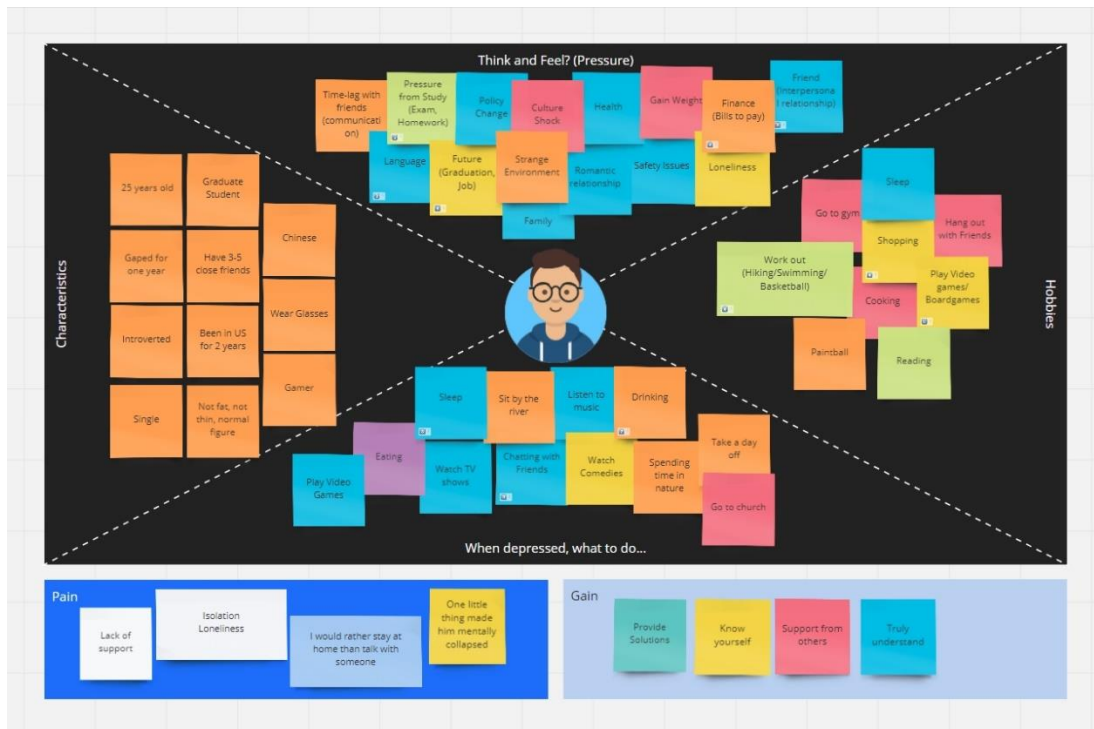


Figure 6.0 Empathy map

4.1.2 The Attitude Towards Campus Counseling

The keywords that showed the perception of campus counseling are as follows.

Key words	When to use	Feedback from others
It's not useful, based on a kind of stereotype...not like counseling...just chatting...	High school, academic pressure	normal, mentally ill; most people in China have bias on counseling, not willing to do...
The activity is a bit monotonous, basically it is to let you talk about the things you worry	undergraduate, in China	

about...there is no substantive effect, and finally solve it yourself...		
Used it in China...kinda useful...set scene and let you draw and describe...know yourself...require long-term therapy...	undergraduate, in China	professional, good There is a sand box in the counseling center...don't know how to use your personalities
Almost same as no...group games...Psychological Committee...no training...with counseling center	undergraduate, in China	
Have worked as a psychological committee...no idea...	Never	Formalism
put more attention on students who's been through something bad...students don't actively seek for help..	Never	

mental issues are not only about personalities...more about the current problems...	undergraduate, in China	Once the problems are solved, you will get better...
It can help you think... in another way...	undergraduate, in China	You need encourage... but you need to solve the problem yourself...
Campus counseling can help stressed out student...report to professor	Graduate, in the US	
Stress out... suicide... problem cannot be solved...	undergraduate, in China	
Every semester... psychological test...advisor let you go...	Never	Antagonism
I know what I need and what I can do...it's not necessary for me...maybe useful for others...	Never	a good friend may have a better help;
No pressure when use counseling...no worry about privacy...	undergraduate, in China	Professional counseling may help...

If I feel bad, I can go to the counseling, but I won't go if others recommend...	undergraduate, in China	
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Table 5.0 Participants' opinions about campus counseling

Table 5.0 showed the specific opinions about campus counseling, the researcher could find key words about their experiences and perceptions of campus counseling in this table. It indicated that two-thirds of the participants believe that campus psychological counseling is “useless”. Many schools set up campus counseling centers for formal purposes only. One of the participants mentioned the campus counseling center in her school uses an interactive way like “drawing and describe” to help students get know themselves. And One of the participants said the campus counseling can help you solve some “academic problems”. One-half of the participants indicated that they had participated in psychological counseling. Another one-half of the participants believed that their psychological problems originated from the current problems, which was quoted as saying that “As long as the problems can be solved, the psychological problems do not need to be paid attention to .” Two of the participants mentioned the stereotypes of psychological counseling in their country. 5/6 of participants believed that psychological counseling should be useful for people with psychological problems because of its “professionalism and privacy”. But one participant thought that a good friend could also play this role.

4.1.3 Expectations of the Service

In the process of building the ideal campus counseling model, the researcher let participants posted their ideas on three phases- before counseling, in counseling and after counseling. The results are shown through the affinity map (Figure 7.0). This

figure intuitively shows the experience and thoughts of the participants in the three stages.

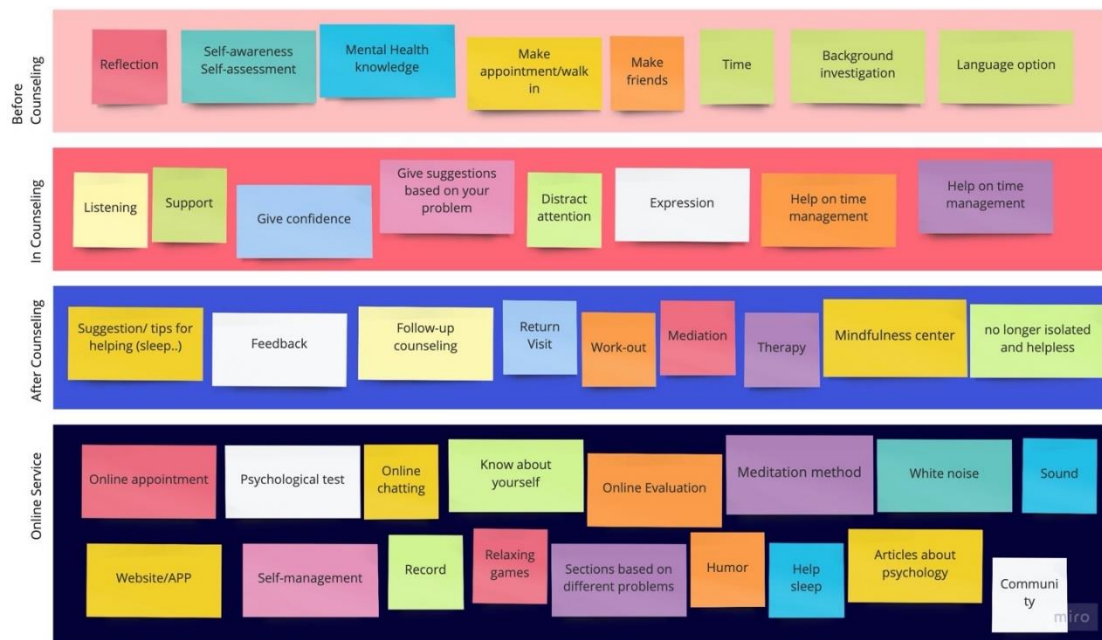


Figure7.0 Affinity Map

Under the topic that the participants want to know before counselling, “self-awareness and assessment” were posted four times, followed by “making appointments” and “background investigation” on counselors, which were posted two times. “mental health knowledge” and “language option” were also mentioned.

Under the topic that the participants want to get from counseling, “give suggestions based on your own problems” were posted four times, “support” and “listening” were also mentioned. As for the topic that the participants want to get after counseling, “feedback” and “follow-up counseling” were both posted four times, followed by “suggestion for helping (sleep...)”, which was posted three times. Other recovery ways like “meditation” and “mindfulness center” were also mentioned.

When talked about online service, participants discussed that the form should be a mobile application or a web page. Some participants believed that the web page was more professional and authoritative, while mobile applications received attention because of its convenience. They generally believed that it depends on the function of the service, and they said both of two forms need to be developed. As for the functions, contents about online assessment were posted four times, followed by “building communities” (posted three times) and some ways about relaxing like “meditation”, “games”, “white noise” (posted three times). In addition, “article about psychological knowledge”, “online appointment”, “self-record” were also mentioned.

4.1.4 Gamification

The discussion around gamification was based on the theory “the eight core drives of gamification” raised by Chou (2019). The researcher introduced the theory to the participants by a simple case study. After a discussion about the application of gamification in online service, the participants vote for each core drive of gamification one by one, the results are shown in table 6.0.

	Meaning	Accomplishment	Ownership	Scarcity
Yes	3	6	5	0
No	1	0	0	3
Not sure	1	0	1	3
	Avoidance	Unpredictability	Social Influence	Empowerment
Yes	0	0	3	5
No	6	2	2	1
Not sure	0	4	1	0

Table 6.0 Participants' vote for 8 core drives of gamification

The results showed that “accomplishment” is the most recognized since all of the participants agreed on it, followed by “ownership” and “empowerment”, which got 5 “yes”. “Meaning” and “Social influence” were considered uncertain because half of the participants agreed. In addition, all of the participants think “Scarcity”, “Avoidance” and “Unpredictability” should not be applied to the service.

Figure 8 more intuitively showed the proportion of eight core drives in voting, arranged from left to right. The order is: Accomplishment > Ownership > Empowerment > Meaning > Social Influence > Unpredictability > Scarcity > Avoidance.

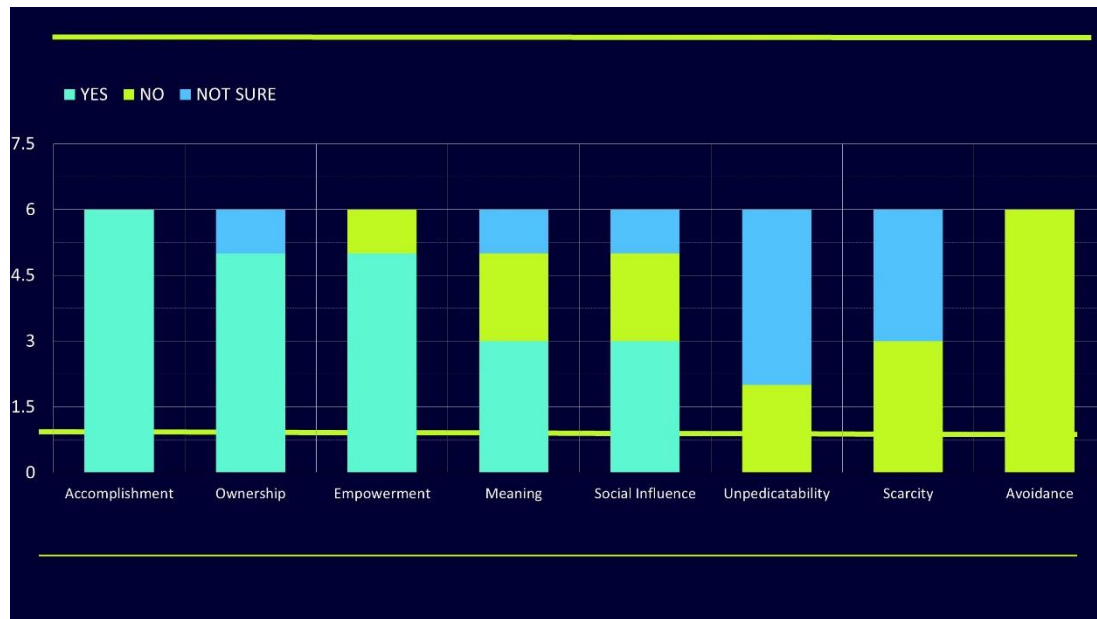


Figure 8.0 Participants' vote for gamification

4.2.0 Data Analysis of Survey

4.2.1. Basic Information of Participants

The survey was posted online for one week and 62 participants filled in the questionnaire on the WeChat. The bar graph (Figure 9.0) below showed the gender composition of participants. The Figure 10.0 showed the participants' age distribution. The age ranges from 19 to 30 and 58% of participants are between 20 to 23 years old. 43.55% of participants are female and 56.45% of them are male.

The table 7.0 represented the proportion of schools from which participants come. Because the online survey was published in the researcher's social circle, there are many participants from the University of Arizona and Arizona State University, 37.09% and 22.58%, respectively. In addition, 19.35% of participants are from other universities in the U.S., 11.29% of them are from universities in Asia, 8.06% of them are from Universities in Europe, and only 1.61% of them are from universities in Australia.

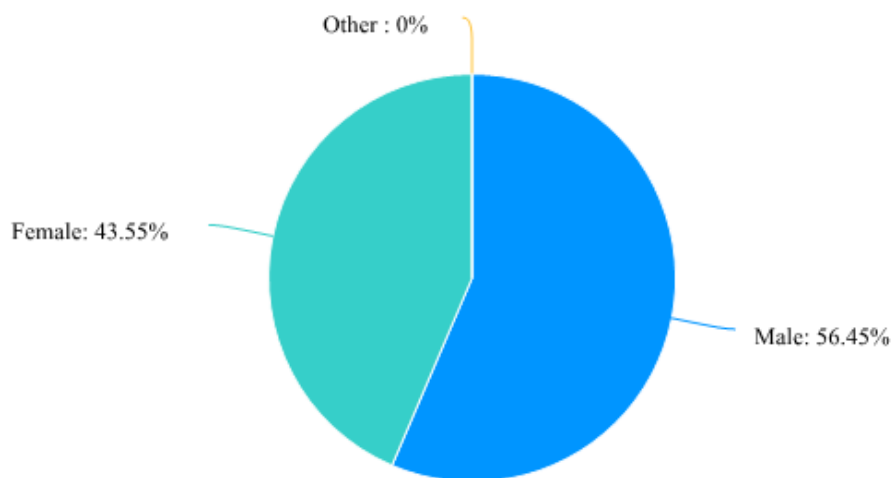


Figure9.0 Gender ratio of participants

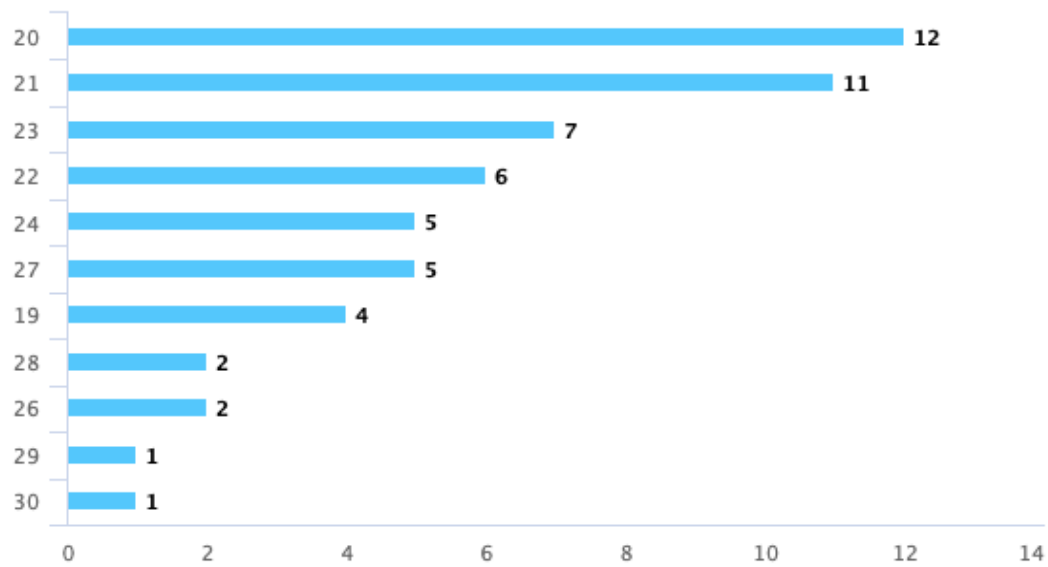


Figure10.0 The age composition of participants

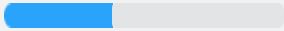
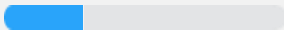
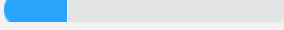
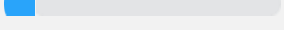
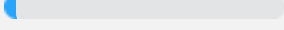
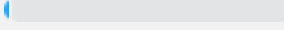
School	Amount	Percentage
University of Arizona	23	 37.09%
Arizona State University	14	 22.58%
Other Universities in America	12	 19.35%
University in Asia	7	 11.29%
University in Europe	5	 8.06%
University in Australia	1	 1.61%
Total	62	

Table7.0 The school composition of participants

4.2.2 Attitude Towards Their Life Abroad

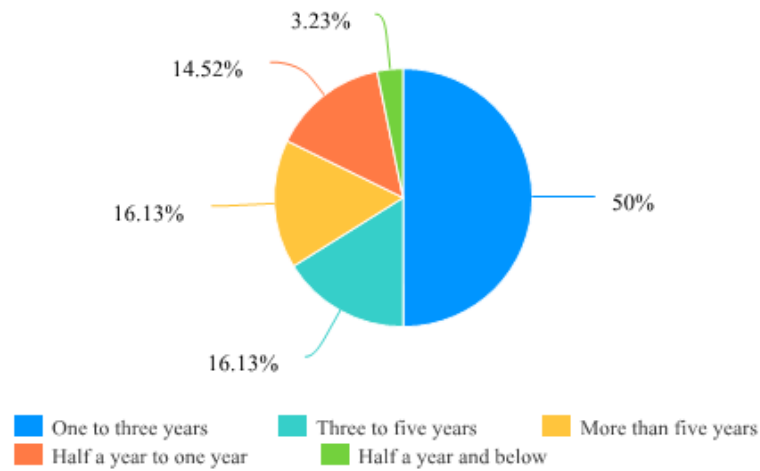


Figure 11.0 Years of living abroad

The first pie chart (Figure 11.0) showed how many years participants have been living abroad. This index can be combined with the second pie graph to evaluate the adaption of participants. There are 50% of participants who have been living abroad for one to three years, 16.13% of participants have been living abroad for three to five years and it's the same rate as living more than five years. About 14.5% of participants lived for half a year to one year and only 3.23% of them lived for half a year and below.

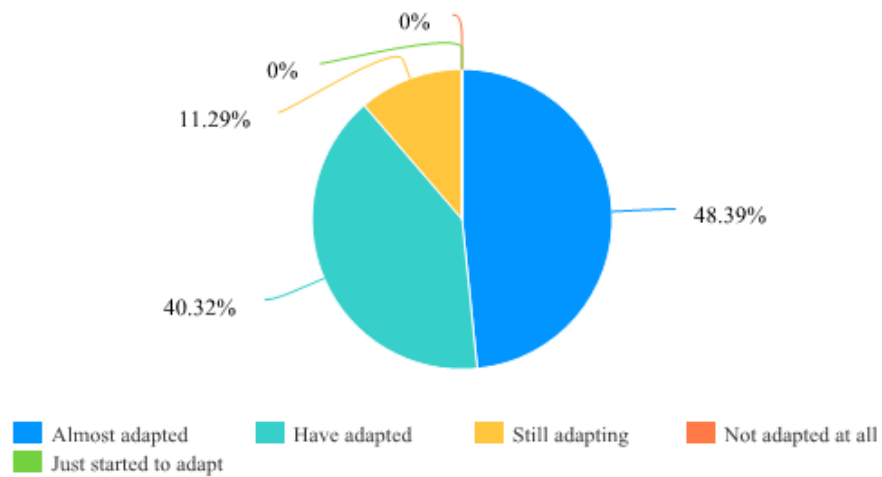


Figure 12.0 Adaptation of international students to life

The results of the adaptation of international students can be seen through the pie charts (Figure 12.0). In this research, none of the participants is not adapted to their life here. 40.32% of the participants reported they have already adapted to the life here, and 48.39% of them are almost adapted to their life here. 11.29% of the participants are still adapting.

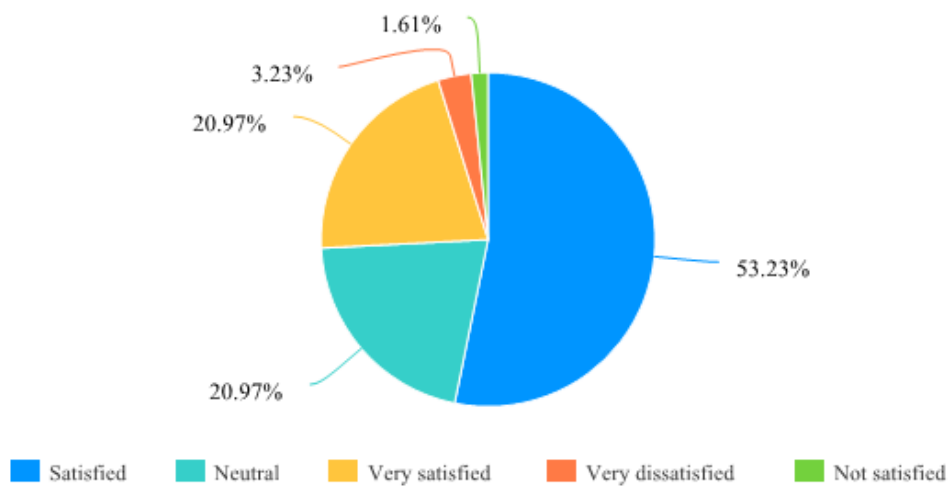


Figure 13.0 International students' satisfaction with their life abroad

Figure 13.0 showed participants' satisfaction of their life abroad. It described the participants' satisfaction of their life abroad in another point of view. The result can be seen through the pie chart. More than half (53.23%) of the participants thought they are satisfied with their life abroad. The rate of participants who are very satisfied is 20.97%, which is about the same level as the neutral rate. Besides, there are 1.61% of the participants said they are unsatisfied with their life abroad and 3.32% of the participants said they are very dissatisfied.

4.2.3 Pressure of International Students

The bar graph (Figure 14.0) is the result when asked about "main reasons of dissatisfaction when living abroad" and the histogram is the order that participants made of all these reasons.

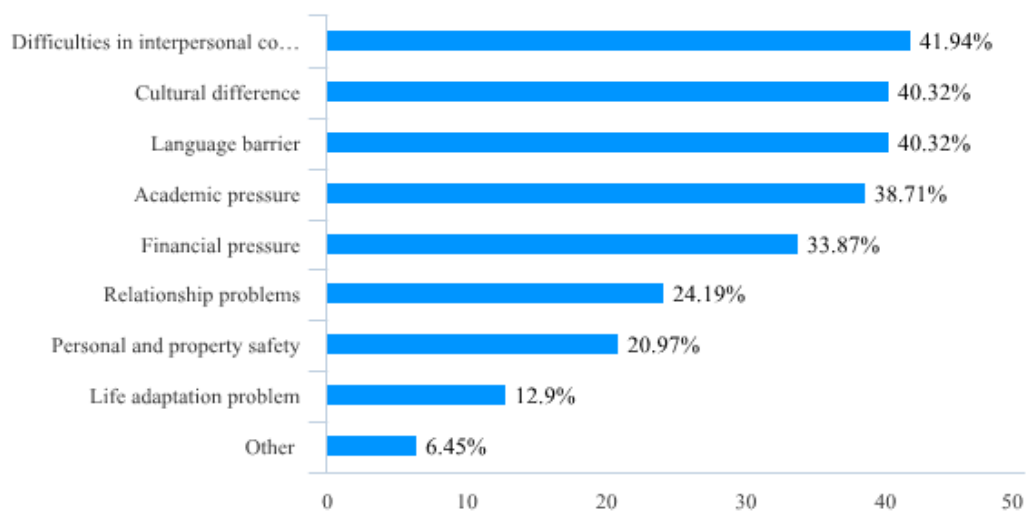


Figure 14.0 Main reasons of dissatisfaction

The result in figure 14.0 showed that the most frequently reported reason is the difficulties in interpersonal communication (41.94%), followed by the ratio of

“cultural difference”, which is at the same rate as the reason “language barrier” (40.32%). 38.71% of participants said academic stress is one of their stress sources, and 33.87% of them reported financial pressure is the reason why they are dissatisfied with their life abroad. Besides, the ratio of “relationship problems” reported is 24.19% and the ratio of “personal and property safety” is 20.97%. The life adaptation problem is reported as 12.9% and the rest 6.45% of participants said they are very satisfied with their life here and there is no reason made them dissatisfied.

Figure 15.0 is the result of the participants arranging these factors in order, which shows the weight of each factor. According to the figure 15.0, the order of these reason is “language barrier” > “academic pressure” > “cultural difference” > “difficulties in interpersonal communication” > “financial pressure” > “life adaptation problems” > “personal and property safety” > “relationship problems”.

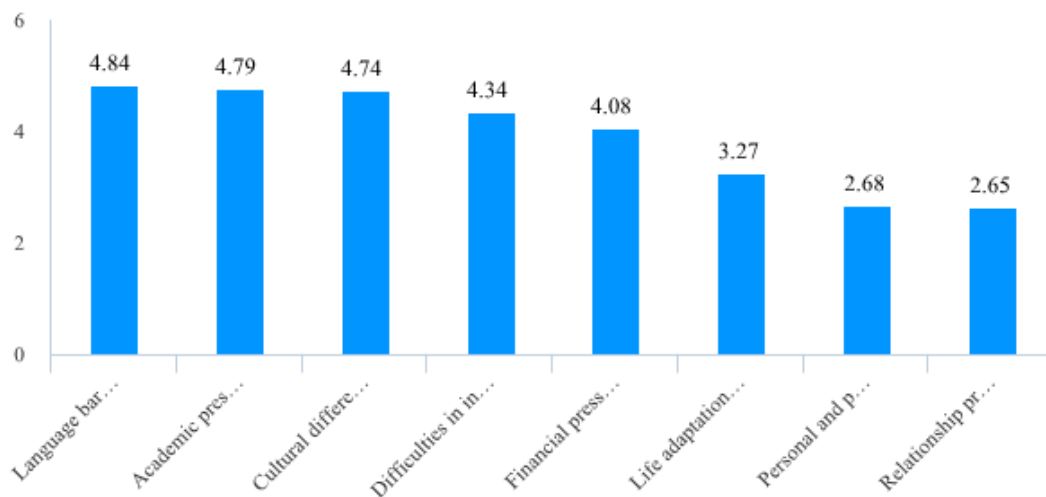


Figure 15.0 The order of challenges for living abroad

4.2.4 Coping Strategies with Depression

Figure 16.0 showed the participants' performance when they are depressed. The results showed that after listing the 7 most common experiences, the students experienced the most is “want to avoid socializing” (56.45%) and “feel anxious and nervous” (56.45%). The second-ranked experience is “lost interest in life” (40.32%). Then is “somehow I feel bad things will happen” experienced by 33.87% of students. The next is followed by “feel like someone is laughing at me” and “can’t keep calm”. In this survey, 17.74% of participating students said that these 7 experiences did not happen to them.

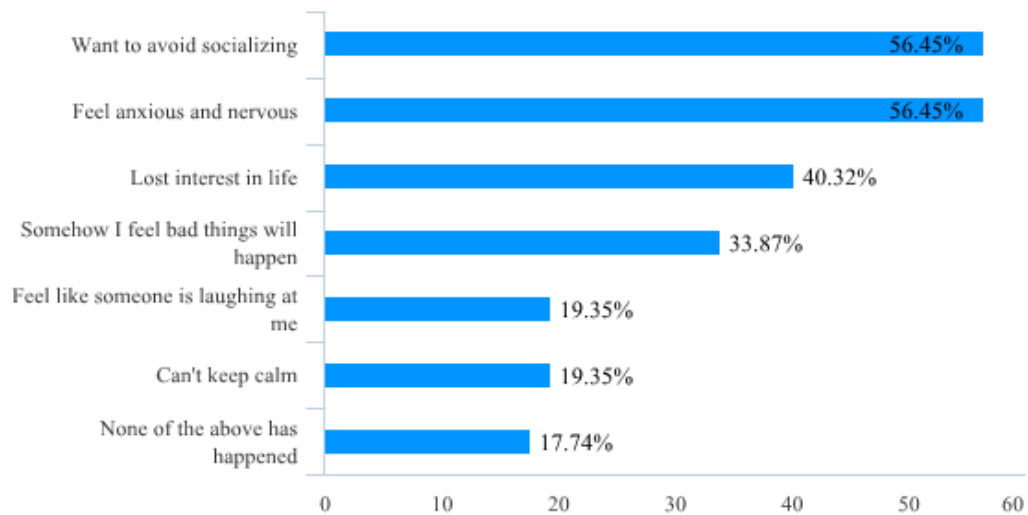


Figure 16.0 Depression situations

The second pie chart (Figure 17.0) showed the frequency of depression among participants. Among them, 50.94% of the participants “sometimes” experienced depression. 28.3% of people “rarely” have depression. 15.09% of people “often” suffer from depression. The remaining 5.66% of participants “always” experienced depression.

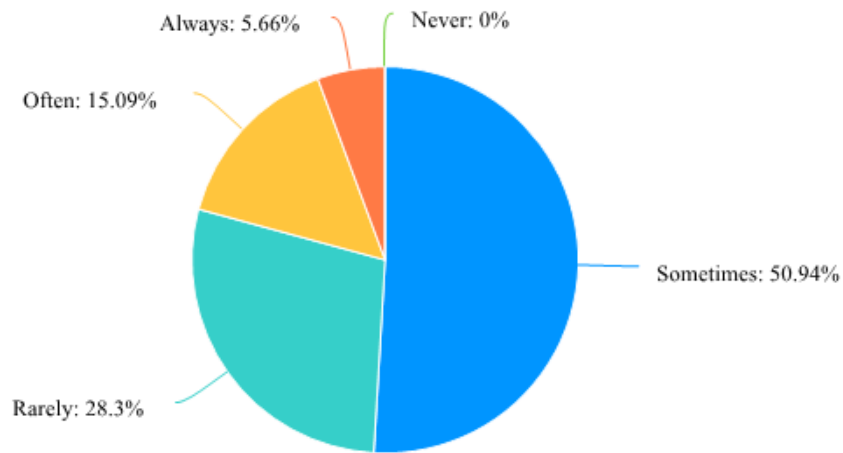


Figure17.0 Frequency of depression situation

The third bar graph (Figure 18.0) showed how participants responded when they experienced depression, which demonstrated their coping strategies. Among them, the most common strategy is to “seek help from family, roommates or classmates” (59.68%). Secondly, 58.06 % of people will “entertainment, such as singing”. In this survey, 33.26% of people expressed they are rather “thinking hard in mind, not talking”. “Find psychological related information on the Internet”, “talking to strangers online” and by using other ways, the proportion of these three strategies is all 11.29%. And also 1.61% of participants are willing to “seek help from campus counseling center”.

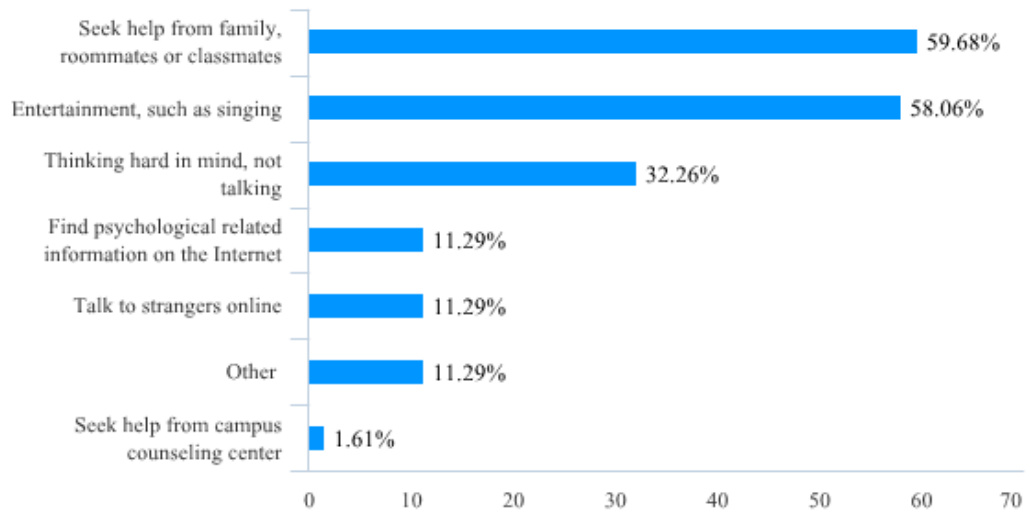


Figure 18.0 Coping strategies when depression

4.2.5 Attitude Towards Campus Counseling Service

The first pie chart (Figure 19.0) showed the participants' understanding of campus counseling. In this survey, 58.6% of the participants chose “I know, but I do not know specifically where”. 20.97% of people chose “I know, and I know the specific location”. The remaining 20.97% know nothing about in-campus consultation.

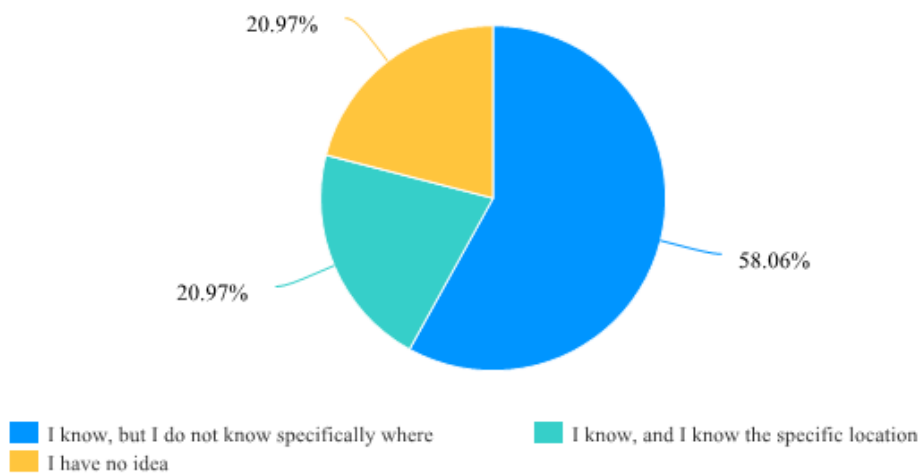


Figure 19.0 Understanding of campus counseling

The second pie chart (Figure 20.0) showed the participants' use of in-school counseling. And can be combined with the first bar graph to discuss why people do not use on-campus consultation. In this survey, 93.55% of the people have not been there, and only a very small number of 6.45% have had the consulting experience.

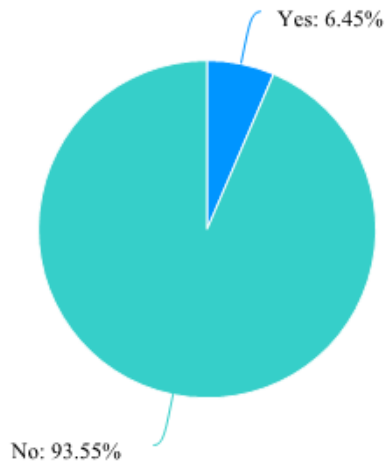


Figure 20.0 Use of campus counseling service

Figure 21.0 showed the satisfaction of the participants who have visited the school for consultation. This can be compared with the second bar chart to view people's views and attitudes about on-campus counseling. 75% of people think the consultation process is "very satisfied". The remaining 25% of participants felt "satisfied". However, it is worth noting that only three participants (n=3) answered this question.

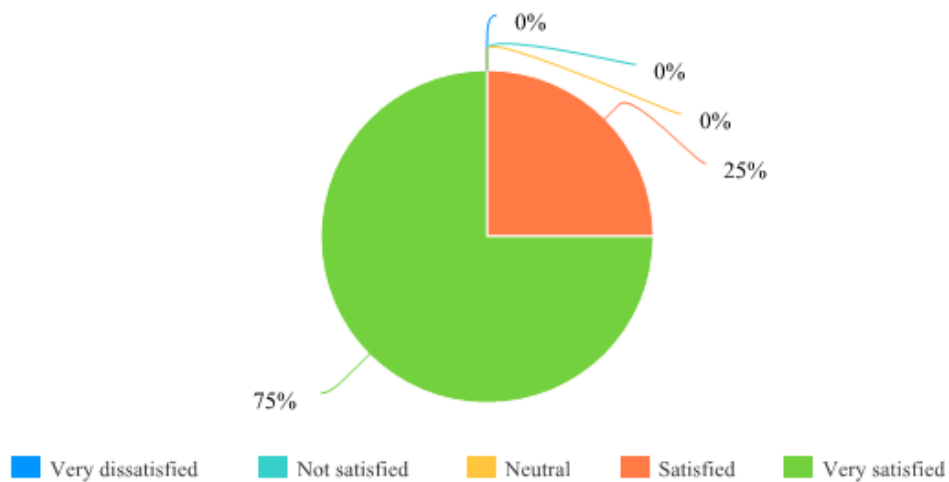


Figure 21.0 Satisfaction with campus counseling service

Figure 22.0 showed why participants did not use on-campus counseling before, which indicated international students' attitudes about campus counseling. The most common reason is that participants think "My mental health problems are not serious and do not require consultation" (72.58%). The second cause of no use is because people "worried about language barriers" (29.03%). 20.97 percentage of participants said, "cannot be understood because of cultural differences". Besides, 8.06% of participants think "Worried about the professional level of the campus counseling center (the professional level of the counselor, information leakage, etc.)". There also have 6.45% of people have some other reason or issue. The last part of the participants is "worried about being talked about, afraid to consult" (4.84%). There is no one "choose an out-of-school counseling agency".

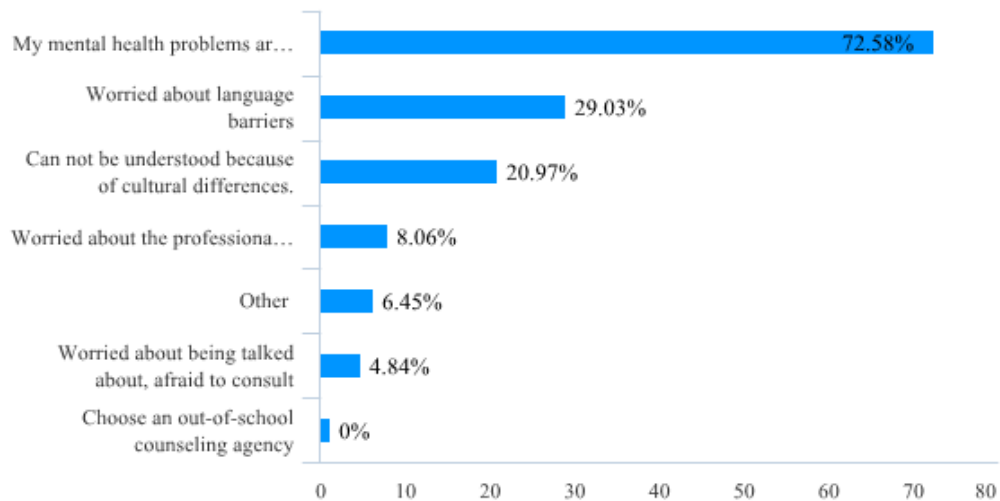


Figure22.0 Reasons why participants did not use campus counseling

Figure 23.0 showed the perceptions of the participants about campus counseling. In the bar chart (Figure 23.0), 64.52% of the participants think “counseling is a good way to relieve emotions”.61.29% of people think “counseling can help people with psychological problems” 41.94% of people choose "people who are mentally healthy can also receive counseling". Also, some participants expressing "consultation is just chatting" (35.48%) and "consultation is to do ideological work" (19.35%). 6.45% of people have a negative attitude to the campus counseling, they think "it's embarrassing to consult". Also, two parts of participants think "people who go to the consultation must be mentally ill" (3.23%) and "consultation is ineffective" (3.23%). There are 1.61% of people have other different attitudes about the consultation.

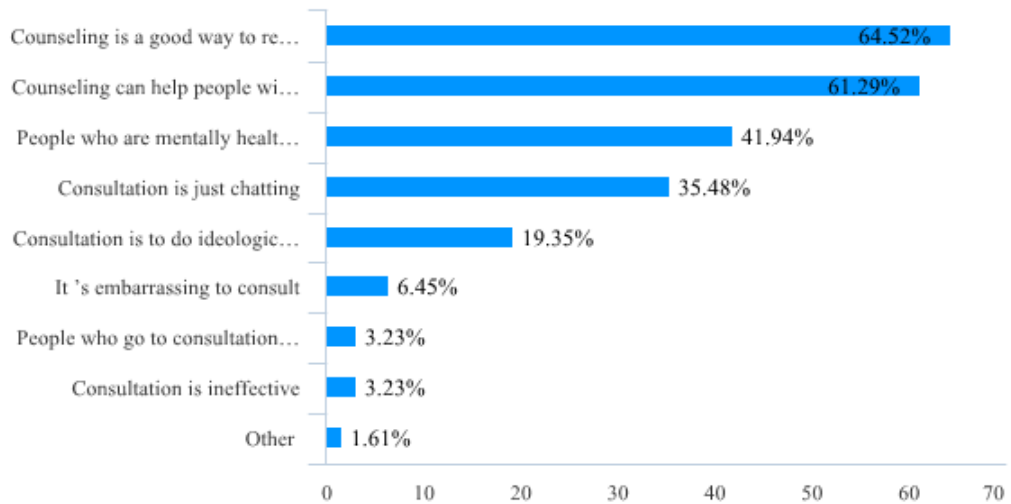


Figure23.0 Participants' attitude towards campus counseling

4.2.6 Attitude Towards Online Service

The first pie chart (Figure 24.0) showed the participants' attitudes about online service, it indicated their acceptations of online services about mental health care. 77.42% of people would like to use it. And there also are 22.58% of people have a negative attitude about online service.

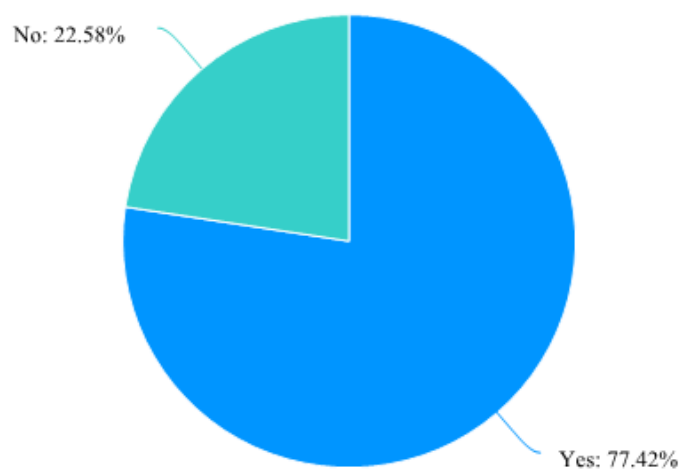


Figure24.0 Participants' attitude towards online service

Figure 25.0 showed which form of online service should be, which could be used as a reference for the future developers. Most people think that “website” and “mobile applications” both should exist (82.26%). A part of people think it should be a “website” (11.29%), and the rest think it should be an application (6.45%).

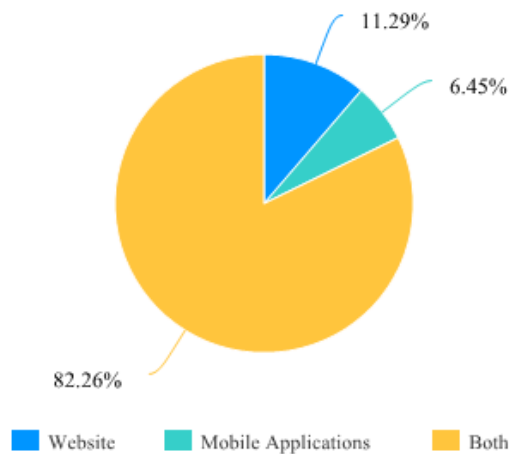


Figure25.0 Forms of online service

Figure 26.0 showed the acceptations of non-face-to-face counseling, which represented if the off-line services can be replaced in the future. 69.35% of people think it cannot be. 19.35% of people think "it depends". And the remaining people think it can be replaced (11.29).

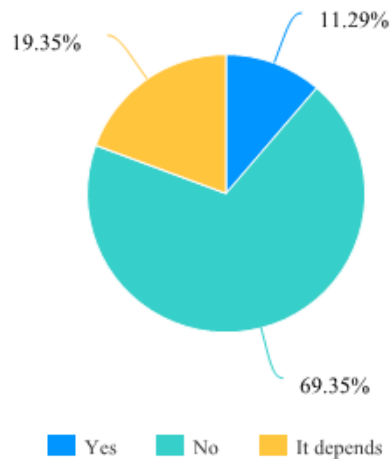


Figure 26.0 Participants' attitude towards face-to-face counseling

The fourth pie chart (Figure 27.0) showed what functions people think online service needs to have, which could be used as a reference to the future developers. It is generally believed that an "online reservation" (74.19%) is required. Next, "immediate psychological counseling" (70.97%) is second-ranked. Also, some people think there should be "self-recording and management" (54.84%) and "psychological knowledge education" (53.23%). And 43.55% of people think it should require some "communities". There are 3.23% of people have other advice.

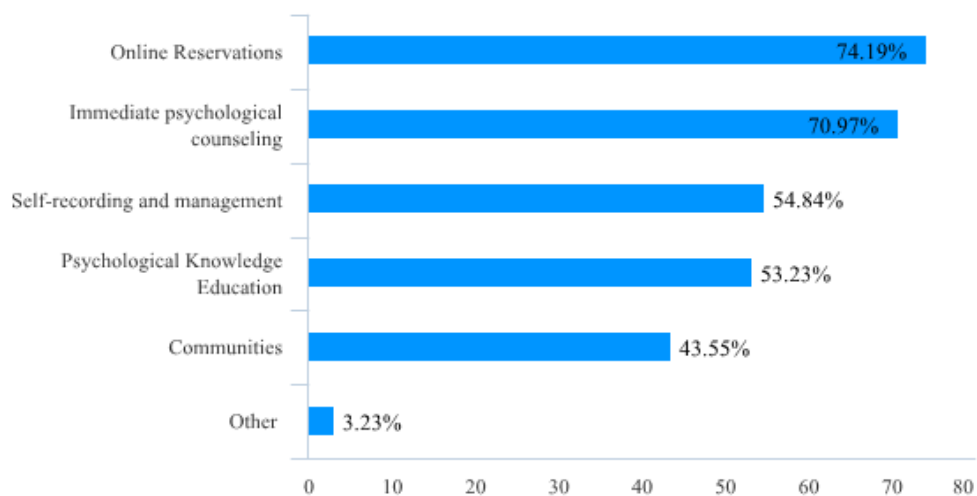


Figure27.0 Functions of online service

Figure 28.0 showed what style of online services can be accepted by most people. Most people are willing to use “professional and official” (69.35%). Second ranked is “highly interactive and interesting” (56.45%). Also, a part of people wants to use “Simple function, easy to use” (35.48%). There are 4.84% of people prefer other ways.

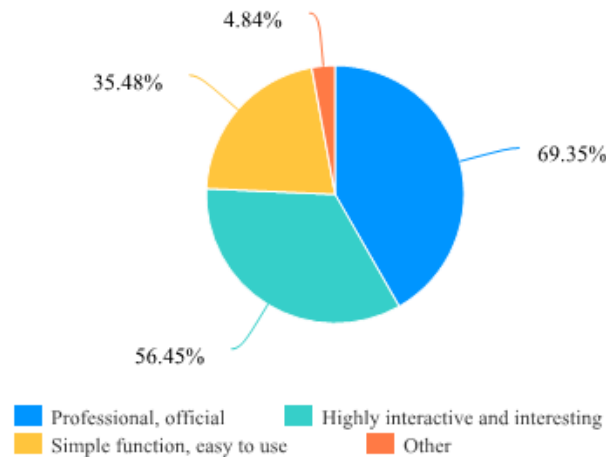


Figure28.0 Style of online service

4.3.0 Data Analysis of Interviews

The researcher did semi-interviews with 8 participants, 7 of them are in Arizona State University and one of them are from another university in America. Among them, 3/4 of the participants have used campus psychological counseling services, and the other two also have some knowledge of campus counseling.

4.3.1 Pressure of International Students

The key words that showed participants' pressure are as follows.

Keywords	Major	Years of residence in the United States
I feel a sense of worthlessness...No support from families and friends...loneliness...It is difficult to deal with everything independently...	Design	2 years
Depression...Isolated from people...can't do academic work... no friend to talk...	Design	2 years
Roommate was annoying...exotic relationship...	Education	2 years
Feel nothing... cannot be happy	Education	2 years
Racism...when play basketball...	Business	6 years
Family issues...Relationship problem...	Business	6 years
Shortage of funds...campus dormitory is expensive...	Business	1 year
Think that other people's psychological problems are disease-free moaning...	Business	1 year
Academic pressure...tutoring center	Business	1 year
High GPA... Academic Pressure...work pressure...club activities...time management...insomnia	Economy	Half a year

Interpersonal relationship...people are using me... not friends...	Economy	Half a year
Race and culture	Economy	Half a year
Academic pressure before tests...Graduate...jobs...	Urban Planning	4 years
Emotion...relative passed away...depressed	Urban Planning	4 years
Not adapted to life here...	Business	7 months
Relationship with family...quarrels with them	Business	7 months
Loneliness...hard to get along with foreigners...cultural background	Business	7 months
Time management...too focused on study...want have some social activities	Business	7 months
I failed the college entrance exam...my father is violent, I have confliction with family because of being homosexual	Business	7 months
Can't get along or make friends with Americans...closed environment...cultural difference...	Business	4 years
Conflict with host family..no one understood me...racism	Business	4 years
Interpersonal relationship...roommates...	Business	4 years

Sense of failure...		
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Table 8.0 Pressure source of international students

The results in Table 8.0 showed why participants used psychological counseling services and were also the source of pressure at the time. Problems about the interpersonal relationships were the most mentioned. The participant was quoted as saying that “I can’t get along with foreigners and I’m always alone...I always have trouble getting along with new friends.” In other words, international students get a sense of loneliness due to many reasons, such as cultural differences, no support from family or old friends, racism, etc... In addition, family issues, academic pressure, financial stress are also mentioned. Most participants had only one major problem when taking counseling.

The words are themed and coded in the Figure 29.0. It can be intuitively seen where the stress of international students comes from and the places highlighted by the participants are mentioned many times. Such as “Future”, “Cultural Background”, “Isolation”.



Figure 29.0 Typology of Stress

4.3.2 Coping Strategies for Stress and Depression

The key words that showed participants' coping strategies are as follows.

Keywords	Major	Years of residence in the United States
Sleep...daze...cry...	Design	2 years
Send messages to friends...Eat with friends...	Design	2 years
Work out with videos...meditation needs to learn...	Design	2 years

Eating...Work out... Meet friends...Communicate with friends and roommates...	Education	2 years
Smoking...Drinking...Never seek help from others...	Business	6 years
Not talk with others on such problems... Watch videos	Business	1 year
Seek help online...find some articles... get suggestion from others...	Economy	Half a year
Work out...listening to music...not seek help from others	Urban Planning	4 years
Buy things...self-harm...don't want to be happy	Business	7 months
Rest disorder...less communication with friends... not go out...	Business	4 years

Table 9.0 Coping strategies of international students

Table 9.0 showed the state and behavior of participants in depression. 3/4 of the participants chose to be alone when they were depressed, and 1/4 of them contacted friends to relieve stress. Half of the participants said they would not take the initiative to seek help when they were depressed, while the other half were proactive in talking to people, including counselors, friends or online for help.

4.3.3 Perception of Campus Counseling

The key words that showed participants' perception of campus counseling are as follows.

Keywords	Major	Years of residence in the United States
Need to send an email to make an appointment, there will be a delay mentality...not timely enough...	Design	2 years
Counselors' attitude towards students is key... just solve the surface problem... not get to the deep...	Design	2 years
Have experience of being judged...Male counselors can't understand female...	Design	2 years
The qualifications of counselors and their professionalism...I met a consultant who had been talking about it and felt that I was not the subject..	Design	2 years
The audience is too small, too few students try, many students do not think they can get help from it....	Design	2 years
Participants...Cultural difference... language barrier...	Design	2 years
Not formal...be introduced to other therapist...counselor was nice but not sincere... cannot solve problems	Education	2 years

Wish to be treated as normal...sense of safety...	Education	2 years
It's a place to talk and chat...solve the problem...listen and take notes...	Business	6 years
Make an appointment for the second time, but the problem is solved and never went...	Business	6 years
Language is not a problem for me...	Business	6 years
Considered as mental illness when go to counseling in my country	Business	6 years
The school can provide a statement to help him get rid of the dormitory...	Business	1 year
Prejudice... Expensive	Economy	Half a year
Language is a problem...my English is not good...	Economy	Half a year
No instant help...digest myself...	Economy	Half a year
Cry out and comfort...empathy with me	Economy	Half a year
Knowledge can help eliminate shame and discrimination...	Economy	Half a year
Coach helps appointment...not so helpful...just chatting...	Urban Planning	4 years
I don't want to suicide...but the counselor keeps reminding	Business	7 months

me...recommended to long-term therapy...not treated normal		
Not solve problem...walk in...wait for a long time...charge for online appointment...	Business	7 months
Want to get some advice...professional	Business	7 months
I know I have mental issues and want to save myself...shameful...recognized myself as mentally ill...suicide tendency...	Business	4 years
Not professional...Not empathy,,No appointment...No solution	Business	4 years
Some articles of psychological knowledge...being cared is good...	Business	4 years

Table 10.0 International Students' Perceptions of Campus Counseling

Table 10.0 showed most of the participants think that the campus counseling was not useful for them, as quoted as saying that “I feel the people there were nice, but they didn’t want to understand you...I feel I was judged by saying...” In other words, they think the reason why the counselors do not empathy them include cultural differences, language barriers, and insufficient professionalism. 3 of the participants also said they felt counseling was a waste of time and was not timely.

The interview notes were coded and listed in the Figure 30.0. Figure 30.0 showed how participants thought of campus counseling. The highlighted words are most mentioned

by participants, such as “Judge”, “Empathy”, “Understanding”, “Instant help” and so on.

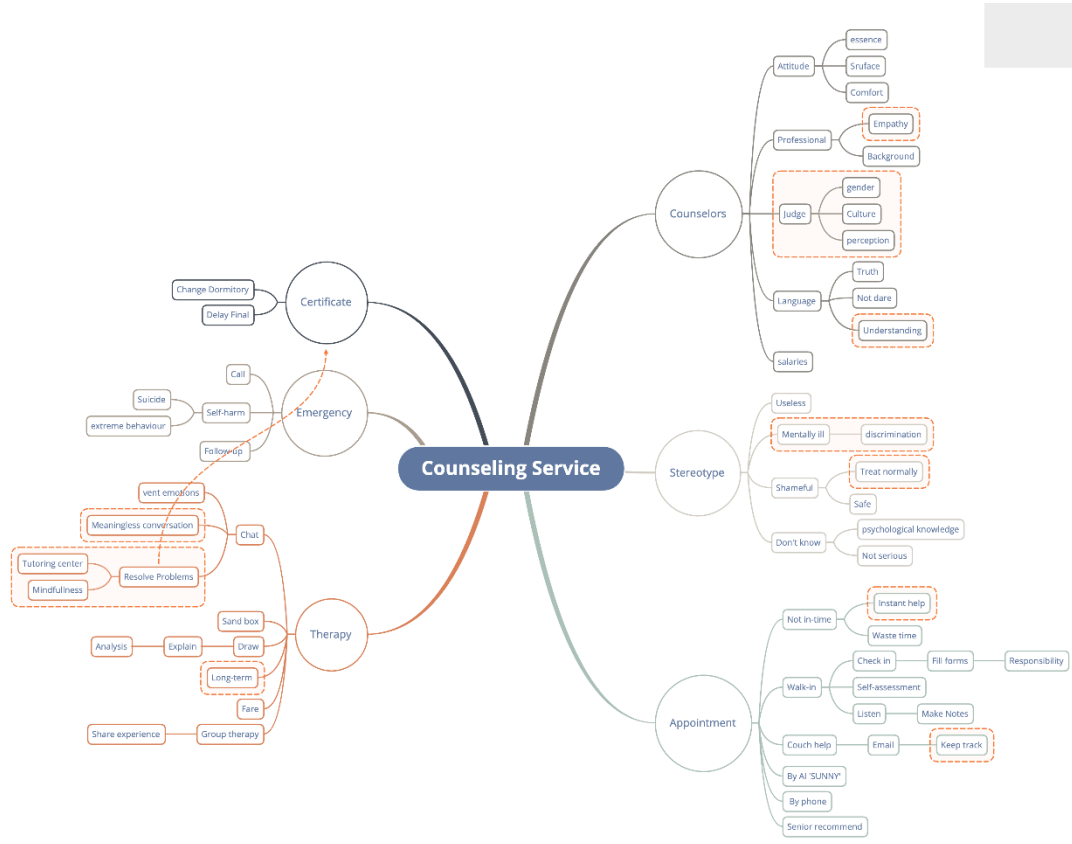


Figure 30.0 Typology of Campus Counseling Services

4.3.4 Expectations for Online Services

The key words that showed participants’ perception of expectations for online services are as follows.

Keywords	Major	Years of residence in the United States
Applets...message...not application	Design	2 years
Face-to-face counseling cannot be replaced...	Design	2 years

Self-recording is not professional...not build further road for students...privacy	Design	2 years
Self-assessment...distinguish from depression scale...Record feelings every day, give tips, and guide to record happy things...	Design	2 years
Privacy and objective profile...	Design	2 years
Gamification is not serious for mental health...but can be used in other function...	Design	2 years
Some knowledge about psychology...	Education	2 years
App is convenient...should be down-to-earth and relaxing...	Education	2 years
Chat with strangers...Receive suggestions from the elder...	Business	6 years
Use app when breakdown...serious...	Business	6 years
Social fear...online answering...appointment for face-to-face counseling...	Business	1 year
Serious for some people who have mental health...the interface should be relaxing...using frequency not high	Business	1 year

Notification...articles for psychology... Interactive way...help meditation...step by step...message... ASU Robot...	Economy	Half a year
Activities remind...psychological lectures...panel for studying	Economy	Half a year
Psychological scale is too rigid...	Economy	Half a year
Like coach...keep track...	Urban Planning	4 years
Profile...appointment with chosen counselor...	Business	7 months
Need time to adapt to apps...	Business	7 months
Recommend activities to increase mental health...	Business	7 months
Online counseling with real person...	Business	7 months
Volunteers to listen to your problems online...face-to-face and online combine...robot...official web is cold and not empathy...	Business	4 years
Professional sense...Cute and good-looking interface...app and web both...feel cared...online therapist...warm...	Business	4 years

Participant of users...one-to-one...communities...alone make things severe...	Business	4 years
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Table 11.0 Expectations for online service

Table 11.0 showed that most participants believe that this service should have both a website and a mobile terminal, because this ensures its seriousness and convenience. And the style of this service is serious or easy based on the functions it provides. The participants also provided some ideas for this service, such as online appointments and online consultations, self-assessment and self-recording, communication communities and psychological knowledge sharing, as well as activity recommendations for improving mental health.

The interview notes were coded and listed in the Figure 31.0. Figure 31.0 showed what participants' ideal online service for mental health care is. The highlighted words are most mentioned by participants, such as "Friends", "Assessment", "Progress", "Anonymous" and so on.

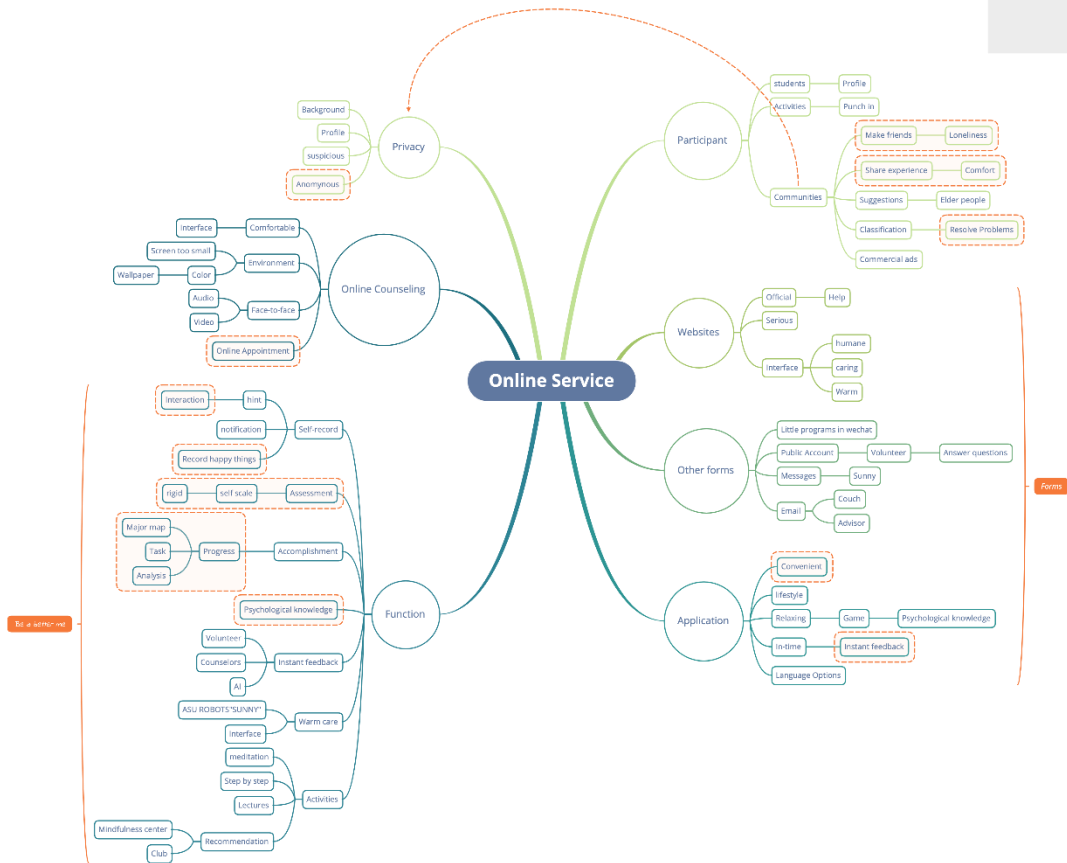


Figure 31.0 Typology of Online Service

4.3.5 Gamification

In interviews, the researcher introduced the conception of gamification, and let them assume that the eight core drives of gamification (Chou, 2019) are used in online services and express their opinions on each point.

The results are shown through the affinity map (Figure 32.0), it showed that everyone's opinions about each core drives and the gray area represents the bad effect of this core drive. "Meaning", "Accomplishment" and "Empowerment" are three core drives that are most comfortable since there are positive assumptions about that. There are many comments under the core drive of "Social Influence", which shows it is a controversial core drive. "Scarcity", "Avoidance" and "Unpredictability" are

uncertain factors because the participants’ understanding and assumptions are different. “Ownership” was recognized negative because the participants said it’s not related to mental health service. In addition, one of the participants think gamification should not be applied to the mental health services, as saying that “growing up is something that you are responsible for, you should not be rewarded by that...gamification is not serious on this issue.”

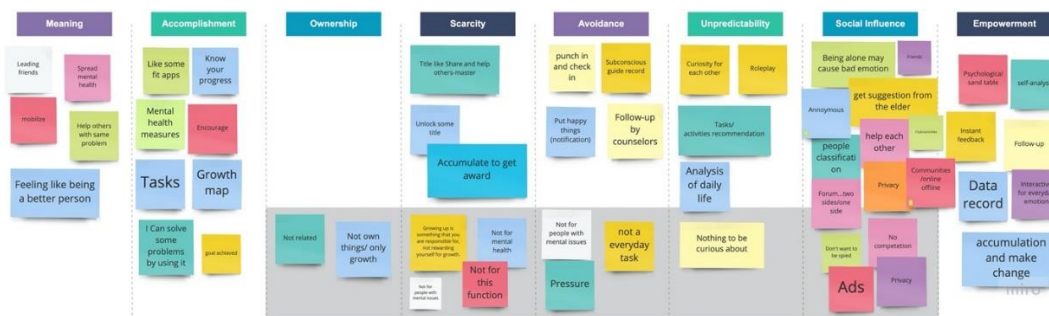


Figure32.0 The Affinity Map for Gamification

Figure 33.0, Figure 34.0 and Figure 35.0 are the matrixes about the eight core drives of gamification (Chou, 2019). In this matrix, the x-axis represents whether this factor is useful, and the y-axis represents whether this factor is appropriate.

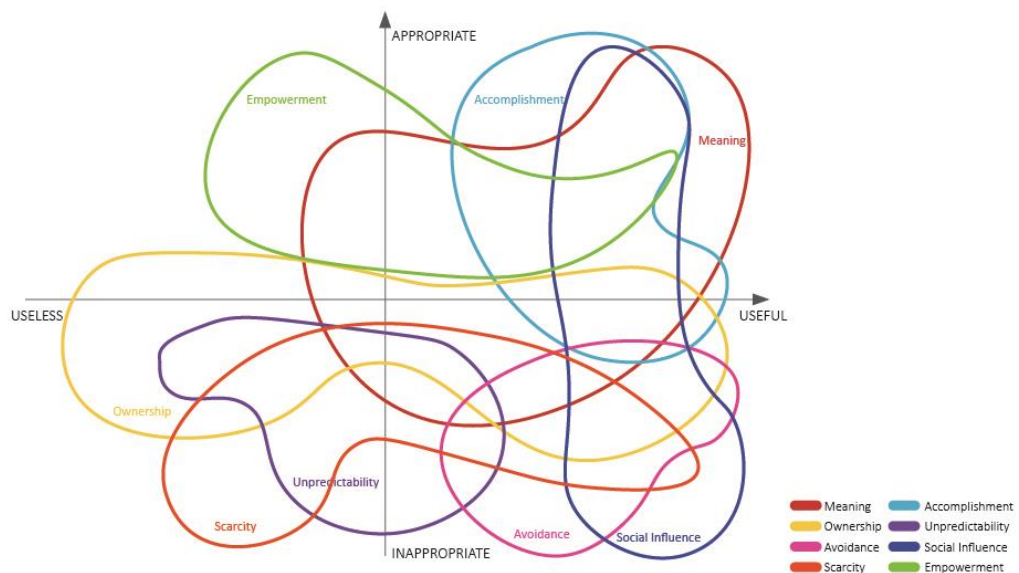


Figure33.0 The Matrix of Eight Core Drives of Gamification

Figure 34.0 is the matrix of “Meaning”, “Accomplishment”, “Ownership” and “Unpredictability”. It showed that participants' evaluation of "Accomplishment" is useful and appropriate, but the evaluation of "meaning" is lower than "Accomplishment" because it occupies a larger area. Participants' evaluation of "ownership" is at a two-level differentiation. Some people think it is useful and some people think it is useless. Most people think that it is not related to mental health, so it is neutral to an appropriate degree. As for "Unpredictability", most participants think it is not suitable for combination with mental health applications, and it has not received much evaluation on its usefulness.



Figure34.0 The Matrix of Four Core Drives of Gamification

Figure 35.0 is the matrix of “Avoidance”, “Social Influence”, “Scarcity” and “Empowerment”. It showed that participants' evaluation of "Avoidance" is that it can help increase participation, so it is useful, but it is not suitable for mental health, so it is in the lower right corner of the matrix. Participants' evaluation of the usefulness of "Social Influence" is consistent, and it is considered useful, but its appropriate level is controversial. The comments of "Empowerment" and "Scarcity" are both controversial in terms of usefulness. However, “Empowerment” is considered appropriate, while “Scarcity” is considered inappropriate, which causes these two factors to appear symmetrical about the x-axis.

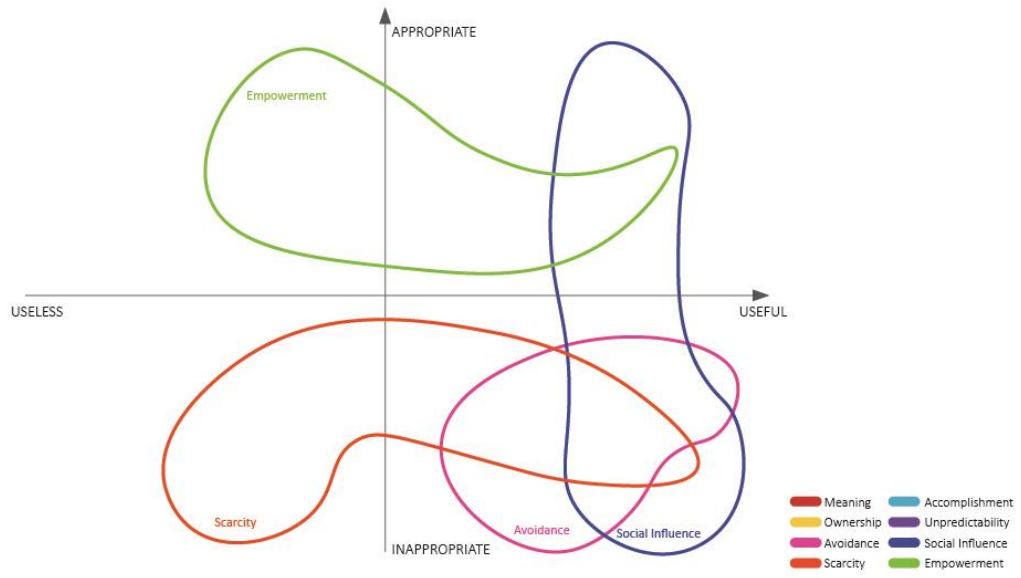


Figure 35.0 The Matrix of The Other Four Core Drives of Gamification

CHAPTER 5 CONCLUSION & DISCUSSION

5.0.0 Introduction

This research used qualitative analysis and descriptive analysis such as literature review, focus group, survey to investigate the main topics and answer the research questions. The main question was how gamification can help design an online service for campus counseling for international students. As the research planned, the researcher first investigated the pressure of international students and their coping strategies, such as their satisfaction of their life abroad. Then it investigated international students' perceptions of campus counseling and potential solutions to existing problems. Thirdly, the research explored the international students' perceptions and expectations for online mental health services. Besides, the feasibility of gamification was discussed, and the core drives of gamification were evaluated. The results of this study answered the research questions. The research findings are described through the following topics.

5.1.0 Pressure of International Students

The research has a rough insight into participants' satisfaction of their life abroad and sources of pressure. In many literatures, the pressure of international students was mentioned, as the report of Li, Wang & Xiao (2014) said, Asian international students were the most challenged group to acculturate the U.S. schools. The results showed in 4.2.2 indicated the degree of international students' adaptability and satisfaction to their life abroad is not low. However, according to the survey results in 4.2.4 (figure 18.0), all the participants had depression situation during their life abroad.

As to international students' sources of pressure, Barletta and Kobayashi (2007) summarized eight main problems encountered by international students, which were "adjustment to new culture", "academic difference and language problems", "cross-cultural male-female relationship", "mental disturbance", "financial difficulty", "racial discrimination", "after graduation" and "reverse culture shock". The results showed in 4.1.1, 4.2.3 and 4.3.1 answered the question posted in 3.1.1 "What is the pressure for international students?". According to the results in 4.1.1, the most reported problems the participants encountered are academic pressure and graduation because the participants consisted of graduate students. The interview results in 4.3.1 showed that interpersonal relationship is the most troublesome problem for new students coming to the U.S., and it can also be seen through the results showed in 4.2.3. At the same time, other issues, such as economic pressure and family issues, were also mentioned. In a word, there are many sources of stress for international students. New international students coming to the United States have more problems in interpersonal communication and loneliness because cultural differences and language barriers, while students who are closer to graduation are more anxious about the future direction. Most students face academic pressure and economic pressure at different levels. And many participants said that their depression often comes from unresolved things. If things are resolved, they will also go back to a good status.

5.2.0 Coping Strategies for Stress and Depression

The research has a rough insight into participants' states and coping strategies when depressing. The results showed in 4.1.1, 4.2.4 and 4.3.2 answered the second question in 3.1.1 "How do international students cope with stress and depression?" According

to the results of 4.1.1 and 4.3.2, most participants showed a state of low vitality and avoid socializing when they are depressed. About half of the people will take the initiative to find the help of relatives, friends or classmates, and communicate their emotions through communication with them. The other half will choose self-digestion emotions to calm themselves through some recreational activities or rest. It was also showed in the survey results in 4.2.4, and it also showed only a small number of people would seek help from the campus counseling center.

5.3.0 The Current Situation about Campus Counseling

The research has a rough insight into participants' experiences and their perception of campus counseling services. The results showed in 4.1.2, 4.2.5 and 4.3.3 answered the question posted in 3.1.2 "What do students think of campus counseling services?" and "What is international students' experiences of campus counseling services?".

The results presented in interviews and focus groups were that most participants felt disappointed with the psychological counseling services they had participated in, mostly because they think that the counselors do not understand them well, including cultural differences and language barriers. The results showed in 4.2.5 stated that only 6.45% of the participants used campus counseling before, and the reason why they didn't use it because nearly 70% of the participants think that their mental state is not necessary to consult, and the rest 30% of the participants believed that the counsellors do not understand them well and the shame of the consultation. As to their attitudes towards psychological counseling, the results showed in 4.1.2, 4.2.5 and 4.3.3 indicated that despite some stereotypes about psychological problems, most

participants believe that psychological counseling can help them. In addition, the professionalism of the counsellors is very much concerned by the participants.

5.4.0 The Perception and Acceptation of Online Service

The research has a rough insight into participants' perceptions and acceptances of online service about mental health. Online technologies have been more and more used in medical services. Results in 4.1.3, 4.2.6 and 4.3.4 answered the question in 3.1.3 "What do students think of online counseling services?". First, the results in the online survey showed the acceptance of online services, nearly 80% of participants said they would like to use online services to maintain their mental health. In the discussion about the terminal form of the service, the participants thought that the website would be better official and professional, and the mobile terminal is more convenient and faster. Nearly 80% of people believe that these two forms should coexist. In addition, some people mentioned SMS reminders, mail services and other forms.

5.5.0 Application of Gamification in Online Service

There are many effective, interesting and safe ways to provide resources which can be applied to the online services in terms of human-computer interaction (Johnson, 2016). And gamification is one of the ways which can increase the likelihood of users adhering to tools or services. Because of the novelty of this concept, the researcher introduced the concept of eight core drives (Chou, 2019) to participants by case study, and some of them mistakenly thought that the researcher wanted to design a game for people with psychological problems when they heard this concept. They thought the

severity of psychological problems cannot be combined with the entertainment of games. The researcher also mentioned it in the chapter one, and that people with mental health problems may turn a blind eye to some features of the gamification itself that requires self-reporting and self-management, which means gamification can't increase their participation. However, the results showed in 4.1.4 and 4.3.5 explained the feasibilities of gamification factors and their possible forms and functions in the online services for mental health. The analysis was based on the concept of eight core drives of gamification raised by Chou (2019).

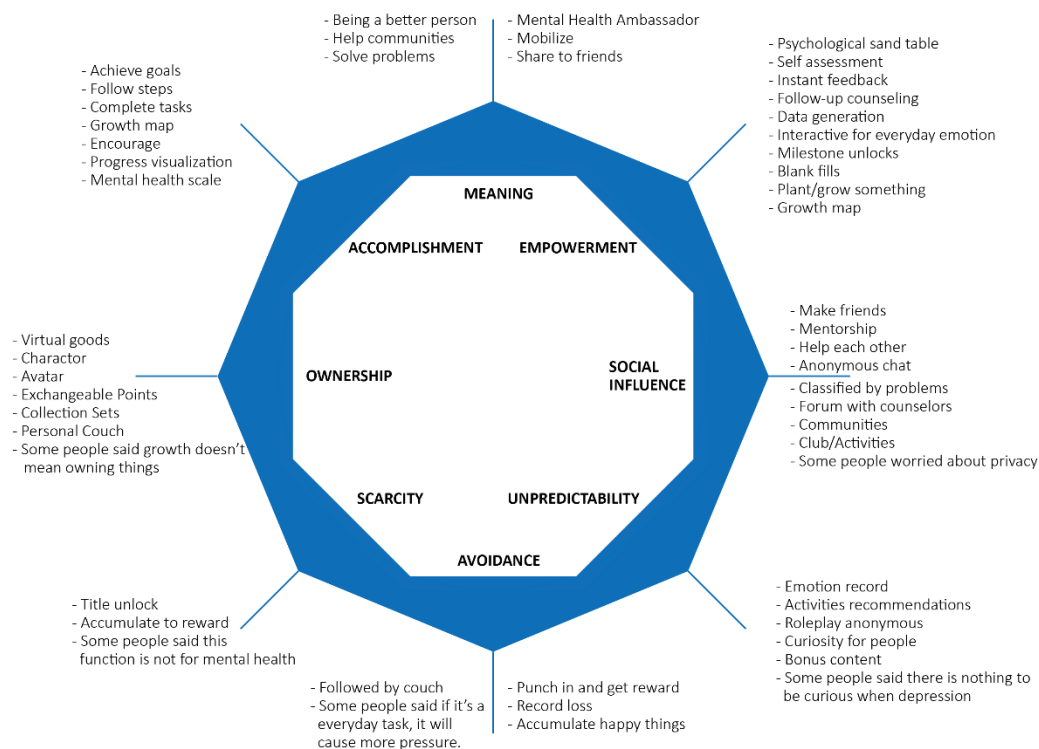


Figure 36.0 The Octalysis (Chou, 2019) of the Online Service

Based on everyone's different understanding of the concept, the results presented in focus groups and interviews are slightly different. Figure 36.0 shows the Octalysis (Chou, 2019) framework of gamification, which is made of eight core drives and their applications in gamification design. Considering the change in ideas caused by the discussions in the focus group, the researcher decided to summarize the results based

on the interviews. “Accomplishment”, “Meaning” and “Empowerment” are three core drives that are most recognized, “Scarcity”, “Avoidance” and “Unpredictability” are uncertain factors, and “Ownership” was recognized negative. What was interesting is the participants’ comments about “Social Influence” were controversial because some participants thought being alone would cause a worse emotion, but others thought the privacy needs to be considered.

The potential applications of these eight cores in online mental health care service are in Figure 36.0. It was sorted by their recognition and importance.

- “Accomplishment”: Mental Growth map, Mental Health Tasks, Progress Visualization, Mental Health Scale, Visible Encourage.
- “Meaning”: Mental Health Ambassador, Share to Friends, Solve Problems for Others, Sense of Belong in Communities.
- “Empowerment”: Psychological Sand Table, Self-assessment, Instant Feedback, Follow-up Counseling, Data Visualization, Interaction with Virtual Figures, Milestone Unlocks, Blank Fills, Plant Something, Growth Map.
- “Social influence”: Make Friends, Mentorship, Help Each Other, Classified by Problems, Forum with Counselors, Anonymous Chat, Communities, Club Recommendation. (The competition is not recommended.)
- “Scarcity”: Title Unlock, Accumulate to Get Reward.
- “Avoidance”: Followed by Couch, Punch in to Get Reward (Some people think it may bring pressure), Record Loss, Record Happy Things.
- “Unpredictability”: Emotion Record and Interesting Feedback, Activities Recommendations, Roleplay Anonymous, Bonus Content.

- “Ownership”: Virtual Goods, Characters, Exchangeable Points, Collection Sets, Personal Couch.

These functions are derived from the elements of the game and will have certain incentives and help to the user. Some functions are not suitable for students with severe depression because they may behave uninterestingly, but for the daily needs of maintaining mental health, many functions can be realized in an interesting and visual way. In order to create a better interactive experience, how to combine these gamification factors and functions deserves more in-depth discussion.

5.6.0 Design Implications

This research study can be considered as the user research for potential online service design for mental health. As said above, there are problems such as the insufficiency of current campus counseling and the low utilization of campus counseling services among international students. Previous research showed that psychological problems are widespread among college students, but there is only a small percentage of students who benefit from the counseling services (Harrar, Affsprung & Long, 2010). And a good counseling can reduce adaptive stress and mood improvement benefits for international students. U.S Department of Health and Human Services (2001) reported that Asians, Africa-Americans, and Hispanics are less likely to use mental health services than White People. The results from this research showed that the reluctance of international students to use campus counseling is the result of many factors. As said in chapter one, digital online services and mobile apps for assistance, integrated care and treatment are rapidly and effectively used for mental health benefits

(Andersson et al. 2014). The main target of this online service is college students, which is what we call Generation Z (Sparks & Honey, 2014). As this group grows with technology, they are very familiar with the network and common interactive processes, and the learning cost of the new service is not high. At the same time, such groups have higher requirements for the aesthetics, cleanliness of the application interface, the novelty of functions and the rationality of interaction.

5.6.1 Service Model

Because of the irreplaceability of face-to-face consultations, coupled with the high acceptance of online services by participants in 4.2.6. The research study brings up with a potential service model combines online and offline services. The service is not only open to international students with psychological problems, but also available to all students in the campus for maintaining mental health. Besides, it also satisfied some special needs of international students.

Figure 37.0 showed the service model based on the study. In this service system, students can do self-record, assessment and get instant help through online services, and counselors can give students feedback and continuous care. Online services can provide information for offline services, and offline services can use online services for feedback and evaluation. Offline services include face-to-face consultations and other school resources, such as the Mindfulness Center or Tutoring Center, which can solve many problems for students. In addition, international students can use online services to choose counselors and communicate with them in advance, thereby

establishing a bridge of communication through the cultural and language barriers between international students and consultants.

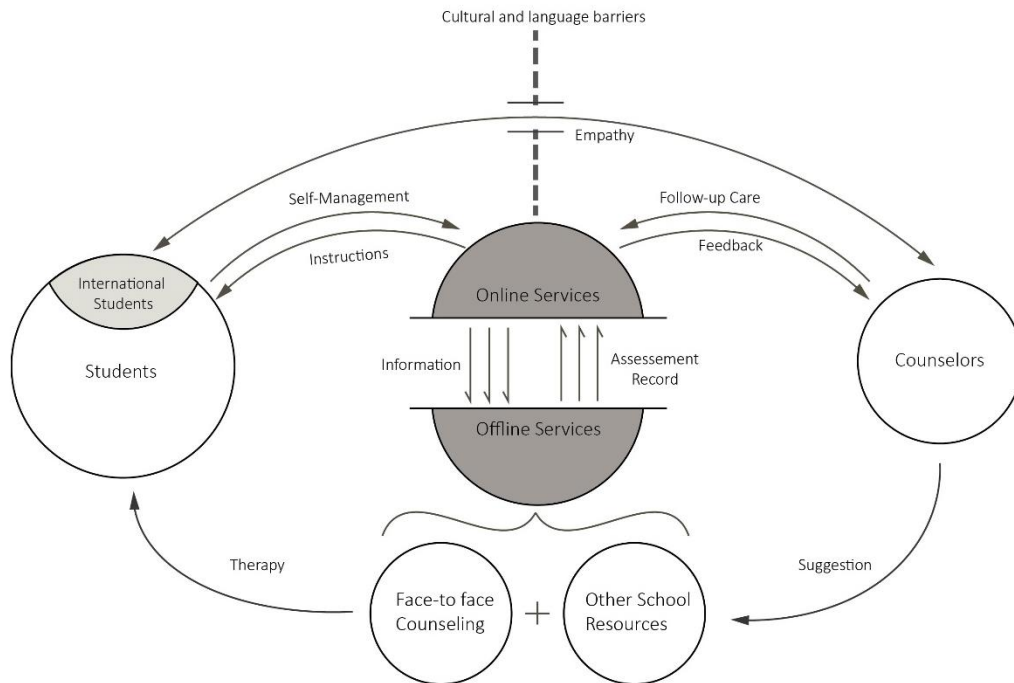


Figure37.0 The Service Model

5.6.2 Acceptance of Online Mental Health Service

The research indicated that face-to-face counseling is hardly be replaced by online counseling, so the online services can try to meet other needs of users, because it's not approved by participants to create an online counseling service. However, the establishment of an online service to maintain students' mental health based on the campus environment has been recognized by the participants. It is the evidence of the feasibility of the online services that most participants indicated that they would use this online service.

5.6.3 Expectation of Working Role

The study showed that the working role of the online services is an auxiliary tool that does not take up a lot of time and resources but can provide a lot of psychological help. It can provide a part of the function when the student is mentally healthy and can also use another part of the function to solve the problem when the student is facing psychological pressure and needs help. Because of the sensitivity of psychological problems, it should not only be aimed at students with mental health problems but should be used more universally by students. In other words, this requires a reasonable allocation of service proportions and design of appropriate methods.

5.6.4 Functions and Principles of Online Mental Health Service Design

The research has a rough insight into the participants' expected functions about online mental health. Bass (2003) stated that the traditional methods are still the mainstream method of diagnosis and treatment of depression, however, as for the new generation of young people, they may be more inclined to self-diagnose and self-report on the internet. In the results shown in 4.2.6, nearly 70% of participants thought face-to-face counseling cannot be replaced, from this the researcher thinks that the online service should be an auxiliary tool for offline services. E-mental health services may accommodate and encourage an outlet for individuals to engage with the care on their own, either in the form of self-help or as direct therapy (Wilson, 2017).

The results from the research showed in 4.1.3, 4.2.6 and 4.3.4 brought up some potential functions of the online services. Participants made some comments about the functions about online services, and these functions break into three phases. In the phase of before the counseling, potential services in adjusting psychology are to help students to self-cognize and self-diagnose and share psychological knowledge to

remove the stigma of psychological problems. Services in psychological counseling include online appointments, understanding the basic situation of the counselor and preferences for upcoming psychological counseling (nationalities and language options...). In the phase of during the counseling, with the offline professional psychological counseling service, online functions can include more timely psychological counseling, get appropriate suggestions, self-recording and In the phase of after the counseling, participants would like to give feedback after the service, including some recommendations of campus activities to keep mentally healthy and inquiry of follow-up treatment. In addition, some participants believe that building an online campus-based community can also allow some students to seek help. The online services can also contact some campus resources to solve problems that cause students anxiety, and some online decompression games and meditation can also help. Without the limitation of face-to-face contact with a mental health clinician, individuals are encouraged to learn about their own condition and to implement self-directed behavioral improvements to strengthen and enhance mental and emotional tolerance, health promotion and prevention approaches, and to participate in specific therapies designed to minimize their personal experience of distress or discomfort (Wilson, 2017).

Table 12.0 showed functions and some design suggestions for the online services.

Functions	Design Suggestions
Style	Website: Official and Professional Online Application: Interesting, Interactive and Caring
Interface	Safe and tidy; Icons or emojis than texts; Avoid stereotyped images of depression; Warm Color;

	Customed function collage; Appropriate font size, color; Reliable; A virtual character is welcomed; Easy guide.
Online Assessment	Shorter questionnaire; Distinguished with traditional psychological scale test; Interactive Q&A; Feedback after answer; Illustrate the result; Not display the results with the stereotype of depression.
Psychological Knowledge	Combining text and images and do not have a lot of text; Interactive mini games or videos; Highlight key parts to eliminate stigma; Get rewards or unlock achievements after reading.
Online Appointment	Ask questions in a warm tone; browse the information of the consultant; select special requirements (such as nationality, language, consulting questions); send a short message to the consultant in advance.
Self-record	Record emotions by selecting icons and interactive Q&A; Optional text, voice or image recording; Replaceable background; Periodic record visualization; Obtain achievements through continuous recording and unlock titles; Visualized accumulated images (such as planting trees, standing water, etc.); The authority can be opened to the counselor.

Instant Feedback	Reliable feedback from experts; Special access in emergency situations; Automatic Reply in warm tone; Recommended ways to solve the problem;
Activities Recommendations	Combined with school activities; Can get rewards as a task; Irregular activities and location recommendations (similar to Pokemon); Record online after participating in the event.
Communities	Gather people through activities; Talk in an anonymous forum, and comments are reviewed by the administrator; Classified by different kind of problem; Convertible and translatable languages.

Table12.0 The design principles for the online service

5.7.0 Future Research

The research is a primary user research for further design which studied a limited scope of participants due to the limited time and place. The interview questions and the survey questions were not well designed and not deep enough. First, the future research should expand the area and nationality of the participants, which can make the results more reliable. Second, In the discussion about gamification, the researcher introduced the core elements of gamification to the participants in this research, which led to limitations for the participants. In future research, participants should be allowed to explore more possibilities for gamification. Third, there is a need to dig deeply in some questions of the research. The understanding of the campus counseling process in the research is basically based on the user's perspective, but to obtain a

more comprehensive understanding, the counselors and school leaders should also be investigated in the future. Finally, this research provides some design suggestions and the application of gamification in online services. Future designs can be prototyped and developed based on this research, and multiple user tests can be performed to iterate through the loop to achieve the final design goal.

5.7.1 Challenges

The biggest challenge in the research is to figure out the research questions and design the research methods. Because the research involves many questions under different fields, which is not easy for the researcher to focus and subdivide it into researchable questions. When designing questionnaires and interview questions, it is also very difficult to use questions and options that have no biased orientation and guidance. The Researcher has also been entangled for a long time on how to shift research issues from psychology to design. Another challenge for the research is to find adequate participants. Although the researchable target group is very large, this research is related to psychological problems. Just as this group is not willing to use psychological counseling because of shame, it is not easy to find volunteers to participate in the study.

In order to make participants more willing to express themselves, researchers are conducting interviews in private spaces. At the same time, the questionnaire is circulating in a small area, and it is difficult for more people to participate. The researcher planned to interview the person who is in charge of the counseling center and the counselors, but because of the outbreak of COVID-19 in the process, the counseling center is no longer available for interviewing.

5.7.2 Research Opportunities revealed

This research is standing on the gap of many fields and it has revealed an open field of opportunity. There are a lot of research studies about international students' mental health but there are few research studies about how to improve it. The application of gamification in mobile applications in many fields is an emerging topic and has been widely discussed, but there are few studies on its applications in psychology. This research showed the feasibility of online services and the acceptance of core drives of gamification. The gamification in psychological field should also be supported by more experiments. In addition, the optimization of campus psychological counseling services also requires a lot of research. At the same time, some participants mentioned interface and design style and commercial value of this services during the research process, so the interaction design, user interface design and business model are also worth exploring in future studies.

5.7.3 Limitation and Improvements

The limitations of this research study are obvious. Due to geographical and time constraints, most of the interviews and focus group participants are students from Arizona State University. In terms of nationalities, the participants are all Chinese, but it is also an advantage for the researcher. The researcher can handle cultural and language aspects more appropriately because she is from China. However, it is not rigorous to use Chinese students to represent the international students. Besides, the interviews were not well organized. Making notes while interviewing was a bit difficult for the researcher, and it also had a bad impact on the mentality of the participants.

REFERENCES

Adams, W. L., McIlvain, H. E., Lacy, N. L., Magsi, H., Crabtree, B. F., Yenny, S. K., & Sitorius, M. A. (2002). Primary care for elderly people: why do doctors find it so hard?. *The Gerontologist*, 42(6), 835-842.

Ahtinen, A., Huuskonen, P., & Häkkinen, J. (2010, October). Let's all get up and walk to the North Pole: design and evaluation of a mobile wellness application. In *Proceedings of the 6th Nordic conference on human-computer interaction: Extending boundaries* (pp. 3-12). ACM.

Ahtinen, A., Mattila, E., Väikkynen, P., Kaipainen, K., Vanhala, T., Ermes, M., ... & Lappalainen, R. (2013). Mobile mental wellness training for stress management: feasibility and design implications based on a one-month field study. *JMIR mHealth and uHealth*, 1(2), e11.

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders (DSM-5®)*. American Psychiatric Pub.

Amstadter, A. B., Broman-Fulks, J., Zinzow, H., Ruggiero, K. J., & Cercone, J. (2009). Internet-based interventions for traumatic stress-related mental health problems: a review and suggestion for future research. *Clinical psychology review*, 29(5), 410-420.

Andersson, G., & Cuijpers, P. (2009). Internet-based and other computerized psychological treatments for adult depression: a meta-analysis. *Cognitive behaviour therapy*, 38(4), 196-205.

Andersson, G., Cuijpers, P., Carlbring, P., Riper, H. & Hedman, E. (2014). Guided Internet-based vs. face-to-face cognitive behavior therapy for psychiatric and somatic disorders: A systematic review and meta-analysis. *World Psychiatry*, 13, 288– 295.

Association, A.P. (2010). *Understanding depression and effective treatment*. Retrieved December 11, 2019, from <http://www.apapracticecentral.org/outreach/depression.pdf>

Auerbach, C., & Silverstein, L. B. (2003). *Qualitative data: An introduction to coding and analysis* (Vol. 21). NYU press.

Barak, A. (2007). Emotional support and suicide prevention through the Internet: A field project report. *Computers in Human Behavior*, 23(2), 971-984.

Barak, A., Hen, L., Boniel-Nissim, M., & Shapira, N. A. (2008). A comprehensive review and a meta-analysis of the effectiveness of internet-based psychotherapeutic interventions. *Journal of Technology in Human services*, 26(2-4), 109-160.

Barber, E., Altbach, P.G. and Myers, R.G. (1984), "Introduction: perspective on foreign students", *Comparative Education Review*, Vol. 28, pp. 163-167.

- Barbour, R., & Kitzinger, J. (Eds.). (1998). *Developing focus group research: politics, theory and practice*. Sage.
- Barletta, J., & Kobayashi, Y. (2007). Cross-cultural counselling with international students. *Journal of Psychologists and Counsellors in Schools*, 17(2), 182-194.
- Barlow, J. H., Ellard, D. R., Hainsworth, J. M., Jones, F. R., & Fisher, A. (2005). A review of self-management interventions for panic disorders, phobias and obsessive-compulsive disorders. *Acta Psychiatrica Scandinavica*, 111(4), 272-285.
- Barnouw, V. (1985). *Culture and personality*. Belmont, CA: Wadsworth.
- Bauerle Bass, S. (2003). How will Internet use affect the patient? A review of computer network and closed Internet-based system studies and the implications in understanding how the use of the Internet affects patient populations. *Journal of health psychology*, 8(1), 25-38.
- Beck, A. T., Ward, C. H., Mendelson, M., Mock, J., & Erbaugh, J. (1961). An inventory for measuring depression. *Archives of general psychiatry*, 4(6), 561-571.
- Berger, M., Wagner, T. H., & Baker, L. C. (2005). Internet use and stigmatized illness. *Social science & medicine*, 61(8), 1821-1827.
- Bertram, D. M., Poulakis, M., Elsasser, B. S., & Kumar, E. (2014). Social support and acculturation in Chinese international students. *Journal of Multicultural Counseling and Development*, 42(2), 107-124.
- Bharti, P. (2014). A complete guide for teachers on how to use Socratic. Retrieved from <http://edtechreview.in/trends-insights/insights/1532-a-complete-guide-for-nurse-educators-on-how-to-use-socratic>
- Bisadi, M., & YK Chua, A. (2014). DGIST: a digital game for international students' adjustment. *Interactive Technology and Smart Education*, 11(1), 15-31.
- Bjerkan, J., Hedlund, M., & Hellesø, R. (2015). Patients' contribution to the development of a web-based plan for integrated care—a participatory design study. *Informatics for Health and Social Care*, 40(2), 167-184.
- Bjørnholt, M., & Farstad, G. R. (2014). 'Am I rambling?' on the advantages of interviewing couples together. *Qualitative Research*, 14(1), 3-19.
- Bolier, L., Haverman, M., Kramer, J., Westerhof, G. J., Riper, H., Walburg, J. A., ... & Bohlmeijer, E. (2013). An Internet-based intervention to promote mental fitness for mildly depressed adults: randomized controlled trial. *Journal of medical internet research*, 15(9), e200.
- Bolier, L., Haverman, M., Kramer, J., Westerhof, G. J., Riper, H., Walburg, J. A., ... & Bohlmeijer, E. (2013). An Internet-based intervention to promote mental fitness for

mildly depressed adults: randomized controlled trial. *Journal of medical internet research*, 15(9), e200.

Bolier, L., Haverman, M., Kramer, J., Westerhof, G. J., Riper, H., Walburg, J. A., ... & Bohlmeijer, E. (2013). An Internet-based intervention to promote mental fitness for mildly depressed adults: randomized controlled trial. *Journal of medical internet research*, 15(9), e200.

Bond, M. H. (1991). *Beyond the Chinese face: Insights from psychology*. Hong Kong: Oxford University Press.

Bordin, E. S. (1979). The generalizability of the psychoanalytic concept of the working alliance. *Psychotherapy: Theory, research & practice*, 16(3), 252.

Brauner, P., Valdez, A. C., Schroeder, U., & Ziefle, M. (2013, July). Increase physical fitness and create health awareness through exergames and gamification. In *International Conference on Human Factors in Computing and Informatics* (pp. 349-362). Springer, Berlin, Heidelberg.

Brinson, J. A., & Kottler, J. (1995). International students in counseling: Some alternative models. *Journal of College Student Psychotherapy*, 9(3), 57-70.

Brown, E. & Cairns, P. (2004), A grounded investigation of game immersion, *Conference on Human Factors in Computing Systems*, New York, NY, pp. 1297-1300.

Brown, M., O'Neill, N., van Woerden, H., Eslambolchilar, P., Jones, M., & John, A. (2016). Gamification and adherence to web-based mental health interventions: a systematic review. *JMIR mental health*, 3(3), e39.

Brunette, M. K., Lariviere, M., Schinke, R. J., Xing, X., & Pickard, P. (2011). Fit to Belong: Activity and Acculturation of Chinese Students. *Journal of Sport Behavior*, 34(3).

Burns, J., Morey, C., Lagelée, A., Mackenzie, A., & Nicholas, J. (2007). Reach Out! Innovation in service delivery. *Medical Journal of Australia*, 187(S7), S31-S34.

Calear, A. L., Christensen, H., Brewer, J., Mackinnon, A., & Griffiths, K. M. (2016). A pilot randomized controlled trial of the e-couch anxiety and worry program in schools. *Internet interventions*, 6, 1-5.

Centers for Disease Control and Prevention. (2004, May 21). Youth risk behavior surveillance— United States, 2003. *Morbidity and Mortality Weekly Report*, 53(SS-2). Retrieved November 23, 2007, from <http://www.cdc.gov/mmwr/PDF/SS/SS5302.pdf>

Charlier, N., Zupancic, N., Fieuws, S., Denhaerynck, K., Zaman, B., & Moons, P. (2015). Serious games for improving knowledge and self-management in young

people with chronic conditions: a systematic review and meta-analysis. *Journal of the American Medical Informatics Association*, 23(1), 230-239.

Chellaraj, G., Maskus, K.E. and Mattoo, A. (2008), "The contribution of international graduate students to US innovation", *Review of International Economics*, Vol. 16 No. 3, pp. 444-462.

Chen, T. Y., Chou, Y. C., Tzeng, N. S., Chang, H. A., Kuo, S. C., Pan, P. Y., ... & Mao, W. C. (2015). Effects of a selective educational system on fatigue, sleep problems, daytime sleepiness, and depression among senior high school adolescents in Taiwan. *Neuropsychiatric disease and treatment*, 11, 741.

Chirban, J. T. (1996). *Interviewing in depth*. Sage.

Chou, Y. K. (2019). *Actionable gamification: Beyond points, badges, and leaderboards*. Packt Publishing Ltd.

Chou, P. C., Chao, Y. M. Y., Yang, H. J., Yeh, G. L., & Lee, T. S. H. (2011). Relationships between stress, coping and depressive symptoms among overseas university preparatory Chinese students: a cross-sectional study. *BMC Public Health*, 11(1), 352.

Christensen, H., Griffiths, K. M., & Korten, A. (2002). Web-based cognitive behavior therapy: analysis of site usage and changes in depression and anxiety scores. *Journal of medical Internet research*, 4(1), e3.

Clarke, A. M., Kuosmanen, T., & Barry, M. M. (2015). A systematic review of online youth mental health promotion and prevention interventions. *Journal of youth and adolescence*, 44(1), 90-113.

Constantine, M. G., Okazaki, S., & Utsey, S. O. (2004). Self-concealment, social self-efficacy, acculturative stress, and depression in African, Asian, and Latin American international college students. *American Journal of Orthopsychiatry*, 74, 230–241.

Cook, V. (2015). *Engaging Generation Z Students*. Center for Online Learning Research and Service, University of Illinois Springfield. Retrieved from https://sites.google.com/a/uis.edu/colrs_cook/home/engaging-generation-z-students

Craven, M. P., Young, Z., Simons, L., Schnädelbach, H., & Gillott, A. (2014, October). From snappy app to screens in the wild: Gamifying an attention deficit hyperactivity disorder continuous performance test for public engagement and awareness. In *2014 International Conference on Interactive Technologies and Games* (pp. 36-43). IEEE.

Cugelman, B. (2013). Gamification: what it is and why it matters to digital health behavior change developers. *JMIR serious games*, 1(1), e3.

d'Ardenne, P., & Mahtani, A. (1993). *Transcultural counselling in action*. London: Sage Publications.

Dan, O. M., & Lai, J. W. (2013, May). How am I doing? The effects of gamification and social sharing on user engagement. In Proc. 68th Ann. Conf. American Assoc. for Public Opinion Research.

Danaher, B. G., Milgrom, J., Seeley, J. R. et al. (2012). Web-based intervention for postpartum depression: Formative research and design of the MomMoodBooster Program. *JMIR Res Protoc*, 1, e18.

de Sousa Borges, S., Durelli, V. H., Reis, H. M., & Isotani, S. (2014). A systematic mapping on gamification applied to education. In Proceedings of the 29th annual ACM symposium on applied computing (pp. 216-222). ACM.

DeAndrea, D. C., Ellison, N. B., LaRose, R., Steinfield, C., & Fiore, A. (2012). Serious social media: On the use of social media for improving students' adjustment to college. *The Internet and higher education*, 15(1), 15-23.

Dennis, T. A., & O'Toole, L. J. (2014). Mental health on the go: Effects of a gamified attention-bias modification mobile application in trait-anxious adults. *Clinical Psychological Science*, 2(5), 576-590.

DeRubeis, R. J., Gelfand, L. A., Tang, T. Z., & Simons, A. D. (1999). Medications versus cognitive behavior therapy for severely depressed outpatients: mega-analysis of four randomized comparisons. *American Journal of Psychiatry*, 156(7), 1007-1013.

DeRubeis, R. J., Hollon, S. D., Amsterdam, J. D., Shelton, R. C., Young, P. R., Salomon, R. M., ... & Gallop, R. (2005). Cognitive therapy vs medications in the treatment of moderate to severe depression. *Archives of general psychiatry*, 62(4), 409-416.

DeSmet, A., Shegog, R., Van Ryckeghem, D., Crombez, G., & De Bourdeaudhuij, I. (2015). A systematic review and meta-analysis of interventions for sexual health promotion involving serious digital games. *Games for Health Journal*, 4(2), 78-90.

Deterding, S., Khaled, R., Nacke, L. E., & Dixon, D. (2011, May). Gamification: Toward a definition. In CHI 2011 gamification workshop proceedings (Vol. 12). Vancouver BC, Canada.

Dicheva, D., Dichev, C., Agre, G., & Angelova, G. (2015). Gamification in education: A systematic mapping study. *Educational Technology & Society*, 18(3), 75-88.

Duggleby, W. (2005). What about focus group interaction data?. *Qualitative health research*, 15(6), 832-840.

Edwards, R., & Holland, J. (2013). *What is qualitative interviewing?*. A&C Black.

Fang, H. (2013). *Impact of social support on the relation between stress from daily life issues and depression among East Asian international students in the United States* (Doctoral dissertation). Retrieved from <https://etda.libraries.psu.edu>

Feather, J. S., Howson, M., Ritchie, L., Carter, P. D., Parry, D. T. & Koziol-Mclain, J. (2016). Evaluation methods for assessing users' psychological experiences of web-based psychosocial interventions: A systematic review. *J Med Internet Res*, 18, e181.

Froehlich, J. (2015). Gamifying green: gamification and environmental sustainability. *The gameful world*, 563-596.

Gale, S. Forget Gen Y: Are you ready for Gen Z? (2015). Retrieved from <http://www.clomedia.com/2015/07/07/forget-gen-y-are-you-ready-for-gen-z/>

Gamecho, B., Silva, H., Guerreiro, J., Gardezabal, L., & Abascal, J. (2015). A context-aware application to increase elderly users compliance with physical rehabilitation exercises at home via animatronic biofeedback. *Journal of medical systems*, 39(11), 135.

Garde, A., Umedaly, A., Abulnaga, S. M., Robertson, L., Junker, A., Chanoine, J. P., ... & Dumont, G. A. (2015). Assessment of a mobile game ("MobileKids Monster Manor") to promote physical activity among children. *Games for health journal*, 4(2), 149-158.

Gaw, K.F. (2000). Reverse culture shock in students returning from overseas. *International Journal of Intercultural Relations*, 24, 83–104.

Gee, J.P. (2003), *What Video Games Have to Teach Us About Learning and Literacy*, 1st ed., Palgrave, New York, NY.

Goodman, L. A. (1961). Snowball sampling. *The annals of mathematical statistics*, 148-170.

Griffiths, K. M., Christensen, H., Jorm, A. F., Evans, K., & Groves, C. (2004). Effect of web-based depression literacy and cognitive-behavioural therapy interventions on stigmatising attitudes to depression: Randomised controlled trial. *The British Journal of Psychiatry*, 185(4), 342-349.

Hamari, J., & Koivisto, J. (2013, June). Social Motivations To Use Gamification: An Empirical Study Of Gamifying Exercise. In *ECIS* (Vol. 105).

Han, X., Han, X., Luo, Q., Jacobs, S., & Jean-Baptiste, M. (2013). Report of a mental health survey among Chinese international students at Yale University. *Journal of American College Health*, 61(1), 1-8.

Harman, J. P., Hansen, C. E., Cochran, M. E., & Lindsey, C. R. (2005). Liar, liar: Internet faking but not frequency of use affects social skills, self-esteem, social anxiety, and aggression. *CyberPsychology & Behavior*, 8(1), 1-6.

Harrar, W. R., Affsprung, E. H., & Long, J. C. (2010). Assessing campus counseling needs. *Journal of College Student Psychotherapy*, 24(3), 233-240.

Heller, L. (2015). Move over Millennials, Generation Z is in charge. *Forbes*.

Herzig, P., Ameling, M., & Schill, A. (2012, August). A generic platform for enterprise gamification. In 2012 Joint Working IEEE/IFIP Conference on Software Architecture and European Conference on Software Architecture (pp. 219-223). IEEE.

Hollon, S. D., DeRubeis, R. J., Shelton, R. C., Amsterdam, J. D., Salomon, R. M., O'Reardon, J. P., ... & Gallop, R. (2005). Prevention of relapse following cognitive therapy vs medications in moderate to severe depression. *Archives of general psychiatry*, 62(4), 417-422.

Hollon, S. D., Stewart, M. O., & Strunk, D. (2006). Enduring effects for cognitive behavior therapy in the treatment of depression and anxiety. *Annu. Rev. Psychol.*, 57, 285-315.

Hookham, G., Kay-Lambkin, F., Blackmore, K., & Nesbitt, K. (2016, February). Using startle probe to compare affect and engagement between a serious game and an online intervention program. In *Proceedings of the Australasian Computer Science Week Multiconference* (p. 75). ACM.

Hyun, J. K., Quinn, B. C., Madon, T., & Lustig, S. (2006). Graduate student mental health: Needs assessment and utilization of counseling services. *Journal of College Student Development*, 47(3), 247-266.

Hyun, J., Quinn, B., Madon, T., & Lustig, S. (2007). Mental health need, awareness, and use of counseling services among international graduate students. *Journal of American College Health*, 56, 109–118.

Institute of International Education. (2017). *Open Doors 2017 Report*. Retrieved December 10, 2019, from <https://www.iie.org/Research/Insights/Open-Doors/Data/International-Students/Places-of-Origin>

Johnson, D. & Wiles, J. (2003), Effective affective user interface design in games, *Ergonomics*, Vol. 46, pp. 1332-1345.

Johnson, D., Deterding, S., Kuhn, K. A., Staneva, A., Stoyanov, S., & Hides, L. (2016). Gamification for health and wellbeing: A systematic review of the literature. *Internet interventions*, 6, 89-106.

Johnson, R. A., & Wichern, D. W. (2002). *Applied multivariate statistical analysis* (Vol. 5, No. 8). Upper Saddle River, NJ: Prentice hall.

Johnson, R., Johnson, D. & Stanne, M. (1986), Comparison of computer-assisted cooperative, competitive, and individualistic learning, *American Educational Research Journal*, Vol. 23 No. 3, pp. 382-392.

- Kebritchia, M., Hirumi, A. and Bai, H. (2010), The effects of modern mathematics computer games on mathematics achievement and class motivation, *Computers & Education*, Vol. 55 No. 2, pp. 427-443.
- Khoo, P.L.S., Abu-Rasain, M.H., & Hornby, G. (2002). Counselling foreign students: A review of strategies. In P. Stephen (Ed.), *Multicultural counselling: A reader* (pp. 98–113). London: Sage Publications.
- Klineberg, O., & Hull, W. F. (1979). *At a foreign university: An international study of adaptation and coping*. New York: Praeger.
- Kongmee, I., Rebecca, S., Montgomery, C. and Pickard, A. (2011), “Using massively multiplayer online role playing games (MMORPGs) to support second language learning: action research in the real and virtual world”, paper presented at 2nd Annual IVERG Conference: Immersive Technologies for Learning: Virtual Implementation, Real Outcomes, Middlesbrough, UK.
- Kroenke, K., Spitzer, R. L., & Williams, J. B. (2001). The PHQ-9: validity of a brief depression severity measure. *Journal of general internal medicine*, 16(9), 606-613.
- Langford, J., & McDonagh, D. (2002). Running Focus Groups with Older Participants. In *Focus Groups* (pp. 118-131). CRC Press.
- Lau, H. M., Smit, J. H., Fleming, T. M., & Riper, H. (2017). Serious games for mental health: are they accessible, feasible, and effective? A systematic review and meta-analysis. *Frontiers in psychiatry*, 7, 209.
- Lazzaro, N. (2009), “Understand emotions”, in Bateman, C. (Ed.), *Beyond Game Design: Nine Steps Toward Creating Better Videogames*, Charles River Media, Boston, MA.
- Leach, L. S., Christensen, H., Griffiths, K. M., Jorm, A. F., & Mackinnon, A. J. (2007). Websites as a mode of delivering mental health information: perceptions from the Australian public. *Social psychiatry and psychiatric epidemiology*, 42(2), 167-172.
- Lee, J.J., Maldonado-Maldonado, A. and Rhoades, G. (2006), "The political economy of international students flows: patterns, ideas, and propositions", in Smart, J.C. (Ed.), *Higher Education: Handbook of Theory and Research*, Vol. XXI, Springer, Dordrecht, pp. 545-590.
- Leong, F.T.L., & Chou, E.L. (1996). Counselling international students. In P.B. Pedersen, J.G. Draguns, W.J. Lonner & J.E. Trimble (Eds.), *Counseling across cultures* (pp. 210–242). Honolulu: University Press of Hawaii.
- Leung, L. (2006). Stressful life events, motives for Internet use, and social support among digital kids. *CyberPsychology & Behavior*, 10(2), 204-214.

- Li, J., Wang, Y., & Xiao, F. (2014). East Asian international students and psychological well-being: A systematic review. *Journal of International Students*, 4(4), 301–313.
- Li, Z., Cheng, Y. and Liu, C. (2013), “A constructionism framework for designing game-like learning systems: its effect on different learners”, *British Journal of Educational Technology*, Vol. 44 No. 2, pp. 208-224.
- Lin, J.G., & Yin, J.K. (1997). Asian international students’ adjustment: Issues and program suggestions. *College Student Journal*, 31, 473–484.
- Liu, M. (2009). Addressing the mental health problems of Chinese international college students in the United States. *Advances in Social Work*, 10(1), 69– 86.
- Lo, S. K., Wang, C. C., & Fang, W. (2005). Physical interpersonal relationships and social anxiety among online game players. *Cyberpsychology & behavior*, 8(1), 15-20.
- Martin, A. (2000), “The design and evolution of a simulation/game for teaching information systems development”, *Simulation & Gaming*, Vol. 31 No. 4, pp. 445-463.
- McKeown, S., & Safety, B. P. (2015). *Gamification for Healthcare Improvement*. Available under [https://goo. gl/I7N6D6](https://goo.gl/I7N6D6).(Accessed 23 August 2017).
- McMahan, A. (2003), Immersion, engagement, and presence: a method for analyzing 3-D video games, in Wolf, M.J.P. and Perron, B. (Eds), *Video Game Theory*, Routledge, London, pp. 67-86.
- Michael, D. R., & Chen, S. L. (2005). *Serious games: Games that educate, train, and inform*. Muska & Lipman/Premier-Trade.
- Mitchell, S. L., Greenwood, A. K., & Guglielmi, M. C. (2007). Utilization of counseling services: Comparing international and US college students. *Journal of College Counseling*, 10(2), 117-129.
- Mohr, K. A. (2017). Understanding Generation Z students to promote a contemporary learning environment. *Journal on Empowering Teaching Excellence*, 1(1), 9.
- Morgan, D. L. (1997). *The focus group guidebook* (Vol. 1). Sage publications.
- Mori, S. (2000). Addressing the mental health concerns of international students. *Journal of Counseling & Development*, 78, 137–144.
- Mori, S. C. (2000). Addressing the mental health concerns of international students. *Journal of Counseling & Development*, 78(2), 137–144.
- Morrell, C. J., Sutcliffe, P., Booth, A., Stevens, J., Scope, A., Stevenson, M., ... & Ren, S. (2016). A systematic review, evidence synthesis and meta-analysis of quantitative and qualitative studies evaluating the clinical effectiveness, the cost-

effectiveness, safety and acceptability of interventions to prevent postnatal depression. *Health Technology Assessment*, 20(37).

Morrison, L. G., Yardley, L., Powell, J. & Michie, S. (2012). What design features are used in effective e-health interventions? A review using techniques from Critical Interpretive Synthesis. *Telemed J E Health*, 18, 137–144.

Nilsson, J. E., Butler, J., Shouse, S., & Joshi, C. (2008). The relationships among perfectionism, acculturation, and stress in Asian international students. *Journal of College Counseling*, 11(2), 147-158.

notes. Children's stress and coping: A family perspective, 25-49.

Oinas-Kukkonen, H., & Harjumaa, M. (2009). Persuasive systems design: Key issues, process model, and system features. *Communications of the Association for Information Systems*, 24(1), 28.

O'leary, Z. (2004). *The essential guide to doing research*. Sage.

Organization, W. H. (2017). *Depression and Other Common Mental Disorders*. World Health Organization.

Oropeza, B.A.H., & Fitzgibbon, M., & Baron, A., Jr. (1991). Managing mental health crises of foreign college students. *Journal of Counseling and Development*, 69, 280–284.

Ospina-Pinillos, L., Davenport, T. A., Ricci, C. S., Milton, A. C., Scott, E. M., & Hickie, I. B. (2018). Developing a mental health eClinic to improve access to and quality of mental health care for young people: using participatory design as research methodologies. *Journal of medical Internet research*, 20(5), e188.

Oswalt, S. B., & Riddock, C. C. (2007). What to do about being overwhelmed: Graduate students, stress and university services. *College Student Affairs Journal*, 27(1), 24–44.

Owen, A. B. (2001). *Empirical likelihood*. CRC press.

Pagulayan, R.J., Keeker, K., Wixon, D., Romero, R.L. & Fuller, T. (2003), User-centered design in games, in Jacko, J.A. and Sears, A. (Eds), *The Human-Computer Interaction Handbook*, L. Erlbaum Associates Inc., Hillsdale, NJ, pp. 883-906.

Paim, C. A., & Barbosa, J. L. V. (2016). Octopus: A gamification model to aid in ubiquitous care of chronic diseases. *IEEE Latin America Transactions*, 14(4), 1948-1958.

Palmer, D., Lunceford, S., & Patton, A. J. (2012). The engagement economy: how gamification is reshaping businesses. *Deloitte Review*, 11, 52-69.

- Park, H. J., & Bae, J. H. (2014). Study and research of gamification design. *International Journal of Software Engineering and Its Applications*, 8(8), 19-28.
- Park, H., Lee, M.-J., Choi, G.-Y., & Zepernick, J. S. (2017). Challenges and coping
- Pedersen, P. (1987). Ten frequent assumptions of cultural bias in counselling. *Journal of Multicultural Counselling and Development*, 15, 16–24.
- Pedreira, O., García, F., Brisaboa, N., & Piattini, M. (2015). Gamification in software engineering—A systematic mapping. *Information and software technology*, 57, 157-168.
- Pereira, P., Duarte, E., Rebelo, F., & Noriega, P. (2014, June). A review of gamification for health-related contexts. In *International conference of design, user experience, and usability* (pp. 742-753). Springer, Cham.
- Pew Research Center. (2014). Millennials in adulthood: Detached from institutions, net- worked with friends. Retrieved from <http://www.pewsocialtrends.org/2014/03/07/millennials-in-adulthood/>
- Prensky, M. (2001), *Digital Game-Based Learning*, McGraw-Hill, New York, NY.
- Ra, Y. (2016). Social support and acculturative stress among Korean international students. *Journal of College Student Development*, 57, 885–891.
- Ra, Y.-A., & Trusty, J. (2017). Impact of social support and coping on acculturation and acculturative stress of East Asian international students. *Journal of Multicultural Counseling and Development*, 45(4), 276–291.
- RADLOFF, L. (1997). Scale: A self-report depression scale for research in the general population. *J Clin Exp Neuropsychol*, 19, 340-356.
- Reischauer, E. O. (1974). The Sinic World in Perspective. *Foreign Affairs*, 52(2), 341–348.
- Renton, T., Tang, H., Ennis, N. et al. (2014). Web-based intervention programs for depression: A scoping review and evaluation. *J Med Internet Res*, 16, e209.
- Renton, T., Tang, H., Ennis, N. et al. (2014). Web-based intervention programs for depression: A scoping review and evaluation. *J Med Internet Res*, 16, e209.
- Reynolds, J., Griffiths, K. M., Cunningham, J. A., Bennett, K., & Bennett, A. (2015). Clinical practice models for the use of e-mental health resources in primary health care by health professionals and peer workers: a conceptual framework. *JMIR mental health*, 2(1), e6.
- Richards, D., Murphy, T., Viganó, N. et al. (2016). Acceptability, satisfaction and perceived efficacy of “Space from Depression” an internet-delivered treatment for depression. *Internet Interventions*, 5, 12–22.

Rickwood, D. J., Telford, N. R., Parker, A. G., Tanti, C. J., & McGorry, P. D. (2014). headspace—Australia's innovation in youth mental health: who are the clients and why are they presenting?. *Medical Journal of Australia*, 200(2), 108-111.

Rickwood, D., Webb, M., Kennedy, V., & Telford, N. (2016). Who are the young people choosing web-based mental health support? Findings from the implementation of Australia's national web-based youth mental health service, eheadspace. *JMIR mental health*, 3(3), e40.

Rideout, V. (2002). *Generation RX. com. Marketing health services*, 22(1), 26.

Salen, K. & Zimmerman, E. (2004), *Rules of Play-Game Design Fundamentals*, MIT Press, London.

Sanders, E. B. N., & Stappers, P. J. (2008). Co-creation and the new landscapes of design. *Co-design*, 4(1), 5-18.

Sandhu, D. S., & Asrabadi, B. R. (1994). Development of an acculturative stress scale for international students: Preliminary findings. *Psychological reports*, 75(1), 435-448.

Sandhu, D. S., & Asrabadi, B. R. (1994). Development of an acculturative stress scale for international students: Preliminary findings. *Psychological reports*, 75(1), 435-448.

Santor, D. A., Poulin, C., LeBLANC, J. C., & Kusumakar, V. (2007). Online health promotion, early identification of difficulties, and help seeking in young people. *Journal of the American Academy of Child & Adolescent Psychiatry*, 46(1), 50-59.

Schueller, S. M., Stiles-Shields, C. & Yarosh, L. (2017). Online treatment and virtual therapists in child and adolescent psychiatry. *Child Adolesc Psychiatr Clin N Am*, 26, 1–12.

Schuler, D., & Namioka, A. (Eds.). (1993). *Participatory design: Principles and practices*. CRC Press.

Seaborn, K., & Fels, D. I. (2015). Gamification in theory and action: A survey. *International Journal of human-computer studies*, 74, 14-31.

Seemiller, C., & Grace, M. (2016). *Generation Z Goes to College*. New York, NY: Jossey-Bass.

Sharp, L. K., & Lipsky, M. S. (2002). Screening for depression across the lifespan. *Am Fam Physician*, 66, 1001-1008.

Shatto, B., & Erwin, K. (2016). Moving on from millennials: Preparing for generation Z. *The Journal of Continuing Education in Nursing*, 47(6), 253-254.

Sodowsky, G. R., & Plake, B. S. (1992). A study of acculturation differences among international people and suggestions for sensitivity to within-group differences. *Journal of Counseling and Development*, 71, 53–59.

Sparks, & Honey. (2014). *Meet Generation Z: forget everything you learned about Millennials*.

Stinson, J. N., Jibb, L. A., Nguyen, C., Nathan, P. C., Maloney, A. M., Dupuis, L. L., ... & Portwine, C. (2013). Development and testing of a multidimensional iPhone pain assessment application for adolescents with cancer. *Journal of medical Internet research*, 15(3), e51.

strategies of East Asian graduate students in the United States. *International Social Work*, 60(3), 733–749.

Strauss, A., & Corbin, J. (1990). *Basics of qualitative research*. Sage publications.

Strauss, C., Cavanagh, K., Oliver, A., & Pettman, D. (2014). Mindfulness-based interventions for people diagnosed with a current episode of an anxiety or depressive disorder: a meta-analysis of randomised controlled trials. *PLOS one*, 9(4), e96110.

Strauss, W., & Howe, N. (1991). *Generations: The history of America's future, 1584 to 2069*. William Morrow & Co.

Strunk, D. R., & DeRubeis, R. J. (2001). Cognitive therapy for depression: A review of its efficacy. *Journal of Cognitive Psychotherapy*, 15(4), 289.

Strunk, D. R., Brotman, M. A., & DeRubeis, R. J. (2010). The process of change in cognitive therapy for depression: Predictors of early inter-session symptom gains. *Behaviour research and therapy*, 48(7), 599-606.

Sue, D.W., & Sue, D. (1990). *Counseling the culturally different: Theory and practice*. New York: John Wiley & Sons.

Tiburcio, M., Lara, M. A., Aguilar Abrego, A., Fernandez, M., Martinez Velez, N. & Sanchez, A. (2016). Web-based intervention to reduce substance abuse and depressive symptoms in Mexico: Development and usability test. *JMIR Ment Health*, 3, e47.

Titov, N., Dear, B. F., Staples, L. G., Bennett-Levy, J., Klein, B., Rapee, R. M., ... & Purtell, C. (2015). MindSpot clinic: an accessible, efficient, and effective online treatment service for anxiety and depression. *Psychiatric Services*, 66(10), 1043-1050.

Toews, J., Lockyer, J., Dobson, D., Simpson, E., Brownell, A., Brenneis, F., et al. (1997). Analysis of stress levels among medical students, residents, and graduate students at four Canadian schools of medicine. *Academic Medicine*, 72(11), 997-1002.

Tremblay, K. (2005), "Academic mobility and immigration", *Journal of Studies in International Education*, Vol. 9, pp. 196-228.

- Turner, A. L., & Berry, T. R. (2000). Counseling center contributions to student retention and graduation: A longitudinal assessment. *Journal of College Student Development, 41*(6), 627-636.
- Valenzuela, S., Park, N., & Kee, K. F. (2009). Is there social capital in a social network site?: Facebook use and college students' life satisfaction, trust, and participation. *Journal of computer-mediated communication, 14*(4), 875-901.
- Wahle, F., Kowatsch, T., Fleisch, E., Rufer, M., & Weidt, S. (2016). Mobile sensing and support for people with depression: a pilot trial in the wild. *JMIR mHealth and uHealth, 4*(3), e111.
- Ward, C., Bochner, S., & Furnham, A. (2001). *The psychology of culture shock* (2nd ed.). East Sussex, England: Routledge.
- Watanabe, N., Horikoshi, M., Yamada, M., Shimodera, S., Akechi, T., Miki, K., ... & Ogawa, Y. (2015). Adding smartphone-based cognitive-behavior therapy to pharmacotherapy for major depression (FLATT project): study protocol for a randomized controlled trial. *Trials, 16*(1), 293.
- Webb, M., Burns, J., & Collin, P. (2008). Providing online support for young people with mental health difficulties: challenges and opportunities explored. *Early intervention in psychiatry, 2*(2), 108-113.
- Wei, M., Ku, T. Y., Russell, D. W., Mallinckrodt, B., & Liao, K. Y. H. (2008). Moderating effects of three coping strategies and self-esteem on perceived discrimination and depressive symptoms: A minority stress model for Asian international students. *Journal of Counseling Psychology, 55*(4), 451.
- Whittemore, R., & Knafl, K. (2005). The integrative review: updated methodology. *Journal of advanced nursing, 52*(5), 546-553.
- Whitton, A. E., Proudfoot, J., Clarke, J. et al. (2015). Breaking open the black box: Isolating the most potent features of a web and mobile phone-based intervention for depression, anxiety, and stress. *JMIR Ment Health, 2*, e3.
- Wilson, R. L. (2017). E Mental Health. In: N. Procter, H. Hamer, D. McGarry, R. L. Wilson & T. Frogatt (Eds). *Mental Health: A Person-centred Approach*, 2nd edn. Port, Melbourne, Australia: Cambridge University Press.
- Wilson, R. L. (2017). E Mental Health. In: N. Procter, H. Hamer, D. McGarry, R. L. Wilson & T. Frogatt (Eds). *Mental Health: A Person-centred Approach*, 2nd edn. Port, Melbourne, Australia: Cambridge University Press.
- Wilson, S. B., Mason, T. W., & Ewing, M. J. M. (1997). Evaluating the impact of receiving university-based counseling services on student retention. *Journal of Counseling Psychology, 44*(3), 316-320.

- Winterowd, C. L., Adams, E. M., Miville, M. L., & Mintz, L. B. (2009). Operationalizing, instilling, and assessing counseling psychology training values related to diversity in academic programs. *The Counseling Psychologist*, 37(5), 676-704.
- Winzelberg, A. (1997). The analysis of an electronic support group for individuals with eating disorders. *Computers in Human Behavior*, 13(3), 393-407.
- Witmer, B.G. & Singer, M.G. (1998), Measuring presence in virtual environments: a presence questionnaire, *Teleoperators and Virtual Environments*, Vol. 7 No. 3, pp. 225-240.
- World Health Organization. (2017). Depression. Retrieved December 10,2019, from <http://www.who.int/topics/depression/en/>
- Wozney, L., Baxter, P. & Newton, A. S. (2015). Usability evaluation with mental health professionals and young people to develop an Internet-based cognitive-behaviour therapy program for adolescents with anxiety disorders. *BMC Pediatrics*, 15, 213.
- Xiong, Y., & Zhou, Y. (2018). Understanding East Asian Graduate Students' Socio-Cultural and Psychological Adjustment in a US Midwestern University. *Journal of International Students*, 8(2), 769-794.
- Yang, K. S., & Bond, M. H. (Ed.) (1986). *The psychology of the Chinese people. Hong Kong: Oxford University Press.*
- Yen, J. Y., Ko, C. H., Yen, C. F., Wu, H. Y., & Yang, M. J. (2007). The comorbid psychiatric symptoms of Internet addiction: attention deficit and hyperactivity disorder (ADHD), depression, social phobia, and hostility. *Journal of adolescent health*, 41(1), 93-98.
- Zhang, J., & Goodson, P. (2011). Predictors of international students' psychosocial adjustment to life in the United States: A systematic review. *International Journal of Intercultural Relations*, 35(2), 139–162.
- Zhang, N., & Dixon, D. N. (2003). Acculturation and attitudes of Asian international students toward seeking psychological help. *Journal of Multicultural Counseling and Development*, 31(3), 205-222.
- Zhou, Y., Frey, C., & Bang, H. (2011). Understanding of international graduate students' academic adaptation to a U.S. graduate school. *International Education*, 41(1), 76-94.
- Zichermann, G., & Linder, J. (2010). *Game-based marketing: inspire customer loyalty through rewards, challenges, and contests.* John Wiley & Sons.

APPENDIX A
DATA COLLECTED JANUARY-MARCH 2020

THE QUESTIONNAIRE OF ONLINE SURVEY

A Survey of International Students' Attitudes on Campus Counseling

Hello, I am a graduate student at the Arizona State University School of Design. I am conducting a study for my graduation thesis, which will investigate the psychological problems of international students studying abroad and their attitudes towards psychological counseling on campus and explore how to create better services for international students about mental health Experience.

Your answer is very important to our research. If you are an international student who is at least 18 years old, please answer the following questions based on your real thoughts. This questionnaire is only used to collect research data, your participation is completely voluntary. There is no good or bad answer, we will keep all the content you fill out confidential. Thank you very much for your participation and support. Please select the option that meets your criteria.

1. What is your college? *

2. How are you? *

3. What is your gender? *

Male

Female

Other _____

4. What degree are you pursuing? *

Undergraduate

Graduate

PhD

Other _____

5. How long have you lived abroad? *

Half a year and below

Half a year to one year

One to three years

Three to five years

More than five years

6. What is your financial support? *

Family

Scholarships for foreign university institutions

Domestic government funding

Funding from other institutions

Work for yourself

Other _____

7. Your evaluation of your English level*

Very poor Poor Ok Good Very good(fluent)

Hearing

Reading

Writing

Speaking

Overall

8. How do you adapt to your life abroad? *

- Not adapted at all Just started to adapt Still adapting Almost adapted
 Have adapted

9. What do you think is the most difficult aspect of living abroad? *

- Lifestyle
 Social environment
 Interpersonal communication
 Cultural values
 Other _____

10. Your satisfaction with studying abroad is? *

- Very dissatisfied Not satisfied Neutral Satisfied Very satisfied

11. What are the main reasons for your dissatisfaction with studying abroad? *

- Cultural difference
- Language barrier
- Academic pressure
- Difficulties in interpersonal communication
- Financial pressure
- Relationship problems
- Life adaptation problem
- Personal and property safety
- Other _____
- Other2

12. Please rank the factors above, 1 is the most important factor, 8 is the most minor factor*

- [] Cultural difference
- [] Language barrier
- [] Academic pressure
- [] Difficulties in interpersonal communication
- [] Financial pressure
- [] Relationship problems
- [] Life adaptation problem
- [] Personal and property safety

13. What the following situation have you experienced? *

- Want to avoid socializing
- Lost interest in life
- Feel anxious and nervous
- Feel like someone is laughing at me
- Can't keep calm
- Somehow I feel bad things will happen
- None of the above has happened

14. How often do you show these emotions? *

- Never Rarely Sometimes Often Always

15. When you are in a bad mood, what method do you choose to deal with? *

- Seek help from family, roommates or classmates
- Seek help from campus counseling center
- Find psychological related information on the Internet
- Talk to strangers online
- Thinking hard in mind, not talking
- Entertainment, such as singing
- Other _____

16. Do you know the campus counseling services of your school? *

I know, but I do not know specifically where

I know, and I know the specific location

I have no idea

17. Have you used campus counseling services? *

Yes

No

18. If you have used campus counseling, how satisfied are you? *

Very dissatisfied 1 2 3 4 5 Very satisfied

19. Do you have any suggestions for improving the existing campus consulting services? *

20. Why are you worried about seeking help from the campus counseling center? *

My mental health problems are not serious and do not require consultation

Worried about the professional level of the campus counseling center (the professional level of the counselor, information leakage, etc.)

Worried about being talked about, afraid to consult

Choose an out-of-school counseling agency

- Worried about language barriers
- Can not be understood because of cultural differences.
- Other _____

21. What is your opinion on psychological counseling service? *

- It 's embarrassing to consult
- People who go to consultation must be mentally ill
- People who are mentally healthy can also receive counseling
- Consultation is to do ideological work
- Consultation is just chatting
- Consultation is ineffective
- Counseling can help people with psychological problems
- Counseling is a good way to relieve emotions
- Other _____

22. If you have conducted or are likely to have a psychological consultation in the future, what is the main reason? *

- I am curious and want to understand how the counselors work
- It's safer so that people around me don't know my privacy
- Strangers can analyze problems from a more objective perspective
- The level of professional counselors is higher and can point out the key of problems
- Other _____

23. If there is an online service for psychological counseling, would you like to use? *

Yes

No

24. What do you think the form of online service should be? *

Website

Mobile Applications

Both

25. Do you think face-to-face consultation can be replaced? *

Yes

No

It depends _____

26. If it is an online service derived from campus psychological counseling, what functions do you think the service needs to have? *

Immediate psychological counseling

Online Reservations

Psychological Knowledge Education

Self-recording and management

Communities

Other _____

27. When it comes to mental health issues, what online services do you prefer to use?*

Professional, official

Highly interactive and interesting

Simple function, easy to use

Other _____

28. What are your suggestions and views on the psychological counseling service combining online and offline? *

APPENDIX B

DATA COLLECTED JANUARY-MARCH 2020

IRB APPROVAL FOR THE RESEARCH

• Survey questions, interview questions and focus group activities, Category: Measures (Survey questions/interview questions /interview guides/focus group questions).

The IRB determined that the protocol is considered exempt pursuant to Federal Regulations 45CFR46 on 2/7/2020.

In conducting this protocol you are required to follow the requirements listed in the INVESTIGATOR MANUAL (HRP-103).

Sincerely,

IRB Administrator

cc: Wei Xu
German Mejia Ramirez
John Takamura
Wei Xu



EXEMPTION GRANTED

John Takamura
HDA: The Design School
480/965-7171
John.Takamura@asu.edu

Dear John Takamura:

On 2/7/2020 the ASU IRB reviewed the following protocol:

Type of Review:	Initial Study
Title:	How gamification as a way of interaction design can help the mental issues of international students.
Investigator:	John Takamura
IRB ID:	STUDY00011440
Funding:	None
Grant Title:	None
Grant ID:	None
Documents Reviewed:	<ul style="list-style-type: none"> • consent for focus group.pdf, Category: Consent Form; • consent for staffs' interviews.pdf, Category: Consent Form; • consent for students' interviews.pdf, Category: Consent Form; • consent for survey.pdf, Category: Consent Form; • HRP-503a_SocialBehavioral_Wei Xu.docx, Category: IRB Protocol; • Recruitment Script for counseling staffs.pdf, Category: Recruitment Materials; • Recruitment Script for students.pdf, Category: Recruitment Materials; • Recruitment Script for survey.pdf, Category: Recruitment Materials; • social media recruitment for interviews and survey, Category: Recruitment materials/advertisements /verbal scripts/phone scripts;