

ABSTRACT

Title of Dissertation: WHO WAS A NEIGHBOR TO THOSE FROM THE OTHER SIDE OF THE GLOBE?: INTERNATIONAL NEWCOMER STUDENTS' LOCAL INFORMATION BEHAVIORS IN UNFAMILIAR ENVIRONMENTS

Chi Young Oh, Doctor of Philosophy, 2018

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This dissertation examines the information behaviors of international newcomer students during their adjustment to new environments. In the context of newcomers' adjustment to local environments, this study focuses on how international students need and seek information about local areas, housing, places, routes, and transportation, that is local information behavior (LIB).

The first study of 20 international graduate students suggested that international students' LIBs might vary depending on their social context. International students who had many co-nationals in their new environment tended to perceive co-nationals as their main information source, while those who had fewer local co-nationals did not. Drawing on information behavior theories and the initial study, the second study introduces a concept "socio-national context," which is defined as the degree to which there are co-nationals in one's local environment. By

surveying a mixed sample of 149 first-year international and domestic graduate students and conducting interviews and cognitive mapping with a subset (57) of the respondents, the second study found that international newcomer students' socio-national context interacts with their socio-technical context to shape their LIBs. International students from the top 3 most common countries, who have many local co-nationals, effectively acquired local information through their local co-nationals in offline, online, and mobile settings, while international students from other less-common countries did not engage in such local co-national interaction and social information practices. The third study, conducted as a follow-up in participants' second year, found that international students' LIB changed over time and the influence of socio-national context decreased. The contribution of this study also includes analyzing newcomer students' information needs and wandering behavior through the lenses of Wilson's information behavior models and proposing new types of information-seeking behavior.

Overall, this dissertation presents how the interplay between socio-national, socio-technical, and temporal contexts shapes international newcomer students' LIBs. In practice, more attention is needed for international newcomer students from less-common countries who may experience more information challenges. This dissertation suggests that information behavior models and theories better account for people's socio-national context and its interactions with other contexts, if they are to be more relevant in global and migration contexts.

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GLOBE?: INTERNATIONAL NEWCOMER STUDENTS' LOCAL
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by

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Dedication

To all good neighbors who were kind to those from the other side of the globe

Acknowledgements

In his heart a man plans his course, but the LORD determines his steps.

Proverbs 16:9

I thank and praise you, O God of my fathers:

You have given me wisdom and power,

you have made known to me what we asked of you...

Daniel 2:23a

Thanks be to God, who guided my steps through this academic journey.

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Chapter 1: Introduction

More than ever before, people travel to different parts of the world, work outside their home country, and migrate to new countries for various reasons and roles. Ranging from expatriate workers to foreign workers, exchange students to degree-pursuing international students, and immigrants to refugees—international mobility and migration are global phenomena. The United Nations defines international migrants as people, either foreign born or foreign citizens, residing outside their country of birth, excluding those who are temporarily travelling abroad (United Nations, 1998, 2013). International migrants are people living in countries other than their country of birth, including immigrants, refugees, foreign workers, and international students. When managed properly, international migration yields positive outcomes for migrants and their families and also contributes to economies and societies of origin and destination countries (United Nations, 2016).

As a type of international migrants, international students are a rapidly growing population around the globe. Globally, there are more than 4.5 million international students studying in higher education programs outside their home countries, and their number is projected to be 8 million in 2025 (Project Atlas, 2015). International education is increasingly popular as it benefits students, education institutions, as well as the industry and economy of the related countries. Higher education institutions in U.S. have increased their level of internationalization and made efforts to diversify the students on campus (ICEF Monitor, 2017). More and more U.S. colleges have a dedicated international office to support international

students and student mobility. Many higher education institutions in countries around the world, including the U.S., make global efforts to recruit more international students by using various strategies, such as maintaining a presence at conferences overseas, working with external companies to engage in recruiting international students, as well as improving social media outreach (Hanover Research, 2014).

However, despite the increasing popularity of international education and the efforts of education institutions to host international students, international students have continually been reported to face various challenges in their life in a new environment. As newcomers in a host country, international students experience differences in cultures, languages, social networks, and various societal systems (Mallinckrodt & Leong, 1992; Zhang & Brunton, 2007). Facing these differences, international students must still adjust to their new environments to fulfill the goals of their international studies during a given period of time.

In this process of adjustment to host countries, it is inevitable for international students to need, seek, and use various types of information for their daily lives. A few studies in Library and Information Science (LIS) have addressed daily information challenges and information needs of international students in new environments (Hofmann, 2010; Mehra & Bilal, 2008). However, most prior studies of international students in several fields, such as psychology, education, and LIS, focused on international students' challenges in and adjustment to different cultures, different social environments, or different library/academic systems. The role and nature of information behaviors involved during international students' adjustment to host environments is far less commonly explored. Thus, it is unclear from prior work

how new international students from countries around the world need and seek information during their adjustment, specifically outside academic settings and in the context of day-to-day adjustment to new environments in host countries.

This dissertation focuses on new international students' information behaviors during their adjustment to unfamiliar host environments and examines the factors and contexts shaping new international students' information behaviors during adjustment. To have a holistic understanding of these information behaviors of new international students, a mixed-method approach and longitudinal study design were used. Through this investigation, I develop a theoretically based and contextually grounded understanding of international students' information behavior in new environments in order to enhance current practices of international students and advance theories and models related to human information behaviors and technology practices in international migration contexts.

1.1. International Students around the Globe and in the U.S.

As international education increases in popularity, more and more students migrate to other countries to pursue their academic goals. According to Project Atlas (2015), there were 2.1 million international students studying in higher education institutions outside their home countries in 2000 and more than 4.5 million students in 2015. Their number is projected to be 8 million in 2025. In 2014, the most popular destination countries included the United States (974,926 students), the United Kingdom (493,570 students), China (377,054 students), Germany (301,350 students), and France (298,902 students). The record high number of international students in the U.S. is a ten percent increase over the prior academic year (886,052), reflecting

the ongoing and rapid growth of international student population in the U.S. The nearly one million international students in the U.S. are from 218 different countries, with about 84 percent of them coming from the top 25 countries of origin including China, India, and Korea. These three countries are most common countries of origin of international students in U.S. According to the National Center for Education Statistics (2014), international students (non-resident alien) comprised 3.5 percent of all students who received bachelor's degrees in U.S. postsecondary institutions in 2012/2013, and for both master's and doctoral degrees, international students comprised 12 to 13 percent of all degree recipients in the U.S. in 2012/2013. According to a more recent report (Institute of International Education, 2017), over one million international students enrolled in U.S. post-secondary, higher education institutions in 2016/2017, and they made up 5.3 percent of all students in U.S. higher education. Specifically in graduate programs, international students were reported to comprise 18.9 percent of total enrollment and more than 50 percent in mathematics, computer science, and engineering programs (Okahana, Feaster, & Allum, 2016). These statistics describe the significant presence of international students in U.S. higher education, especially in graduate programs.

1.2. Challenges Faced by International Students

Like any international migrant away from their familiar environments, international students experience challenges involving different cultures, languages, customs, and social networks. The educational system in the host country also adds to the challenges of some international students due to the differences in educational systems between their home and host country (Charles & Stewart, 1991). Challenges

also involve loss of existing social networks, loneliness, and problems with daily living management (Sodowsky & Plake, 1992; Toyokawa & Toyokawa, 2002; Zhang & Brunton, 2007). Prior studies argued that the challenges faced by international students may have an impact on their general adjustment, academic success, psychological well-being, and education institutions' student retention (Andrade, 2006; Bastien, 2011; Charles & Stewart, 1991; Poyrazli & Grahame, 2007).

1.3. Information Challenges and Local Information Behaviors (LIBs)

International students need various kinds of information as they cope with challenges in a new country (Mehra & Bilal, 2008; Sin & Kim, 2013). Specifically, for their adjustment to living in new environments, they need to engage with information about local areas, places, locations of places, public transportation, routes, streets, and other local systems. This type of information has been termed *local information*. New international students need various kinds of local information in determining where to live, where to buy things, where to eat, where to locate places, and how to move around their new environment. Developing this kind of local information is essential for international students' general living adjustment to new environments (Hofmann, 2010; Mehra & Bilal, 2008). However, despite a number of studies on international students' adjustment to host environments in disciplines such as education and psychology, little is known about how international students need, seek, and use local information during their adjustment to new environments.

The term *local information behavior (LIB)* is used in this dissertation to refer to human information behavior related with information about the nearby physical, spatial, social, and organizational environment. Based on the definitions of

information behavior by Wilson (1999) and Fisher, Erdelez, and Mckechnie (2005), LIBs are defined as the totality of human information behavior related to how people need, both actively and passively seek, acquire, and use local information through various information sources and technologies. This dissertation specifically focuses on international students' local information challenges in new environments and examines international newcomer students' LIBs in the context of adjusting to new environments in a host country.

1.4. Theoretical Background

Drawing on prior studies and related theories and models, the current research takes into account various kinds of factors and contexts that can influence international students' information behaviors (Burnett & Jaeger, 2011; Pettigrew, 1999; Wilson, 1981, 1999). Through a series of studies, this dissertation explores and examines the factors and contexts that shape the LIBs of international newcomer students during their adjustment.

Wilson (1981, 1999) provides helpful frameworks for addressing complex contexts of information behaviors. Wilson's (1981) model of *the context of information seeking* and his model of *information needs and seeking* consider various social, demographic, and environmental factors that influence the formation of human information needs and information seeking behaviors. Specifically, his model of *the context of information seeking* discusses how users' social contexts of reference groups and the broader context of the user's life world play important roles in shaping their information behaviors. Although abstract, Wilson's models provide a theoretical lens to understand complex social contexts of human information behaviors which

resonates, in many ways, with other information behavior related theories such as *information grounds* and *information worlds*.

Pettigrew's (1999) notion of *information grounds* provides a spatially bounded information environment that can be relevant to understanding the information behavior of international students who migrate and adjust to new geospatial environments. By examining the interaction between community health nurses and seniors at foot clinics, she identified the environmental factors at clinics and the situational factors of seniors and nurses that affected the communicative construction and sharing of information among them. Pettigrew used a holistic approach in investigating human information behaviors in specific spatial and situational contexts of local clinics and demonstrated the importance of encompassing contextual factors in information behavior research. Pettigrew described the clinics as information grounds where spontaneous and serendipitous information sharing emerges in social atmospheres. As a space where people meet and information flows in social settings, *information grounds* may exist in various contexts of people's lives. To this end, this dissertation aims to identify how local information grounds form among international newcomer students from around the world, whether in physical or virtual settings.

While the theoretical concept of *information grounds* articulates how social, situational, physical, and spatial contexts shape human information behaviors, the theory of *information worlds* addresses small, intermediate, and larger worlds that are interwoven to influence human information behaviors (Burnett & Jaeger, 2011). The multi-tiered worlds of contexts include small worlds, such as family, friends, and other trusted individuals, which have immediate influences on human information

behaviors. The complex contexts also include intermediate and large worlds, such as institutions, technologies, cultures, and nationalities, which provide broader social influences on human information behaviors. Burnett and Jaeger (2011) state that information behaviors are situated and contextualized simultaneously by these multi-tiered contexts. Looking through the lens of the theory of information worlds, the theoretical concept of information grounds specifically helps us explain how small and intermediate levels of social factors affect human information behaviors. However, the theory of information worlds uses a more expanded view and takes account of broader societal and fundamental factors influencing human information behaviors that could better relate to the focus of this dissertation research on new international students' information behavior.

Together, Wilson's (1981, 1999) information behavior models, Pettigrew's (1999) information grounds, and Burnett and Jaeger's (2011) information worlds theory provide a foundation for examining new international students' LIBs and the various social, demographic, spatial, situational, and other factors and contexts that may shape their LIBs during adjustment to new environments. However, these theories and models do not provide detailed interactions of the various factors that might affect new international students' information behaviors. The current dissertation seeks to identify specific interactions of these factors and contexts in shaping the information behaviors of new international students during adjustment to a host country.

Additionally, in response to a call for more research examining longitudinal changes in international migrants' information behavior (Caidi, Allard, & Quirke,

2010), this research also aims to add to our knowledge about how the information behaviors of international newcomer students change over time as they adjust to new environments.

In the remainder of this dissertation, I review related prior work; present three studies that have been conducted to answer the key questions listed above; and discuss the findings and implications of this dissertation research. Chapter 2 introduces and discusses prior studies on international students and other migrants addressing their information-related behaviors and challenges in new environments. These reviews of prior work lead to the identification of research gaps and the research questions that drive this dissertation research. Chapter 3 introduces the first study (Study 1) of this dissertation research project, which explores the LIBs of a small sample of 20 international students and suggests areas of research to further examine in following studies. With a larger sample, Study 2 (Chapter 4) examined the LIB patterns of 149 new international and domestic (as a control group) students, aiming to identify the complex contexts that shape their LIBs during their initial transition to new environments. Chapter 5 describes the results from Study 3, which involved following up with a subset of Study 2 participants one year later, seeking to identify any longitudinal changes in international students' LIBs in host environments. Chapter 6 wraps up by summarizing the studies conducted within this dissertation research and concludes the dissertation by discussing the implications.

Chapter 2: Prior Work

Prior studies of international students in disciplines such as education, psychology, and LIS have examined various aspects of international student life in host environments. Reviewing these studies of international students as well as studies of other types of international migrants in similar settings in new countries provides a basis for understanding the nature of international students' life challenges, information environments, information and technology practices, and various contexts that might influence their LIBs in new environments. This chapter presents these prior studies regarding international students' adjustment and challenges; their information behaviors in academic, library, and everyday life settings; and other international migrants' information behaviors.

2.1. International Students in New Environments

As international education is increasingly popular around the globe, scholars and practitioners have examined the lives and experiences of international students, identifying various challenges that international students face in new countries. These challenges involve differences in cultures, languages, customs, and values; loneliness; loss of existing social networks; and problems with daily life tasks, and daily living management in the host countries (Abe et al., 1998; Mallinckrodt & Leong, 1992; Sodowsky & Plake, 1992; Toyokawa & Toyokawa, 2002; Zhang & Brunton, 2007). Along with these challenges that they experience, studies have also identified various factors which can affect international students' successful adjustment in new environments, such as language skills, study load, and length of stay in the host

country (Bastien, 2011; Charles & Stewart, 1991; Poyrazli, Arbona, Bullington, & Pisecco, 2001; Zhai, 2004). Studies also argue that there should be more efforts to provided needed information to international students; help them understand potential differences they may face; assist them with their adjustment to their new societies through social and cultural support programs; encourage them to seek appropriate counselling support; and guide them to undertake a reasonable study load (Charles & Stewart, 1991; Ozturgut, 2013; Poyrazli & Grahame, 2007). Although these studies do not extensively address how international students seek and use information during adjustment, the difficulties and challenges identified in these studies underscore the importance of information during international students' adjustment to unfamiliar environments. However, the types of information that are important to international students adjusting to new environments, the ways in which international students seek and acquire that information, and the factors that affect their information seeking practices during adjustment remain understudied.

2.2. Information Behavior of International Students

Information behaviors of international students have been studied by researchers in the LIS field although many of these studies have focused on their use of libraries and libraries' provision of services to international students as users (Allen, 1993; Baron & Strout-Dapaz, 2001; Bordonaro, 2006; DiMartino, Ferns, & Swacker, 1995; Jackson, 2005; Liao, Finn, & Lu, 2005; Liu & Redfern, 1997; Onwuegbuzie & Jiao, 1997). Liu and Redfern (1997) studied multicultural students' use of libraries at San Jose State University and explored how students' language skills are related with their library use. Through a survey, Baron and Strout-Dapaz

(2001) identified the major challenges for international students, such as communication problems, adjustment to new education/library systems, and general cultural adjustment. In Bordonaro (2006), international students' use of the college library was explored as they worked to develop their English language skills in a self-directed manner in libraries. These studies examined international students' information behaviors and challenges in using information in the context of libraries. These findings indicate that new international students may come to host countries with different skills and backgrounds and that they could experience differences in library-related systems of host environments. Also, from these studies, it is implied that the differences and challenges that international students experience could influence their information needs and information-seeking behaviors in new environments. However, as these findings and implications are based on the studies of international students in library or academic settings, it is unclear how international students need, seek, and use information in daily, non-work settings, specifically during their transition to new countries.

2.3. Information Behavior of Immigrants

A group of international migrants that shares many characteristics with international students are immigrants, and there have been a number of LIS studies focusing on immigrant populations. Caidi, Allard, and Quirke (2010) described how immigrant studies in LIS addressed difficulties of immigrants as a population in transition to unknown information environments. Fisher, Durrance, and Hinton (2004) studied how immigrants use a public library in New York through Pettigrew's (1999) notion of information grounds and reported how literacy and coping skills

programs benefit the immigrant patrons of the library. Quirke (2012) examined information practices of new Afghan immigrant and refugee youth in Toronto during their settlement to a new country. Quirke found that settlement-related information is sought and shared in leisure settings and that family and friends were among the preferred information sources for Afghan youth in the study.

Most of the information behavior studies of immigrants have each focused on information behaviors of immigrants from specific countries. Komito and Bates (2011) explored Polish and Filipino immigrants' information behaviors in Ireland and their use of social media to maintain their social networks in their home country. Shoham and Strauss (2007) studied how North American immigrants seek information before and after their immigration to Israel. Khoir, Du, and Koronios (2014) found that the Internet and strong social networks, both online and offline, were important information sources for Asian immigrants in South Australia. Similarly, Su and Conaway (1995) examined information behaviors of elderly Chinese immigrants in the greater Los Angeles area, and Hakim Silvio (2006) studied information behaviors of immigrant southern Sudanese youth in the city of London, Ontario, Canada. These immigrant information behavior studies imply that international migrants from specific countries have their unique contexts and challenges surrounding their information behaviors. However, there is little research which has specifically addressed different information behaviors among international migrants from around the world.

2.4. Information Behavior Studies Considering Countries of Origin of International Migrants

International students in LIS studies have been treated as one single large group of foreign students rather than as a set of potentially different groups of people in terms of their information behaviors (Jackson, 2005). Some LIS studies of international students have collected data about the countries of origin or regions of origin of their research participants, but did not necessarily examine their information behaviors by country or region of origin (Liao et al., 2005; Lingel, 2011; Sin, 2015; Sin & Kim, 2013). Liao et al. (2005) conducted a survey to investigate differences in information behaviors between international students and American students in academic and library settings. Although Liao et al. (2005) identified regions of origin of the international students, the purpose was to check whether the survey sample resembled the demographic distribution of students at the university where the survey was conducted. Participants' information behavior was not examined based on their regions of origin. Also, Sin and Kim (2013) analyzed international students' everyday life information needs and their use of social networking sites for daily information seeking, and Sin (2015) examined demographic differences in international students' information source use and difficulties in seeking information. Both Sin and Kim (2013) and Sin (2015) identified regions of origins of their participants, but the purpose was to compare the composition of the study participants' regions of origins with the one of all international students in U.S. In addition, Lingel (2011) explored information practices of international migrants in New York City, including immigrants, international exchange students, and other sojourners from six different

countries, but her research did not compare and contrast international migrants' information practices based on nationalities or regional backgrounds.

However, there were a few exceptions that examined information behavior of international migrants based on their nationalities or regions of origin. Through a survey, Song (2004) explored how international students of different nationalities perceived and used libraries and electronic library resources in a U.S. university. By focusing on students from three East Asian countries (China, Korea, and Taiwan) who were the majority of the survey respondents, Song described their perceptions of several library services and their experiences in using electronic library resources based on their nationality. Song's (2004) survey-based empirical results demonstrated that international students' countries of origin might be related to differences in their use of libraries, online resources, and information. In a similar approach, but with a larger sample, Burke (2008) explored the relationship between immigrants' sociodemographic factors and their public library usage rates in the U.S. She found that immigrants' region of origin (e.g. Central America/Mexico, Europe, East Asia, South Asia) was one of the variables predicting their library use. Also, her study showed that immigrants' education level and the number of persons in the household were useful predictors of their library use, while distance from the library was not a good predictive variable for their library use. Burke's (2008) focus was immigrants' library use patterns, and her study found different information related practices among international migrants from various parts of the world. The differences in information behaviors of international students and immigrants in these studies

suggest that international students' countries of origin may play a role in shaping their information behavior in a new country.

Given the diverse national backgrounds of students in today's education systems and the increasingly transnational nature of our societies, understanding the effects of nationality and other related factors on human information behaviors calls for more attention. The current dissertation aims to fill this research gap by investigating the information behaviors of new international students from various countries during their adjustment to host environments. In light of information behavior models and theories that account for the influences of social, environmental, demographic, situational, and other factors in shaping human information behaviors, this dissertation identifies how nationalities and other contexts specifically interact to affect the LIBs of international students during adjustment to new environments (Burnett & Jaeger, 2011; Pettigrew, 1999; Savolainen, 1995; Wilson, 1981, 1997, 1999).

2.5. Information Behavior Studies Considering Temporal Contexts of International Migrants

A few information behavior studies of immigrants and international students have explored information behaviors of both relatively newer migrants and longer-established migrants. Song's (2004) survey respondents included both newer international students and more established international students, whose lengths of stay in the U.S. ranged from three months to eight and a half years at the time of study participation. Song found that the participants' lengths of stay in the U.S. and their use of electronic resources in the library were very weakly correlated. Khoir,

Du, and Koronios (2015) studied information needs, information sources, and information grounds of Asian immigrants in South Australia, examining information behaviors of Asian immigrants who had been in the host country less than five years and those who had been longer-established. They found that newcomers and longer-established immigrants demonstrated different information needs as longer-established immigrants' information needs were more focused on achieving fuller participation in the society. However, Khoir et al. (2015) found that, unlike information needs, information source use of newcomers and longer-established immigrants were similar. The findings may suggest that international migrants' information source use does not significantly change over time during their adjustment to new countries. However, Quirke (2014) suggests longitudinal changes in international migrants' information source use. Quirke examined information seeking and sharing behavior of Afghan immigrant and refugee youths in Toronto, interviewing both relatively new immigrants, who immigrated within less than two years, and longer-settled immigrants. She found that longer-settled youth broadened their information sources to include different people and more online sources such as social networking sites. With these conflicting findings from a limited number of studies, it is unclear how international migrants' information seeking behavior and source use change during their adjustment to new countries. More research is needed to better understand longitudinal changes in the information behaviors of international migrants. The findings from this dissertation will add to our knowledge of information seeking behavior and its change over time for international migrants, specifically international students, during their adjustment to new environments.

In addition, in terms of research methods used, most of the studies discussed above examined just snapshots of the information behaviors of immigrants or international students whose lengths of stay in their new countries varied at the time of the studies. These studies did not necessarily examine how the information behaviors of the same individuals change over a specific period of time. As a result, these studies provide only suggestive results about the longitudinal changes in the information behaviors of international migrants or international students. Thus, although these information behavior studies considered temporal contexts of international migrants, further studies using longitudinal follow-up approaches might add to our understanding of international migrant information behavior and how it changes over time as they adjust to their new countries.

2.6. International Students' Information Behavior in Daily, Adjustment Contexts

While many studies of immigrant information behavior addressed non-work, everyday information seeking outside libraries, there has been little LIS research about the information behavior of international students outside the contexts of libraries. There have been a few exceptions which have looked into everyday life information behaviors of international migrants, including international students. Using a broader term of “migrational individuals” that refers to people in the process of movement, such as immigrants, refugees, and international exchange students, Lingel (2011) explored everyday life information behaviors of international migrants in New York City. Using the perspective of everyday life information seeking (ELIS) (Savolainen, 1995), she identified participants' information behaviors pertaining to their acculturation in New York City, such as wandering around the local area. While

Lingel (2011) studied the ELIS of various types of migrational individuals, including international students, immigrants, and other sojourners, Sin and Kim (2013) focused more narrowly on international students' ELIS, especially international students' information seeking on social networking sites (SNSs). Through their survey, Sin and Kim found that majority of the respondents frequently used SNSs for ELIS. Lingel (2011) and Sin and Kim (2013) addressed everyday life information behaviors of international students and other migrants, but these studies did not necessarily consider the specific temporal contexts of their adjustment to new environments. Little is known from prior studies about how new international students seek non-work, everyday life information during their adjustment to new environments.

2.7. Summary and Research Questions

Summing up, although international students' information behaviors and challenges in host countries have been studied in various disciplines including education, psychology, and LIS, more research is needed to better understand their information behaviors during their adjustment to new environments. Prior information behavior studies of international students focused on their information behaviors in libraries and also tended to consider them as one monolithic group of foreign students. International students' ELIS outside libraries has been less commonly studied while there were more ELIS studies of other types of international migrants such as immigrants and refugees. Also, less is known about how international students' information behaviors change over time during their adjustment to new countries. To gain a better understanding of international students' information behaviors and fill these research gaps, this dissertation examines new

international students' LIBs during adjustment to host environments, specifically taking into account the possibility of diverse information behaviors among international students from different countries around the world and the possibility of changes in their information behavior during adjustment to new countries.

This dissertation addresses these research gaps by answering the questions listed below:

RQ1. How do international newcomer students need, seek, and use local information during adjustment to new environments (that is their local information behavior—LIB)?

RQ2. What are the factors and contexts that shape international newcomer students' LIBs?

RQ3. How do LIBs vary across international students from different countries of origin?

RQ4. How do international students' LIBs change over time as they adjust to new environments?

These research questions are answered through a series of three studies that will be reported and discussed in following chapters. With a small sample, Study 1 explores international students' LIBs, addressing RQ1 and RQ2. Using a larger sample and a theoretical lens of socio-national context, Study 2 examines the LIBs of international students during adjustment (RQ1, RQ2, and RQ3). Lastly, Study 3 investigates how the LIBs of international students change over time, specifically addressing RQ4.

Chapter 3: Study 1

As an exploratory study of international students' LIB during adjustment, Study 1 was conducted in the Fall 2013 at University of Maryland, College Park with the research questions 1 and 2.

RQ1. How do international newcomer students need, seek, and use local information during adjustment to new environments?

RQ2. What are the factors and contexts that shape international newcomer students' LIBs?

By using a mixed-method approach, this study explored how international students need, seek, acquire, and use local information in new environments. Several factors and contexts that might influence international students' LIB were identified, which led to building more concrete questions to ask for the dissertation research project. In the following sections, I will describe the research methods and processes, and then turn to the findings and discussions of the study.

3.1. Methods

To gain a holistic understanding of new international students' LIBs, this study 1 used a mixed-method approach with interviews, surveys, and cognitive mapping (Tversky, 1993). For the interviews, Corbin and Strauss's (1990) grounded theory approach with open coding was used, and this approach was complemented by surveys and cognitive mapping methods which involved participants drawing their own map of their local area on a blank sheet of paper during the interview session.

3.1.1. Participants

Twenty international graduate students who had been in the U.S. for about one year were recruited through campus email lists at the beginning of Fall 2013.

Participant recruitment was aimed to include both students from the major countries of origin of international students in the U.S. and students from less common countries of origin (Institute of International Education, 2012). Most participants were from the top 3 countries of origin of international students both in the U.S. and on University of Maryland, College Park (UMD) campus—China, India, and Korea (South)—which comprised about 70 percent of the international student population on UMD campus (University of Maryland, 2013). Additional efforts were made to recruit students from Latin American countries, which were among the least common countries of origin of international students both in the U.S. and on UMD campus. The resulting sample included students from China, India, Korea, Argentina, and El Salvador (See Table 1). Including participants from several different countries allowed this study to explore potentially different information behaviors among the participants. Participants were also recruited to have balance in terms of gender within the sample.

Of the 20 participants, 50% were male and 50% were female. Most of the participants were between 23 and 29 years old, except for one who was 35 years old. 70% of the participants were pursuing a Master's degree and 30% were pursuing a PhD degree. The countries of origin of the participants were China (7; 3 males and 4 females), India (7; 4 males and 3 females), Korea (4; 2 males and 2 females), El Salvador (1 male), and Argentina (1 female).

P#	Sex	Country of origin	Age	Program
P01	Female	China	27	PhD
P02	Male	India	26	Masters
P03	Female	India	24	Masters
P04	Male	India	24	Masters
P05	Male	El Salvador	26	Masters
P06	Female	Argentina	29	Masters
P07	Female	China	24	Masters
P08	Female	Korea	24	PhD
P09	Male	China	24	Masters
P10	Male	China	24	Masters
P11	Female	India	24	Masters
P12	Female	China	24	PhD
P13	Male	India	29	Masters
P14	Male	India	25	Masters
P15	Female	India	25	Masters
P16	Male	China	23	Masters
P17	Female	China	23	Masters
P18	Male	Korea	29	PhD
P19	Male	Korea	29	PhD
P20	Female	Korea	35	PhD

Table 1. Participants in Study 1

For the temporal context, participants who had been in the U.S. for about one year were recruited so that they would have finished most of their early adjustment to the area; be able to talk about their adjustment process; and at the same time remember their information behaviors during their early adjustment period relatively well. Thus, most of the participants were international students who entered their graduate programs in Fall 2012, and one participant was in Spring 2013.

3.1.2. Research sessions: Interview, survey, and cognitive mapping

Each interview lasted about one to one and a half hours. At the beginning, participants were asked to talk about their initial arrival experiences and then were

told what “local information” means in this study: information about local areas, places, housing, services, and transportation. They were asked to talk about important things they did and places they went to during their initial adjustment to their new environment, which helped them recall their information behaviors during early adjustment. Participants were then asked to complete a survey that collects data about their demographics and LIBs during their early adjustment period (See Appendices 1 and 2 for the interview questions and survey questions). In the survey, participants were asked to rate the importance of diverse types of local information (e.g., information about housing, grocery stores, and university/school-related places) during their adjustment and were asked about how often they used diverse types of information sources (e.g., friends, family, online communities, web, online maps) using 7-point Likert scales. The survey questions were developed based on previous studies of the information behaviors of international migrants (Lingel, 2011; Komito & Bates, 2011). Participants were also asked to add other types of local information or information sources to the existing lists, if any. They were asked to use “think-aloud” protocol (Rogers, Y., Sharp, H., & Preece, 2011, p.256), in which participants were encouraged to talk aloud about what they are thinking as they complete the survey, instead of being silent. This technique allowed for following what was going on in a participant’s mind while they were answering the survey questions, and naturally led to conversations about the contexts and reasons for their answers, which in turn allowed for a richer understanding of their information behaviors.

At the end of the interview, participants were engaged in a cognitive mapping exercise (Tversky, 1993). They were asked to draw maps of their local area on a

blank sheet of paper. First, they were asked to draw a map based on their knowledge and perspectives of the area that they had during their early adjustment period. The term “local area” was explained to the interviewees as the area where they moved around in their daily lives. When they finished drawing, they were asked to list the top five most important places to them during the early settlement period. After their early adjustment period map was drawn, they were asked to draw another map of their local area based on the “current” knowledge and perspectives that they have as of the day of the interview. Also, they were asked to list the five places that are currently most important to them. The map-drawing tasks were intended to understand how new international students perceive the local, geospatial environments in the host country and how local environments are mentally represented in their “cognitive maps” (Tversky, 1993; Mark, Freksa, Hirtle, Lloyd, & Tversky, 1999). For the current study, new international students’ cognitive maps of their local area were expected to visually depict their perception of the new environments and help me better understand their LIBs.

3.1.3. Analysis methods

For the analysis of the survey data, descriptive statistics analysis, factor analysis, and one-way ANOVA were used in SPSS 21. Descriptive statistics analysis allowed to identify the patterns of the perceived importance of 16 types of local information and of the frequency of using each of these 16 types of information sources. Factor analysis was used to reduce the number of types of local information to a few similar groupings and also to reduce the number of information sources to a few similar groupings. One-way ANOVA was used to statistically compare the

perceived importance of different types of local information and the frequencies of using various types of information sources among the participants.

For the analysis of the interview data, the interviews were audio-recorded with the permission of the participants. The recorded interview data were transcribed, and the interview transcripts were analyzed and coded through open-coding scheme on Excel spreadsheets. For example, participants' information seeking practices involving combined use of multiple information sources were coded with a descriptive code "combination," and participants' information seeking strategies of physically walking around to get familiarized with the area was coded "wander around." Also, participants' experiences involving finding some local information by chance was coded as "information encountering." Participants' intense information needs towards basic local information, such as housing, was coded "survival." As these codes and the related transcripts were continually reviewed and interpreted, and through this process, several themes emerged, which were also used for organizing and synthesizing the results from other methods.

Participants' cognitive maps were examined in several ways by using quantitative, qualitative, geospatial, and visual approaches. The number of places included in the maps were compared between each participant's "early period map" and their "current map." And the maps were visually and qualitatively analyzed for their characteristics and themes that can be extracted from the maps. In addition, the orientation of each cognitive map was identified—whether it is following the correct cardinal direction (north-up), and these results were interpreted along with the results from other analysis approaches.

3.2. Findings

The interviews, survey, and cognitive mapping data were analyzed in terms of participants' local information needs, information source use, and factors that might have affected their LIBs. This exploratory examination of the LIB of international students allowed me to develop a broad understanding of patterns in participants' information needs and information source use during their adjustment to their new environments. Also, several themes regarding their LIBs emerged from the data through the analysis process.

3.2.1. Local information needs during adjustment

In the survey, participants' perceived importance of 16 types of local information was examined. Of the 16 types of local information, the most important types included information about housing, school-related places, grocery stores, transportation, and banks, in order of importance. Among the least important types of local information was information about leisure/sports, health-related places, movies/concerts, event/festivals, and religious places.

Through factor analysis using SPSS 21, the 16 types of information were grouped into four (See Figure 1). The type of local information that was perceived most important was basic and survival-related information (Group 1: housing, grocery store information), followed by transportation/navigation-related information (Group 2: transportation, street/roads).” The third was information about places essential for their initial settlement (Group3: school-related places, banks, mobile phone/electronics

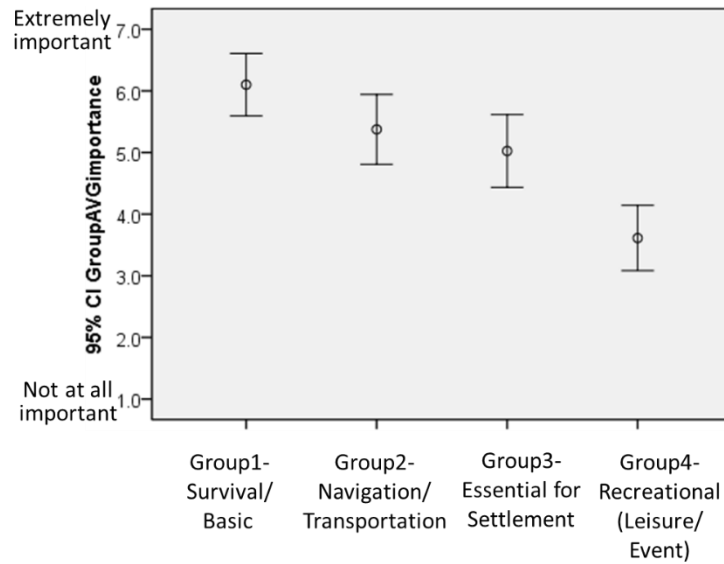


Figure 1. Perceived importance of each information type

stores, health-related places). The least important type of local information was recreational place information (Group 4: café/restaurants, leisure, movies/concerts, events/festivals). Compared to groups 1 through 3, the perceived importance ratings of group 4 was significantly lower ($p < .01$ for all the pairwise comparison with the other three groups).

These results identify the types of local information which were important for the participants during their early adjustment period in the host country. The participants’ high prioritization of basic, essential local information and low

prioritization of recreational local information were reflected in the participants' comments as below:

"...I guess when I first landed here, (leisure/sports) it was probably not one of my top priority at the moment... I'd probably say different now because then I had to get settled..." (P3, 24 years old, Female, from India)

"I wasn't worried about getting my social security number. I wasn't worried about getting my driver's license. I was more worried about where I'm going to live... How do I get there, how do I get to the university. That was my primary..." *"(I) never use that information (of) events or festivals."* (P5, 26 years old, Male, from El Salvador)

These comments illustrate the importance of basic, essential information during the adjustment period and suggest that these local information needs might change over time as international students adjust to living in new environments.

Their status as international graduate students seemed to affect their behaviors and information needs accordingly. P6 from Argentina described her busy life as a graduate student and addressed time constraints she had in her daily life:

"Let's see I'm a graduate student working in the University of Maryland taking courses. How much time can you spend in events with recreation, groceries, making the house tidy? Not even once a month." (P6, 29 years old, Female, from Argentina)

Her representation of the situation describes challenges and workloads that she copes with as an international graduate student.

In sum, the participants put more weight on certain types of local information needs during their early adjustment to new environments. The result showed that information needs of the participants strongly lean toward information that is needed for their housing, navigating, and other essential aspects of their adjustment to the new environments.

3.2.2. Sources of local information during adjustment

In terms of frequency of using information sources, the participants' frequencies of using 16 types of information sources were examined. The 16 types were then reduced to the 12 types of sources of local information shown in Figure 2

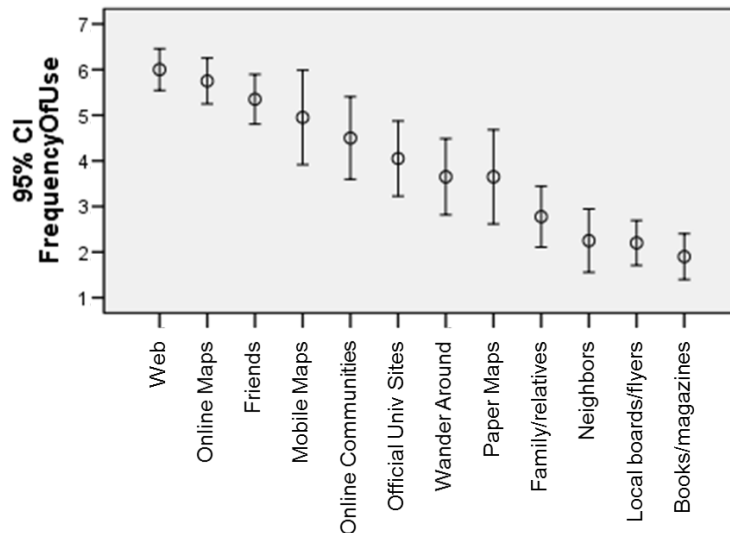


Figure 2. Frequency of using information sources

through factor analysis using SPSS. Web searches, online maps, mobile maps, friends, and online communities were among the top five most frequently used information sources. Except for friends, the five most frequently used information sources were all Internet-based. As social information sources, friends and online communities were frequently used, and as non-social information sources, web searches and online/mobile maps were used more frequently than other information sources.

3.2.3. Online/mobile maps: Essential sources of local information

Being in an unfamiliar geospatial environment, participants greatly relied on online maps and mobile/smartphone maps for their navigation in the host environment. As P8 and P16 describe:

“... Since all the street names are in English, I know it’s that street but I can’t remember the name, so when I was walking, I always use my smart phone to get GPS on. Usually, if I take a metro or metro bus, then I always use my smart phone... Google map.” (P8, 24, Female, from Korea)

“Actually, if I want to go somewhere tomorrow I’ll search for it on Google maps today. (On) laptop. I will have a sense of where it is. Although I... get out of the nearest metro station tomorrow I still don’t know where it is, so I’ll resort to my smartphone Google maps. I know it’s quite nearby, but I don’t know which direction I should go.” (P16, 23, Male, from China)

These descriptions illustrate how new international students rely on online/mobile maps for seeking geospatial information in an unknown environment. However, in many cases, their local information needs were not satisfied solely through online/mobile maps, but in combination with other information sources. Lack of knowledge of the place names or the right places made it difficult for P1 and P5 to simply use online maps to find the places that they wanted. Through the use of human information sources, P1 was able to learn the name of a grocery store in her local area, which she then used as a search keyword for her web searching, and P5 found the name of an electronics store and also used it as a search keyword on Google

Maps. Both P1 and P5 used multiple information sources to create the queries needed to find the places of interest through searching.

3.2.4. Wandering around: A way to get local information

While online sources were frequently used for local information practices of international students, many participants also reported that they just walked around and explored the unfamiliar local environment. There was something that they could not get just by using online maps or other information sources. As P18 explains:

“Usually the map provides limited information, probably the name of the building, and the location of the building, probably the coordinate on the map. But what I feel, by walking around, physically, is not just the location, but other things around that building, around that location. Probably trees, maybe, environments, how the road looks like, how the ground elevated ... how the ground elevate goes downhill. Those kind of information.” (P18, 29, Male, from Korea)

Except for a few participants (P1, P5, and P8), most participants used “Wandering around” as an information seeking tactic (Lingel, 2011, 2015) to get familiar with their new geospatial environment or to learn about nearby places. “Wandering around” was the only information source where there was a gender difference in the one-way ANOVA ($F = 5.642, p = .029$) for the frequency of use of information sources. Compared to male students, female students were less active in wandering around the new environment for several reasons. P5 (29, Female, from Argentina) was concerned about safety in walking around the area, and P8 never

wandered around the area because she was afraid of being lost and not finding ways to come back:

“I know it’s weird, but I’m really scared of getting lost. I know I can go anywhere but then I wouldn’t know how to come back because I can’t remember how I went so I always have the thing turned on, the map turned on.” (P8, 24, Female, from Korea)

P1’s reason for not wandering around was also related with coming back home, but her focus was more about physical fatigue from walking around a large area:

“It’s a huge campus. It’s not like in Beijing. So if you walk outside, there’s no way you can go back unless you walk back. Even I walk so tired in maybe only 2 miles... but you can maybe you need to walk 20 maybe 40 minutes.” (P1, 27, Female, from China)

3.2.5. Social information sources

Compared to using non-social information sources such as online maps or web searches, getting local information seemed relatively more comprehensive and effective when the participants used human information sources as described in the case of P3:

“Most of the local knowledge, I think I would have gained by talking to people who have stayed here, who were here already. I speak to them and find out which is the best place to get this. Which is the best means to get to that place? Then again, to first talk to people, find out which other places, and

again, make use of Google Maps to find out which is the best means to transport to the place and how far it is. Yeah. I would say it would be a combination of both.” (P3, 24, Female, from India)

In this comment, P3 showed her experience of seeking local information by asking people who were already living in the area and had more knowledge and information about the area than she had, to some extent, assuming that they knew the best places and the best means to get to those places. Similarly, P18 sought local place information by using human information sources such as senior students, who had local knowledge and experience, and peer students, who could share helpful information with each other:

“I asked the people who used to live here in the area, by talking to them, asking them which places they recommend to buy the items that I needed. Some were senior friends, some were colleagues of mine, who entered the school at the same time. Because we all had different information, so we wanted to kind of share those information ... while we adjust together.” (P18, 29, Male, from Korea)

For the participants from China, India, and Korea, “friends” mostly referred to senior or peer students with the same nationality. Those co-national senior or peer students were the most frequently used human information sources, and the interaction between them took place both offline and online:

“There is a group called The Student Council of India, they have a group and they have a forum in Facebook, so they are ready to help always.” (P4, 24, Male, from India)

As identified in P4's comment, Indian students had a very helpful senior student group to provide various kinds of assistance and information to new students, such as providing recommendations for housing, guiding throughout the campus, and providing temporary housing for a week. Participants from China, India, and Korea reported that they all had their student associations at the University of Maryland, College Park, and that their websites and Facebook groups were the online communities where the senior students and new students could connect with each other and share helpful information.

However, the use of online communities differed across participants' countries of origin (Table 2). When the frequencies of using each information source were tested by each country of origin through one-way ANOVA (excluding Latin American countries), statistically significant differences were found in the use of online communities, official university sites/services, local bulletin boards, and wandering around. Students from India used these four information sources significantly more frequently than students from other countries. Interviews with Indian students indicated that they actively use their Facebook groups and sometimes

	Mean	SD	Mean by each country of origin			ANOVA	
	Total (China, India, Korea)		China	India	Korea	F	p
Web search	5.94	.998	6.00	6.00	5.75	.087	.917
Online maps	5.67	1.085	5.86	5.71	5.25	.380	.690
Friends	5.56	1.294	5.29	6.29	4.75	2.373	.127
Online community	4.83	1.724	4.14	6.14	3.75	4.933	.023*
Mobile maps	4.72	2.218	5.57	3.57	5.25	1.698	.216
Official univ. sites	4.22	1.768	3.71	5.57	2.75	5.825	.013*
Paper maps	3.89	2.193	3.14	4.86	3.50	1.173	.336
Wandering around	3.83	1.757	2.71	5.14	3.50	5.086	.021*
Family/relatives	3.28	1.934	3.43	4.14	1.50	2.969	.082
Neighbors	2.39	1.501	2.57	2.57	1.75	.435	.655
Local bulletin boards	2.33	1.029	2.14	3.29	1.00	24.000	.000*
Books/paper media	2.00	1.085	2.14	2.00	1.75	.150	.862
Religious group	1.72	1.127	2.29	1.29	1.50	1.577	.239

(* $p < .05$)

Table 2. Frequency of using information sources by country of origin

wandered around town with their co-national friends. On the contrary, the participants from El Salvador (P5) and Argentina (P6) had no or one co-national friend in the local area of the host country, and their use of online communities as information sources was very low (P5: Never – 1 on the 7 point scale, P6: Rarely – 2 on the 7 point scale).

In brief, during early adjustment, the participants in this study frequently used Internet-based information sources, such as web, online maps, mobile maps, and online communities, as well as social, human information sources, mostly co-national senior or peer students. Online/mobile maps were essential sources of geospatial and transportation information for moving around in the unfamiliar environment. Most participants, especially male students used an active information tactic of wandering around as a way to learn about their local area. Also, most participants benefitted from getting local information from co-national peers who had similar interests and already had more local knowledge than newcomer students. These findings may explain new international students' overall experience of using information sources, but they do not necessarily explain which specific information sources were more likely to be used for particular types of local information.

3.2.6. Main information sources for each information type

Although web searching was found to be the most frequently used information source, it was not considered by most participants to be the main information source during their adjustments to new environments. Figure 3 presents a matrix with the distribution of numbers of participants who mainly used each specific information source for seeking specific types of local information. The size of the circles indicates

the number of participants who used the specific information source for the specific information types.

Main information source for each type of information	Friends	Online/mobile maps	Official Univ. sites/emails	Web search/content	Online Community	Wander/walk around	Personnel (Staff, etc.)	Paper maps	Specialized App (Yelp, Bus)	Family/Relative	Paper media (book, etc.)
Group1 -Survival/Living	7.5	○		○	5.5	○	○				
Group2 -Navigation/Transportation	4.5	6.5	○	○		○	○		○		
Group3 -Essential for Settlement	6.5	○	5	○	○	○	○	○			
Group4 -Recreational	8.25	○	3.5	○	○	○		○	○	○	○

Figure 3. Main sources for each type of local information

Coinciding with previous research about international migrants’ information practices (Khoir et al., 2014; Komito & Bates, 2011; Lingel, 2011), friends and the Internet were the main information sources for most participants in this study. This pattern was almost consistently observed across different groups of information types.

In short, “friends,” who were mostly co-national senior or peer students, were the main information sources for most kinds of local information. However, several information sources were also used by many others in seeking certain types of information. Those sources include online communities that were used for seeking housing and living information and online/mobile maps for seeking geospatial/transportation information. Also, official university sites or email listservs were used by many participants as main sources for local information essential to new students. These results show international students’ high reliance on friends as information sources and also confirm the active use of various Internet-based online and mobile information sources for different types of information.

3.2.7. Cognitive maps depicting significant localities

All participants were spontaneously able to draw the two kinds of maps of the local area—one for their early adjustment period and the other for the time of their current research participation, which was mostly about one year after they first arrived in the area. Through multiple approaches of analyses—quantitative, geospatial, and visual, certain patterns emerged from these cognitive maps. First, when the early adjustment period maps and the current period maps are compared, the number of places shown on maps increased (17 out of 20 participants), and the vague and conceptual maps in the early adjustment period versions developed into more specified and realistic maps in the current versions. This transition goes with Tuan's (1977, pp.17-18) description of newcomers' experience learning about significant localities within a neighborhood. Places, areas, and routes newly added to the current version of maps are what participants identified about the neighborhood throughout their one year of living in the host environment.

Second, there were different patterns of orientations of the maps. Eleven (55%) out of the 20 participants drew maps in the north up orientation displaying the correct cardinal direction, while the rest of them (9 participants) drew maps in other orientations. However, there was a pattern in those maps drawn in different orientations. Interestingly, 7 out of the 9 participants drew maps in the orientation of facing school (in the upper side of the map) from their home (in the bottom side of the map), also including their commuting routes to school in their daily lives (Figure 4 and 5). This “going to school” perspective in the custom-oriented maps may indicate that their cognitive representation of their geospatial environments have been

formed not around an abstract direction system, but in terms of a valued, regularly occurring daily task—“going to school”. Maps that the participants drew may reflect how new international students perceive their local environment and what are significant localities to them in certain periods of time in the host environment.

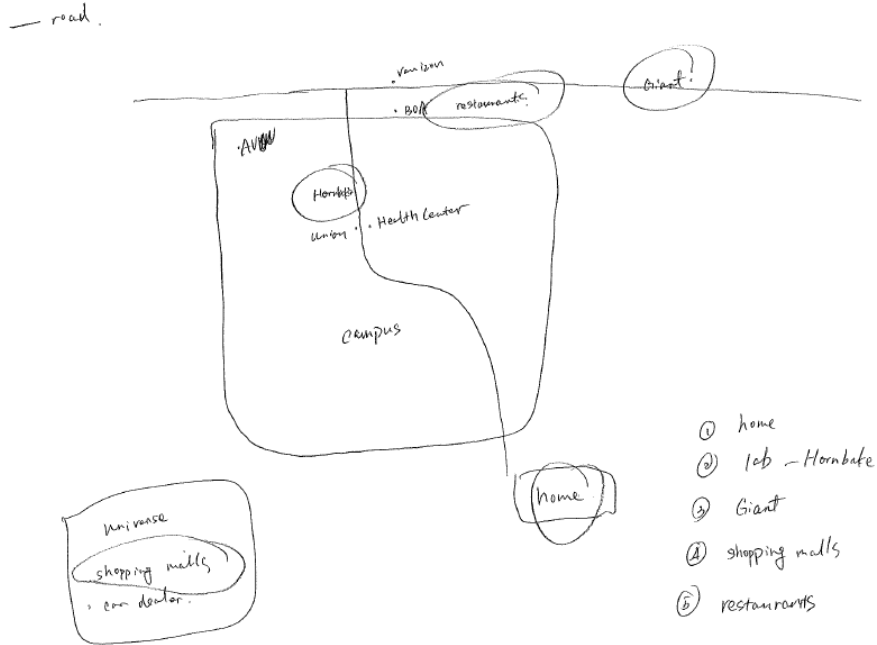


Figure 4. P1's early adjustment period map

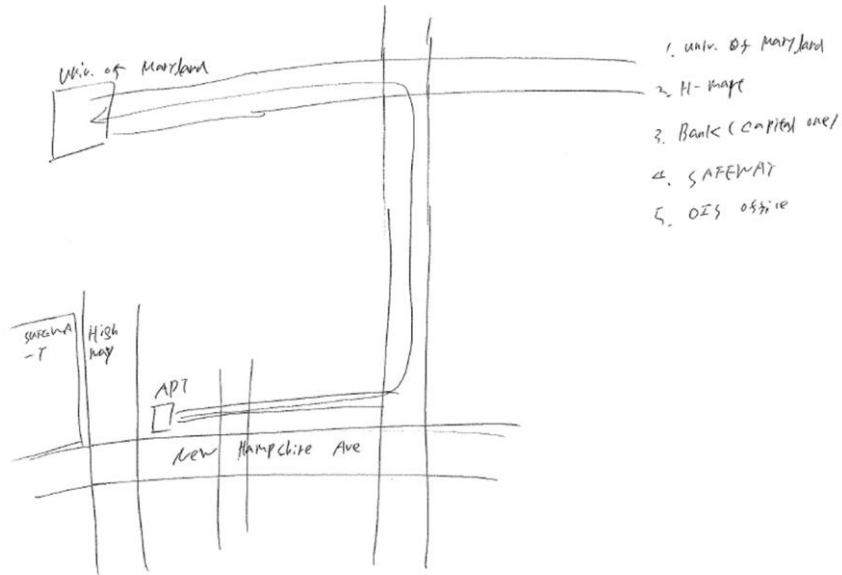


Figure 5. P19's early adjustment period map

Lastly, regarding the top five most important places that the participants listed in each of their two cognitive maps—early adjustment period map and current map-- several differences were observed between the two maps. In the early adjustment period maps, the most commonly listed places were school (20 participants; 100%), grocery (19 participants), home (14 participants), mall (7 participants), and bank, library, restaurant (6 participants each). In the current maps, the most commonly listed places were school (19 participants), grocery (18 participants), home (16 participants), metro station (9 participants), and restaurant (7 participants). In both early adjustment and current versions of the cognitive maps, the three most commonly listed places—school, grocery, and home—were the same. However, bank, which was the fifth most commonly listed place on the early adjustment period maps, did not appear at all in any participant’s top five most important place list in the current maps. Metro station, which was listed in only two participants’ top five most important place lists on the early adjustment period maps, was among the most commonly listed places on the current maps. Also, there were several places that newly appeared in the top five most important place lists on the current maps, including premium outlets, theaters, lakes, café, and parks, which were not present at all in the top five lists associated with the early adjustment period maps.

3.3. Discussion

Through the analysis of the findings from both qualitative and quantitative approaches, Study 1 of my dissertation research explored the LIBs of international graduate students during their adjustment to new environments. In spite of the limitations of this small sample study, the findings provide insight into new

international graduate students' local information needs, information sources, and how they seek to satisfy different types of local information needs using various kinds of information sources in an unfamiliar environment.

3.3.1. Survival first, recreation next

Results from the survey and interviews indicate that the participants initially put more weight on local information that is essential for their living, navigating, and adjusting in new environments than local information that is helpful for their recreation. This finding is different from the results in Sin and Kim (2013) where, on average, entertainment information was perceived by the international students in the study to be more important than information about food and transportation. In their study, entertainment information was among the top five most important information needs (out of twelve types of information) for international students, both undergraduate and graduate students combined. However, the current study examined information needs of international "graduate students," and their information needs leaned more towards basic, essential information such as information about housing, groceries, and transportation than recreation-related information such as movies, exercise, and events.

This difference between Sin and Kim's (2013) findings and those of the current study may be related to the different study levels of the research participants and the different temporal contexts of the participants in the two studies. Some of the characteristics that differentiate undergraduate and graduate students such as socio-economic contexts, age, and academic goals could be considered as factors that potentially affect international students' information needs. Also, the differences may

have occurred because of the time frames of the participants in the host environment. Sin and Kim's study did not specifically account for the international students' length of stay in the host country while the current study focused on international students who had been in the host country for about one year. Furthermore, different from Sin and Kim's study, the current study focused on international students' information behavior during their adjustment period. Thus, the findings in the current study need to be understood as describing the information needs and behaviors of international students at the graduate level during their adjustment to a new environment.

Results from participants' cognitive maps and the top five most important places they listed on their cognitive maps—both early adjustment period maps and current maps—also support this tendency toward survival first, recreation next in international students' local information needs. In her research Lingel (2011) used a similar method with map drawing tasks called participatory mapping. She argued that international migrants' own histories shape the lens through which they see their neighborhoods in New York City, and discussed a possibility that international migrants' conceptual maps of city space may become less individualized and more homogenous as they become increasingly acculturated. Like the maps in her study, the cognitive maps drawn by the participants in the current study seem to be drawn in diverse perspectives, in different orientations, and with different local places. However, unlike the maps in Lingel (2011) drawn by international migrants with varying demographic and occupational characteristics, these maps in my study strongly demonstrate common interests in specific places among the participants, who were all relatively new international graduate students, a more homogeneous group of

individuals in terms of their current occupation and daily activities. For example, in most maps, both early adjustment period maps and current maps, there are common components such as school, grocery stores, homes, and on/off campus restaurants. This pattern was also observed in their top five most important place lists for both early adjustment period maps and current maps regardless of the time frame. This finding indicates that international graduate students share certain local information needs in common.

Also, the characteristics of the students' local information needs tended to change over time. Some places included in the top five most important place lists for the early adjustment period maps, such as banks, the international student office, and mobile phone/electronics stores, did not appear in the current versions of the cognitive maps. Instead, recreational places, such as theaters, parks, and cafes, appeared in the top five important place lists on the current maps. These disappearing places and newly appearing places on the participants' important place lists on their cognitive maps suggest that there are unique local information needs associated with different time frames of life of international students in their new environments. Most new international graduate students share certain types of local information needs, and their local information needs might change over time during their adjustment to new environments. These findings suggest that information that is necessary and important to international students may follow predefined and predictable patterns. This finding may also indicate that information organizations and academic institutions could design their systems and services for new

international students in a way to help them acquire necessary local information and better adjust to their unfamiliar environments.

3.3.2. Internet-based, geospatial information sources: Essential tools during adjustment

The current study also found that Internet-based information sources and friends comprised the top five most frequently used information sources for new international graduate students adjusting to new environments. This result intersects with previous findings on information behaviors of international migrants and international students in that these international migrants actively use information communications technologies (ICTs) and the Internet (Komito & Bates, 2011; Lingel, 2011). But in those findings, the Internet was regarded as a single type of information source, and thus specific Internet-based information sources, such as web search, online maps, mobile maps, and online communities/social networking sites, were not distinguished or identified as individual information sources. Especially, online maps or mobile maps have not yet been paid much attention to as information sources for international migrants living in new environments. However, findings in the current research suggest that online and mobile maps are among the most frequently used information sources for new international students' adjustment to host environments.

This paper examined use of Internet-based information sources by new international graduate students and the crucial role of online/mobile maps as sources of local and geospatial information to them in the host country. However, more research about the use of online/mobile maps and other Internet-based technologies by international students and other international migrants would improve our

understanding of their adjustment experiences and information behavior in the host country. New international students' strong reliance on and frequent use of online/mobile maps may imply that they face various situations in a new environment involving the tasks of finding places and visiting those places.

Additionally, in the process of seeking place and local information, international students often demonstrated combined use of multiple information sources, such as friends and web searching. This suggests that international students may benefit from information systems or services where social informational help and local information systems are both provided or connected with each other. Further studies on the combined use of social information sources and local/geospatial information systems may be helpful to understand how they can be integrated to better assist international newcomers to adjust to their new environments.

3.3.3. Wandering around and information encountering

The findings of the study showed that the behavior of wandering around the area was an important way of gathering local geospatial information for many participants. In the process of wandering around, the participants became familiar with the geography of their local area. They also serendipitously got local information, such as the location of a discount mattress store or a shortcut to a grocery store. According to the information behavior literature, this behavior of wandering around could be understood by two types of information seeking—"active search" and "passive attention" (Wilson, 1997). First, it can be explained by "active search" in that the individual actively seeks out geospatial information of the local

area with a purpose of getting familiarized with the local host environment. However, wandering around can be different from “active search” in that the participants who wandered around did not have specific goals of finding certain local information in most cases in this study. In the process of wandering around, participants happened to get other information that was relevant to their information needs. This kind of information practice is different from purposeful, active information search, and it can be explained by “passive attention” which describes a type of information behavior leading to an acquisition of information without intentional information seeking. This passive attention of the participants in the current study may be better explained by more specified terms such as information encountering (Erdelez, 1999) and incidental information acquisition (Williamson, 1998) which emphasize the opportunistic component of this information behavior.

As Erdelez (1999) described the characteristics of information encountering, this opportunistic information acquisition was not only experienced during the process of information seeking, information browsing, or wandering around, but also during other activities that are not necessarily intended to be information-oriented. For example, P5 accidentally found an electronics store when he was heading to a restaurant as follows:

“I went to the Chipotle [a restaurant] that is near in campus. It’s south of campus. Near the Chipotle, there is a Radio Shack store. So I’d say, “Oh, Radio Shack is here.”” (P5, 26, Male, from El Salvador)

This unintentional finding of places was experienced by most participants, either during wandering around the local area or during other activities. Although this

experience of incidentally acquiring local information is not an intentional information behavior, it should be considered a unique aspect of LIBs in an unfamiliar environment. This suggests that “wandering around” (Lingel, 2011, 2015) in an unfamiliar local environment can be seen as a specific type of information behavior, which can involve multiple aspects of information behavior, framed in a geospatial context of unfamiliar environments. Wandering around may involve complex information practices of intentionally learning geospatial information, leisurely scanning the environment, and accidentally finding relevant information. More research is needed to understand how this practice of wandering around, that is both active and passive, is performed by international newcomer students—individually or collectively—and how this unique information practice might affect their adjustment to unfamiliar environments.

3.3.4. Co-nationals and online communities

Except for information behaviors relating to incidental information acquisition, most of the other types of information behaviors of new international students can be understood as “purposeful information seeking” (Williamson, 1998). Analysis of the frequencies of using each information source (Figure 2) indicates that the participants actively used both Internet-based information technologies and friends as their most frequently-used information sources during their adjustment to the host environment, and in seeking most types of information, friends were their main information sources (Figure 3). In-depth interviews with the participants suggested that the information source “friends” referred primarily to co-national senior or fellow students in the local area. This result confirms the findings from

other studies of international migrants that immigrants, migrant workers, and exchange students got help and information from their co-national migrants in the local area (Komito & Bates, 2011; Lingel, 2011).

In the current study, co-nationals were among the most frequently used sources of local information for students from China, India, and Korea; however, this tendency was not observed from students from Argentina and El Salvador. Also, students from China, India, and Korea not only obtained information from other co-national students face to face, but also from co-national online communities.

For example, the participants from India were well connected with other senior Indian students, who had already been in the area for one or more years, or other fellow Indian students, who entered the program at the same academic year. Specifically, they were connected with each other through their co-national online community, which is their Facebook group run by Indian senior students at the Student Council of India at University of Maryland, College Park (UMD). The new Indian students received various types of assistance and information from senior Indian students and came to know other peer new Indian students in that online community. Most participants from India reported that they assumed that a Facebook group for Indian students at University of Maryland would exist since they knew that numerous Facebook groups existed for most universities, and they easily found the Indian students group at University of Maryland on Facebook. The study participants from China and Korea also used Facebook groups or their own community websites for their local co-national online communities and learned about local information

through these online social information sources, but getting local information through online communities was more common for Indian students, as shown in Table 2.

In contrast, the frequency of using online communities for local information was very low among the participants from Argentina and El Salvador—‘Never used’ (1 on 7 point Likert scale) to ‘Rarely (2 on 7 point Likert scale)—while their use of non-social online information sources, such as web searching, online maps, and mobile maps, were as high as the use of those non-social online sources by students from China, India, and Korea. Although not statistically comparable due to their small sample sizes, the interviews and survey suggest that the participants from Argentina and El Salvador did not get as much local information from either co-nationals or online communities as the participants from China, India, and Korea did during adjustment to new environments. This low use of co-nationals and online communities may be attributed to the small number of students from these countries (Argentina and El Salvador) on campus and the resultant lack of local co-national social networks in College Park campus and surrounding areas.

3.3.5. Socio-national context

Although the sample size for this study was small, this result of different social information practices among international students might suggest that there is a complex social context that shapes international newcomer students’ information behaviors in new environments. This context can be explained as people’s co-national social network in a local area, which is called hereinafter “socio-national context” of a local area or “local socio-national context”. In the findings of Study 1, the participants from Argentina and El Salvador did not have many co-nationals in the

area to connect with and get information from, while the participants from China, India, and Korea had many co-nationals in the surrounding environment to get to know and share information with. Participants in different socio-national contexts then engaged in different LIBs during their adjustment to College Park and surrounding area. One's socio-national contexts in a local area encompass their nationality, locations, local or institutional composition of people's nationalities, and local social networks. Interactions of these factors might create unique social environments and information worlds that can affect the information practices of international newcomers in new environments (Burnett & Jaeger, 2011).

3.4. Conclusions

While previous work on international students has identified various challenges that they face and their information practices in libraries and academic institutions, this study identified how new international students seek and acquire local information during their adjustment to new environments. Findings included their specific patterns of local information needs and specific social and non-social information source use to meet their local information needs, which addressed Research Question 1. However, due to the design of the current research studying only international students, it is hard to argue that these patterns of local information needs and information source use are unique patterns for international students and whether these patterns apply to other newcomer students such as American newcomer students. In other words, it was unclear whether the current findings would be specifically helpful to understand the unique information needs and information-related behaviors of international newcomer students. Following studies could

identify specific information needs and information seeking behaviors of international students by studying the information behaviors of both international and domestic newcomer students.

Further, this study showed that socio-national contexts might play a role in shaping international students' LIB during adjustment, in part, answering Research Questions 2 and 3 about the factors and contexts that affect international students' LIB and how their LIBs vary across their nationalities. Based on the findings, the LIBs of the students from the top three most common countries (China, India, and Korea) and those from less common countries (Argentina and El Salvador) seemed clearly different. However, while this finding suggests potential differences in LIBs among the students from different countries, it would be helpful to include more students from less common countries of origin if the study is to yield a more reliable comparison between international students from common and less common countries of origin. Additional research using a larger sample of participants would enhance our understanding of the interplay between international newcomer students' socio-national contexts and their LIBs.

Drawing on the findings and limitations of Study 1, I designed a second study to examine the LIBs of a larger sample, including both international and domestic newcomer students (U.S. students from states other than Maryland), during their adjustment to new environments. The following chapter will discuss this second study (Study 2), which included international students from a greater number of countries, specifically more participants from less common countries of origin, as well as U.S. out-of-state students.

Chapter 4: Study 2

Based on the findings and implications of Study 1, a larger sample mixed method study (Study 2) was designed and conducted in the 2014/2015 academic year at UMD. The main purpose of Study 2 was to better understand the LIBs of newcomer students from various countries of origin through the lens of socio-national contexts. Thus, international newcomer students from any countries of origin were recruited. Also, domestic newcomer students from states other than Maryland were recruited as a control group. Study 2 intended to gain more specific answers to the following research questions:

RQ1. How do international newcomer students need, seek, and use local information during adjustment to new environments?

RQ2. What are the factors and contexts that shape international newcomer students' LIBs?

RQ3. How do LIBs vary across international students from different countries of origin?

While Study 1 explored patterns of international students' local information needs and information source use, the sample size was relatively small, and it did not necessarily show whether the findings are unique to international newcomer students or are applicable to all newcomer students including domestic newcomer students. Considering these limitations, Study 2 recruited a larger sample of both international newcomer students and domestic out-of-state newcomer students to identify whether and how international newcomer students' LIBs might be different from domestic newcomer students' LIBs.

Study 1 also suggested that the local co-national social context—socio-national context—might affect international newcomer students' LIBs. Study 2 investigates the role of socio-national contexts in shaping LIBs of international newcomer students from various countries of origin as a specific approach to answer research questions 2 and 3.

4.1. Methods

To gain a holistic understanding of the participants' LIBs within the context of their lived experiences during adjustment to new environments, I employed a mixed method approach using an online survey, follow-up interviews, and cognitive mapping tasks (Tversky, 1993). The research process began with an online survey, and the survey respondents who were willing to participate in follow-up interviews were contacted for one-on-one interview sessions where they also completed cognitive mapping tasks. The online survey participation was open to all international newcomer students and domestic out-of-state newcomer students in the first year in graduate programs at UMD. For the analysis of the survey data and for the follow-up interviews, the participants were classified into three different groups based on their socio-national contexts in the local area. The following Methods section describes participant recruitment, the temporal context of the study, the research methods used and the related processes, and how the data were analyzed.

4.1.1. Participants

At the beginning of Study 2, the online survey was advertised through several campus email lists and through e-newsletters from the International Student and

Scholar Services of UMD. Participation in the online survey was open to both international newcomer students and domestic out-of-state newcomer students in their first year enrolled in a graduate program at UMD. Through screening questions, survey respondents were screened to ensure they met the above-mentioned recruiting criteria. If participants did not meet the above criteria, the survey ended with a thank-you message. Also, incomplete survey responses were excluded from the data. Additionally, one student from Denmark responded to the online survey and later participated in an interview session (P38, Female, International-less-common, Denmark). However, at the interview session, it became clear that she was an exchange student for one semester and that she was about to leave the College Park area to move to another area to continue her exchange studies. Due to this unique and different context of her situation, all of her data (survey, interview, and cognitive maps) were excluded from the research data. Thus, the online survey data included responses from a total of 149 newcomer graduate students.

Of the 149 survey respondents, 83 were new international graduate students from 20 different countries: India (27), China (21), Korea (South) (7), and 17 other countries (29) including Argentina, South Africa, Greece, and Vietnam (See Table 3 for details). The rest of the respondents were 66 U.S. newcomer graduate students from states other than Maryland. In terms of study levels and gender (in parentheses), 80 respondents were Master's students (female 53.75%, male 46.25%) and 69 were PhD students (female 53.62%, male 46.38%). The age of the survey respondents ranged between 21 and 41 with a mean of 24.79 ($SD = 3.58$), a median of 24, and a

mode of 22. About 91 percent of all survey respondents were between 21 and 29 years old.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	India	27	32.5	32.5	32.5
	China	21	25.3	25.3	57.8
	South Korea	7	8.4	8.4	66.3
	Iran	3	3.6	3.6	69.9
	Russia	3	3.6	3.6	73.5
	Argentina	2	2.4	2.4	75.9
	Brazil	2	2.4	2.4	78.3
	Canada	2	2.4	2.4	80.7
	Germany	2	2.4	2.4	83.1
	Singapore	2	2.4	2.4	85.5
	Taiwan	2	2.4	2.4	88.0
	Turkey	2	2.4	2.4	90.4
	Australia	1	1.2	1.2	91.6
	Bangladesh	1	1.2	1.2	92.8
	Greece	1	1.2	1.2	94.0
	Israel	1	1.2	1.2	95.2
	Italy	1	1.2	1.2	96.4
	South Africa	1	1.2	1.2	97.6
	Sri Lanka	1	1.2	1.2	98.8
	Vietnam	1	1.2	1.2	100.0
	Total	83	100.0	100.0	

Table 3. Countries of origin of international student participants

In order to examine how participants' LIBs vary among the students in different socio-national contexts, the survey respondents were classified into three groups based on their socio-national contexts in the area. This grouping was used for the analysis of the data and the recruiting for the follow-up interviews. The three groups were: (1) International-common; (2) International-less-common; and (3) Domestic (out-of-state).

The first group "International-common" consisted of international newcomer students from China, India, and Korea (South), the top three most common countries

of origin of international students both in the U.S. and on UMD campus, who are likely to have many co-nationals in College Park and surrounding area. The second group “International-less-common” consisted of international newcomer students from countries other than China, India, and Korea, who are less likely to have many co-nationals in the local, College Park and surrounding areas. The third group “Domestic (out-of-state)” was composed of U.S. newcomer students from states other than Maryland. They were out-of-state, newcomer students who were new to College Park, but were expected to have many co-national American students in College Park and surrounding areas.

Those who showed their willingness on the survey to participate in follow-up interviews were contacted after their survey participation. The goal was recruit 20 interview participants per each of the three groups—“Group 1. International-common,” “Group 2. International-less-common,” and “Group 3. Domestic (out-of-state).” During this recruiting process, additional effort was made to recruit interviewees in Group 2 and Group 3 because of the relatively small number of these participants who had indicated their willingness to participate in follow-up interviews. Specifically, it was somewhat challenging to get follow-up interviews with male students in group 3. As results, 57 of 149 (38.26%) survey respondents participated in the follow-up interviews; 20 for Group 1 (international-common; 10 male, 10 female); 20 for Group 2 (international-less-common; 10 male, 10 female), and 17 for Group 3 (domestic-out-of-state; 7 male, 10 female). Excluding the student (P38) who was found to be a short-term exchange student, the 57 participants were labeled as P1 through P58 in the interview and cognitive map data.

As with Study 1, participants were required to be students in graduate level programs since graduate students have been reported to have different information needs than undergraduate students (Sin & Kim, 2013), and because international students comprise a greater proportion of the graduate student body (about 12.4% in U.S. and 29.4% in UMD) than of the undergraduate student body (about 3.5% in U.S. and 3.0% in UMD) (National Center for Education Statistics, 2014; University of Maryland, 2013).

4.1.2. Timing of study

Study 2 aimed to gather data from participants about their LIBs in the early adjustment period while their memory is fresh. Thus, compared to the temporal contexts of participants of Study 1, where participants had spent about one year in the local area at the time of study participation, Study 2 was designed to be conducted relatively early within the first year of the participants' lives in College Park and surrounding areas. The online survey was advertised starting September 2014, and the interview/cognitive mapping sessions were conducted between October 2014 and March 2015, which was within about the first three to seven months of the participants' time in the area. Most of the study sessions (50 of the 57 sessions) were held in October, November, and December 2014. It was in the academic year of 2014/2015, and the participants were new international graduate students and new out-of-state graduate students who had entered their programs at UMD in Fall 2014.

4.1.3. Research methods: Online survey, follow-up interview, and cognitive mapping

The mixed-method research approach for this study included an online survey, follow-up interviews, and cognitive mapping tasks. The survey questions were

developed and refined based on previous studies of international migrants' information behaviors and Study 1 of this dissertation project (Lingel, 2011; Komito & Bates, 2011). Based on the results of the Study 1 survey and interviews, the types of local information and information sources were updated to merge, specify, or exclude some of the types of information and information sources, but most key questions, such as questions asking participants' perceived local information needs, information source use frequencies, and main information sources for each type of local information, remained the same. In the key questions about local information needs and information source use, 7 point Likert scales were used, and participants were asked to rate the importance of 12 types of local information (Table 4) and their frequencies of using each of 18 types of information sources (Table 5) for local information during their adjustment to new environments. The online survey was created and conducted through the Qualtrics platform.

1. Housing/Places for living
2. Grocery stores
3. Retail stores (e.g., Wal-mart, Target, Ikea, etc.)
4. Café/Restaurants
5. Health related places (e.g., Health center, Drugstores, Clinics, etc.)
6. University/School-related places (e.g., School, Gym, ISSS)
7. Banks/ATMs
8. Public transportation (Metro, Bus, Shuttle)
9. Routes/names of streets
10. Leisure/sports/exercise/recreational places
11. Movies/concerts/entertainment places
12. Event/fair/festivals

Table 4. Types of local information

1. Friends--New students from the same country
2. Friends--Existing students from the same country
3. Friends--New students from other countries
4. Friends--Existing students from other countries
5. Family
6. Neighbors
7. Staff/Personnel in University office/Library/Leasing office
8. University/school homepages
9. Forums/Q&As in online communities (e.g. Facebook groups, Korean Students Association website)
10. Web search / Web content
11. Smartphone map applications (e.g. Google Map)
12. Online maps website (e.g. Google Map)
13. Location-based smartphone applications (e.g., Yelp, Metro-bus app, etc.)
14. Paper map (e.g., campus map, etc.)
15. Offline media (e.g., Bulletin boards/ads/flyers/books/newspaper)
16. Wandering around by yourself
17. Wandering around together with friends/others
18. Finding it by chance (as you walk by or pass by)

Table 5. Types of information sources

At the end of the survey, participants were asked about their willingness to participate in follow-up interviews. Survey participants who showed their willingness to participate in the interviews were contacted for follow-up interviews. The interviews took place at open office space at the College of Information Studies at UMD, and each session lasted about 40 to 90 minutes. Participants were compensated \$10 for their participation in the study session. During the interview, participants were asked to talk about their early adjustment experiences, beginning with how they arrived in College Park and the surrounding area (e.g., how they arrived in College Park from an airport). This question helped participants to virtually go back to their early adjustment period and helped elicit their stories, feelings, and experiences during their first few weeks in College Park and surrounding areas. The following questions pertained to how participants acquired information about the local area, places, routes, transportation, and so on—that is, “local information.” Additionally, participants were asked follow-up questions based on their answers in the online survey (for all the interview questions, see Appendix 3). The interviewer had participants’ survey answers in hand to refer to the answers during the interviews. In most cases, this probing was focused on identifying their rationale and contexts for high or low needs for specific type of local information; frequent or less frequent use of specific types of information sources; and specific information seeking patterns. Also, probing questions were asked about participants’ local social networks, social information practices, local information challenges, use of social technologies (e.g., mobile social networking apps) and geospatial technologies (e.g., Google Maps), experiences of getting lost, and wandering around their local areas.

During the interview, participants were also asked to complete a cognitive mapping task; that is, they were asked to draw their own map of their local area on a blank sheet of paper using the knowledge and perspective of the local area that they had during their early adjustment period—their first few weeks in the area. After they drew early adjustment period maps, they were asked to list five places on their map that were most important to them during their early adjustment period in order of importance (Top 1 through 5). Participants were encouraged to talk about their experience and information practices while drawing their cognitive maps and were asked questions about objects or texts on their maps for clarification, so that the interviewer could clearly understand their local information practices as reflected on their maps, when needed.

4.1.4. Analysis methods

As Study 2 specifically aimed to answer research questions 2 and 3, the analysis of Study 2 data focused on comparing the data among the three groups of students in different socio-national contexts: “International-common,” “International-less-common,” and “Domestic-out-of-state.” While the socio-national contexts of the local area, reflected in the participant groupings, were the key factors in Study 2, the data were also examined in terms of other factors—gender and study level—that might influence international newcomer students’ LIB as well.

The survey data were analyzed through SPSS using descriptive statistics analysis, factor analysis, and one-way MANOVA. Descriptive statistics analysis identified the patterns of the perceived importance of each of 12 types of local information and of the frequencies with which participants used each of 18 types of

information sources. As with Study 1, factor analysis was used to identify underlying types of local information and information sources. Thus, the types of local information and information sources that had statistically similar patterns to each other were merged to a smaller number of types of local information and information sources through the factor analyses. When the data were examined and compared between the three groups in different socio-national contexts, other variables—age, gender, and study level (Master’s, PhD)—were controlled. For the analysis of the “main information sources” for each type of local information, descriptive statistics were used to create a visualization matrix with circles for each matching pair of specific type of local information and specific type of information source (see Figure 8 in the upcoming “Findings” section). Larger circles mean that more participants considered the specific type of information source as their main information source for the specific type of local information. The main information sources for each type of local information were visually examined for their patterns within each of the three groups and for the patterns across the three groups of different socio-national contexts.

For the analysis of the interview data, the interviews were audio-recorded, with permission of the participants, and transcribed. The interview transcripts were then coded and analyzed through NVivo software. As coding schemes, both deductive and inductive/open-coding approaches were adopted (Hesse-Biber & Leavy, 2010), and as practical coding techniques, elemental coding methods with structural and descriptive coding were used (Saldaña, 2009). First, based on the themes and other results of Study 1, several deductive codes were developed at the

beginning of the coding process, and more free codes were added in open-coding approaches to the deductive code structures through the coding process. The initial, high-level deductive codes included “Geographical-local adjustment,” “Sense of challenges,” “Social environments,” “Use of ICTs (Information communication technologies),” “Recreation,” “Information sharing,” “Wandering around,” and “Information encountering.” As analysis and interpretation of the transcripts were under way, other high-level codes, such as “way of life” and “previous experience,” and various sub-codes under the high-level codes were created and often modified during the organic coding process that blended deductive and inductive approaches.

For the analysis of cognitive map data, participants’ cognitive maps were examined in multiple ways using quantitative, qualitative/visual, and geospatial approaches. First, the maps were visually and qualitatively analyzed for their characteristics and themes that were identified and extracted from the cognitive maps. Also, participants’ top five important places on their cognitive maps were analyzed to show the patterns of types of places that were important to them during their early adjustment period. In addition, the orientation of each cognitive map was identified—whether it follows the generally used cardinal direction (north-up). The results from these approaches were used to analyze participants’ cognitive maps and better understand the geospatial contexts of their LIBs.

4.2. Findings

Use of multiple, mixed methods—online survey, interviews, and cognitive mapping—provided rich data about different aspects of participants’ LIBs in new

environments. The following sections describe participants' local information needs and the information seeking behaviors they used to meet those needs.

4.2.1. Perceived importance of each type of local information

Through the online survey, the participants' perceived importance of 12 types of local information during their early adjustment period was examined. Factor analysis of the 12 types of local information identified 7 underlying types of local information. For the factor analysis on SPSS, Principal Component Analysis was used as the extraction method, and Varimax with Kaiser Normalization was used for the rotation method. Across all participants, the most important local information was housing information ($M = 6.336$, $SD = 1.088$; 7-point Likert scales, ranging from 1 as "not at all important" to 7 as "Extremely important"), followed by information about public transportation ($M = 5.846$, $SD = 1.532$), groceries/retail stores ($M = 5.614$, $SD = 1.007$), and new student essentials (school-related places, health-related places, banks/ATMs; $M = 5.142$, $SD = 1.082$) (See Figure 6). Information about recreational places ($M = 4.015$, $SD = 1.158$) was perceived as least important, which is reflected in the following comment by a participant from India:

"Initially when I came here, I was not much interested in movies and stuff, I was more interested in getting settled, getting my groceries, getting apartment, and stuff like my bed and all."

(P6, Female, International-common, India)

This pattern of considering recreational information less important appeared for U.S. newcomer students as well. As a participant from Washington State mentioned:

I think with leisure, sports, recreational... I enjoyed doing those things. But... it was kind of one of those things that where I just figured like, “Well, I’ll figure that out as I sort of adjust to the new place because there’s always gonna be places for exercising and things like that... (P18, Male, Domestic-out-of-state, WA, USA)

This pattern in the perceived importance of types of local information applied more generally across all three groups. Housing and other basic local information was perceived as more important and recreation-related place information was perceived as less important for all three groups (Figure 6). The theme “survival first, recreation next” which was suggested in Study 1 was also identified in this larger sample examination in Study 2. Overall, the variance of the perceived importance between different types of information (e.g., difference between the perceived importance of housing information and recreation-related information) was greater than the variance among the three groups within a type of information (e.g., differences in the perceived importance of housing information among the three groups).

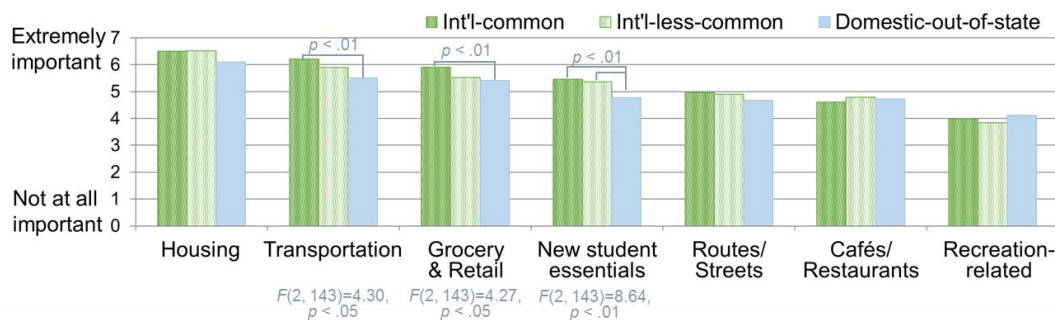


Figure 6. Perceived importance of different types of local information

However, when the data were examined across the three groups of different socio-national contexts, one-way MANOVA identified that there were statistically

significant differences among the three groups for their perceived importance of local information about Transportation ($F(2, 143) = 4.30, p = .015$), Grocery/retail stores ($F(2, 143) = 4.27, p = .016$), and New student essentials ($F(2, 143) = 8.64, p = .000$), holding other variables constant (age, gender, and study level). International students tended to perceive these types of basic local information as more important than did domestic out-of-state students. Especially, “International-common” group students perceived all three of these types of basic local information as significantly more important than did “Domestic out-of-state” students (Transportation: $p = .004$, Grocery/retail stores: $p = .004$, New student essentials: $p = .000$).

Regarding other control variables, gender differences and age differences were found for several information types. Female students perceived Routes/streets information ($p = .025$), Transportation information ($p = .016$), and Recreational local information ($p = .034$) as more important than did male students. Older students were more likely to perceive Cafes/restaurants information ($p = .006$, *Partial Eta Squared* = .051) as more important. There were no statistically significant differences in perceived importance of types of local information between Masters and PhD students.

4.2.2. Frequencies of using information sources

In the survey, participants’ reported frequencies of using each of 18 types of information sources were examined, and factor analysis of the 18 types of information sources identified 10 underlying types of information sources, as shown in Figure 7. Across all participants, the most frequently used information sources for local information were Web and online maps ($M = 5.497, SD = 1.041$) and Mobile

maps and location-based services (LBS) apps ($M = 5.131$, $SD = 1.567$), followed by Co-national friends ($M = 4.225$, $SD = 1.576$), University online resources ($M = 4.121$, $SD = 1.623$), Wandering and encountering ($M = 3.751$, $SD = 1.249$), Other national friends ($M = 3.064$, $SD = 1.417$), and Online communities ($M = 3.007$, $SD = 1.791$). The least frequently used sources of local information included Offline university resources (such as bulletin boards, paper media, and staff/personnel; $M = 2.993$, $SD = 1.236$), Family ($M = 2.450$, $SD = 1.650$), and Neighbors ($M = 2.134$, $SD = 1.374$).

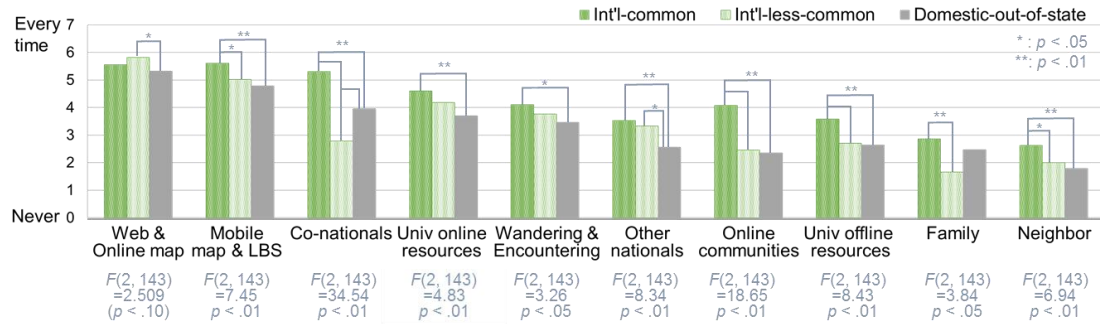


Figure 7. Frequencies of using information sources

For all three groups, “Web and Online maps” were the most frequently used sources of local information during their adjustment. When compared across the three groups, the use of “Web and Online maps” did not significantly vary ($F(2, 143) = 2.509$, $p = .085$). However, except for “Web and Online maps,” the frequencies of using all the other types of information sources were statistically significantly different across the three socio-nationally different groups, either at the $p < .05$ or $p < .01$ level, as shown in Figure 7.

Among these differences, particularly notable findings pertained to their information seeking through “Co-nationals” and “Online communities.” International-common group students acquired local information from their co-

national friends significantly more frequently than did the other two groups. The use of co-nationals as sources of local information was significantly more frequent for International-common students than for Domestic out-of-state students who were expected to have a greater number of co-nationals (Americans) in the local environments. For International-less-common students, the use of co-nationals as sources of local information was significantly less frequent than for International-common and Domestic out-of-state students. A student from India described his early adjustment experience and how he learned about local transportation systems from his Indian senior students as below:

It was a bit tough at the start. What happened was, we were not sure how the local transport works here. So, we asked a few (Indian) seniors. They told us to get the Metro card. (P17, Male, International-common, India)

Also, a Chinese student talked about how he was able to get information from the Chinese student organization at UMD through the use of their own Chinese social technology platform:

The Chinese Students and Scholars Association will build up a group on a very popular Chinese IM software platform, QQ. We join that group and can get very instant information from the CSSA.
(P2, Male, International-common, China)

The co-national information practices of Chinese students involved the use of social technologies that helped connect them to other co-nationals and instantly acquire information that they might need.

Social technologies were also helpful tools for Indian newcomer students to get connected with each other before and after their arrival to the U.S. An Indian student explained how he came to know other Indian students coming to UMD (or UMCP; University of Maryland, College Park) through social technology platforms as below:

So, when we got admit from University of Maryland, we made a Facebook group. So, guys joining UMCP from India joined that group, so we knew each other before coming here. There's a group called... MS in US. Masters in US. Almost around it has 30,000 to 40,000 members. So what happens is if someone gets an admit, he posts, or he or she posts it there, and then add the link of the group he or she has created for this particular university and then everyone joins that group. (P17, Male, International-common, India)

Even before coming to the U.S., many Indian students got connected with each other and shared information. P17 also described how their online social networking expanded onto mobile social networking platforms:

What happens (is), once you contact everyone on Facebook you form a WhatsApp group. So, once a WhatsApp group is in place then you do not prefer to go online and check updates there.

(P17, Male, International-common, India)

Another Indian student described her experience of creating WhatsApp mobile social networking groups of Indian students who were coming to UMD:

Actually we have a Facebook page of our Student Council of India... I told you this thing, 2014 group. So, that time we used to ask each other whether

*you got the I-20 from the university or not? What airline are you planning?
And we also created a "WhatsApp" group... So, we knew each other through
WhatsApp and so we created groups and we decided the roommates, then
what all stuff to take to US. (P6, Female, International-common, India)*

A Chinese student also shared his experience of selecting an apartment and his roommates through their co-national online social networking platform:

*Before I arrived here, I already decided where to live. From the internet.
Yeah, I applied for the apartment from the internet... with others, with four,
four of us share an apartment... from the internet... a Chinese website, yeah.
There's a... Do you know QQ? They had a group and all the fresh students of
University of Maryland from China and contacted each other and found a
roommate. (P4, Male, International-common, China)*

As such, students in the “International-common” group actively used online and mobile social platforms for their co-national networking and information practices. However, this co-national networking and information sharing was rarely observed among students in the International-less-common group. In most cases, they knew some co-nationals in the local area, but did not acquire much local information from them. One student from Argentina described her limited interactions and information practices with other Argentinian people in the local area:

*I know that there are some Argentinian students, and I've met some of them,
but I rarely interact with them, so it's not one of my main sources of
information.
(P12, Female, International-less-common, Argentina)*

An International-less-common group student from Italy tried to find other Italians or Italian student organizations on campus, but was not successful:

I'm pretty sure there are (Italians), it's just in my department, I am art history major and I'm the only international student in my department... I actually tried using the... There is a page on the UMD website, of all, in which all the association are listed, I'm actually part of the GAHA which is Graduate Art History Association, and I was like, "Oh, maybe there are some Italian communities or something", so I actually checked and there are none, so... (P7, Female, International-less-common, Italy)

However, there were a few cases in which international-less-common students from specific countries had quite a number of co-nationals in the local area and got local information from them. P50 (Male, International-common, Taiwan) and P53 (Female, International-common, Taiwan) knew a few Taiwanese students on campus, and they acquired some information from UMD Taiwanese Student Association's Facebook group as well.

We have a Taiwanese student association... and also, we have a Facebook (group)... Sometimes they post housing information and when somebody is... when they are moving to another place, they would post some furnitures... (P50, Male, International-common, Taiwan)

I only know them (Taiwanese students) on the Facebook, they have the association, but only one girl... I talk to her more than the others because we know each other before we came to the United States (P53, Female, International-common, Taiwan).

Their co-national networking and information practice seemed relatively less active than that of international-common students, and these Taiwanese students did not use mobile social networking among local co-national students as much as International-common group students did. However, at least these Taiwanese students had access to local co-national students through an online co-national social network that was university-based (UMD Taiwanese Student Association's Facebook group) and acquired some local information through the online community. Similarly, International-less-common students from Iran also had their UMD student Facebook group. They connected with co-national students through their Facebook group and also sometimes got local event information through the Facebook group. Their online networking developed into offline information practices, as P25 describes:

We have [a] Facebook group. You can find them online and see them in person and ask your question in person... Maybe it's just like a trigger, this online community. It initiates your contact with those you need, but you get the information in person. (P25, Male, International-less-common, Iran)

Their online networking also developed into some mobile social networking through Viber (www.viber.com). P39 mentioned that he met some co-national peer students on the Facebook group and then made a chat group on Viber for going to lunch or hanging out. (P39, Male, International-less-common, Iran). In general, International-less-common students were significantly less active in co-national networking and social information practices than International-common group students. However, some International-less-common students from “relatively common” countries of origin, such as Taiwan and Iran, exhibited some co-national information practices.

International-less-common students from Taiwan and Iran had quite a few co-nationals in their new local area and engaged in some co-national networking and social information practices that were quite similar to those of International-common students.

Also, as another co-national social information source, the frequency of use of Family (family members and relatives) was significantly different between International-common and International-less-common students. Although Family was one of the least frequently used sources of local information in general, International-common group students who tend to have many co-nationals in the surrounding areas of College Park (Washington DC Metropolitan area) and in the U.S. were more likely to acquire local information from family members or relatives than were International-less-common students ($p = .006$).

Apart from co-national sources, the frequencies of using “Other nationals,” as their sources of local information, significantly differed across the groups ($F(2, 143) = 8.338, p = .000$). Both International-common students ($M = 3.527, t = 3.876, p = .000$) and International-less-common students ($M = 3.339, t = 2.553, p = .012$) acquired local information from “Other nationals” significantly more frequently than did Domestic out-of-state students ($M = 2.561$). But there was no statistically significant difference in the use of “Other nationals” between International-common and International-less-common student groups.

For University/organization-based online and offline resources, international students (the two international student groups combined) used these sources to get local information more frequently than did domestic out-of-state students

(University/organization-based online resources—e.g., university/school home pages: $F(1, 144) = 8.942, p = .003$; University/organization-based offline resources—e.g., Staff/personnel, bulletin boards: $F(1, 144) = 8.379, p = .004$). In their interviews, several international students shared that university websites were helpful for finding essential local information for newcomer students:

University home page have lots of resources, like the UM shuttle website, and there's this TerpNav, that's for like, navigating across different buildings.

Although it's a bit complicated too, but it helps sometimes.

(P49, Male, International-common, India)

I looked up the Recreation Center there and the Stamp. The Stamp gives a list of the different food places, I would look up, here's the food places then I would Google them to see what they were like. The bank (on campus), I looked up that, so, all information about banking, stuff like that from the university website. (P19, Female, International-less-common, South Africa)

Although some participants mentioned about room for improvement in their design and usability, generally the university websites were perceived as useful sources of local information, especially of campus-based local information.

Also, participants sometimes gained local information by “Wandering and encountering” which includes wandering around their new environments and finding local information by chance—which can be identified as information encountering or incidental information acquisition (Erdelez, 1999; Williamson, 1998). International students (the two international student groups combined) engaged in these field-based local information practices significantly more frequently than did domestic out-of-

state students ($F(1, 144) = 5.712, p = .018$). Among the three groups, “Wandering and encountering” was significantly more frequent for “International-common” group students than for “Domestic out-of-state” group students ($t = 2.531, p = .012$). By wandering around the area, newcomer students aimed to get familiarized with their new surroundings and often discovered new places along the way:

I sometimes wander around so that I could look for some new places that I haven't been to or some local information. For example, a few days ago I found out that there is a performance theater like within the walking distance from my home. So that's, I think by wandering around you can also get some likely information. (P34, Female, International-common, Korea)

When I was wandering around myself, I probably found things that I wouldn't have known to ask for. So, like Jo-Ann Fabrics in the mall, I wouldn't have asked, "Where's the nearest Jo-Ann Fabrics?" And I've been to the store a number of times now, so just serendipitous things like that.

(P28, Female, Domestic out-of-state, USA)

Also, in many cases, “wandering around” and “information encountering” took place when participants had other destinations. On their way to a specific place or after getting to a place, they looked around, explored the new areas, and often found new local information:

When I go to the PG Mall, around that area. I was only there to go to the bank, but I also wandered around and find there a fitness center, find there were lots of grocery stores I didn't know, and I found it was a good place...

(P41, Female, International-common, China)

Some International-common group students wandered around their local areas with other co-national friends during their early adjustment to new environments:

When we came here, I didn't know where the downtown was. It was like all... We three, four people were roaming around and we met a few (other Indian) friends coming from the other direction. So we asked them, "Where are you coming from?" So, they just told us, "We had gone to downtown". Okay, then we know, okay downtown is that side... We came here around 15 days before the classes started. So, at that time, it was pretty frequent, we went out daily. But after the classes started, everyone started their jobs and all, then it has become... So, it's... Now, we go out very less.

(P17, Male, International-common, India)

In general, newcomer students' "wandering around" behavior was fairly active at the beginning of their first semester in their programs. After that period, their "wandering around" behavior became less frequent than before due to work, classes, and hence less amount of available time.

Lastly, participants' information source use was examined using other control variables—age, gender, and study levels (Master's, PhD). There were a few cases where the frequencies of using information sources significantly differed depending on the participants' gender. Female participants used "Web and online maps ($t = 2.129, p = .035$)" and "Mobile maps and LBS (Location-Based Systems such as bus/metro apps and Yelp; $t = 3.216, p = .002$)" significantly more frequently than did male participants. There were no statistically significant differences associated with participants' study levels and ages for their use of information sources.

4.2.3. Main information sources for each type of local information

Through the online survey, participants were asked about their main information sources for each type of local information. The results are shown in Figure 8. The size of circles represents the percentage of participants who perceived that specific information source as their main source for the corresponding local information. For example, in the International-common group, 51% (28 of 55 international-common students) answered that “Senior co-nationals” were their main information source for “Housing” information.

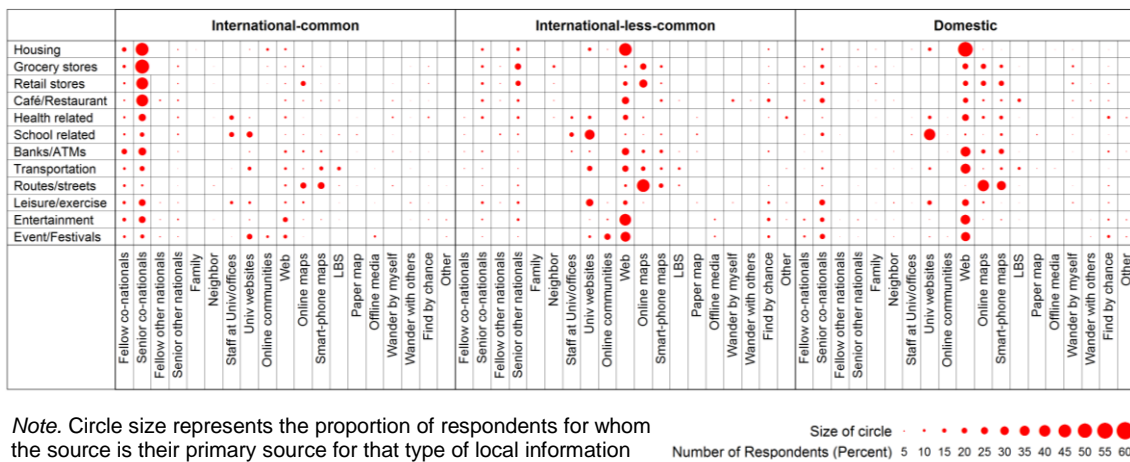


Figure 8. Main information sources for each type of local information

The patterns of the main information sources varied among the three groups. Firstly, in the International-common group, “Co-nationals” were more likely to be their main information source for basic, food, and essential local information (information for Housing, Groceries stores, Retail stores, Cafes/restaurants, and Health-related places) than were other sources. A Chinese participant had a friend who was already studying at UMD (as a senior co-national student), and he found a place to live through the help of that Chinese friend, as described below:

I knew one of my roommates back in China, so he told me that one room in that house will be available from August, so I contacted landlord in with the help of him. So, I'm now at the house.

(P15, Male, International-common, China)

For this Chinese newcomer student, a co-national senior student was his main source of housing information. Also, senior co-national students were the main source of other basic, local information for many students in the International-common group as shown in the example below. This Indian student was able to get a context-specific local information from his senior Indian students about the grocery/retail store nearest to his apartment building:

What we have heard from (Indian) seniors who have been staying here for the past one, one-and-a-half year, (is) that the nearest place to shop near Parkside is Shoppers. (P17, Male, International-common, India)

But for recreation-related (entertainment, events/festivals), school-related, and routes/transportation-related information, quite a few of the International-common students perceived online and mobile sources, rather than “Co-nationals,” as their main information sources. A student from China just typed on his mobile phone and found a route to a place and found the right building:

I just type on my mobile phone, where I might want to attend the ISSS orientation, Susquehanna Hall and it will find the route for me. I just follow and I will find the right building. (P2, Male, International-common, China)

In contrast, “International-less-common” group students rarely perceived “Co-nationals” as their main information sources. Rather, slightly more “international-

less-common” students perceived “Other nationals” as their main source of some basic local information such as information about groceries and retail stores. A student from Turkey came to know about a grocery store from a student from a different country who he met at the student orientation:

One of the girls that I met (at the orientation) said that there was a store called "Giant" for a grocery shopping. I didn't know about that.

(P30, Male, International-less-common, Turkey)

But for most types of local information, online and mobile sources were the main information sources for International-less-common group students. A male student from Greece searched for housing information on the UMD housing website *(P23, Male, International-less-common, Greece)*. At that time he knew another incoming Greek student, but neither he nor the other Greek student acquired local housing information from other co-nationals. Rather, both of them searched for housing information on UMD housing website. Also, a female student from South Africa searched for housing information on university housing website and used Google maps frequently for her housing search:

I used the university website, the off campus housing, I used that a lot and I used Google Maps a lot

(P19, Female, International-less-common, South Africa).

So, without much help and information from their co-nationals or even other-national social sources, International-less-common students were more likely to seek and acquire most types of local information from online and mobile sources, such as the Web, Online maps, Mobile maps, and University websites.

Lastly, in the Domestic out-of-state group, a few students acquired recreational place information (Events/festivals, Entertainment, and Cafes/restaurants) from their co-national American students. But for most types of local information, online and mobile sources were their main information sources. A U.S. student from Florida talked about his extensive search looking for housing:

I was looking for some housing on the internet. I didn't really know too many people here before I moved... I went on Google. I Googled the housing and the College Park, Hyattsville or whatever. It came out with big lists.

(P54, Male, Domestic-out-of-state, FL, USA)

Rather than being limited to the UMD housing website, this student looked for local housing information on the entire Internet. He Googled and found big lists of housing options. Another Domestic-out-of-state student shared her information seeking experience using online sources during her adjustment to the local area as below:

So I mostly just would Google stuff. I still use Google Maps all the time... First, I just typed in my, the address and where I live, and would try to see what was around it, and that's how I found the nearest grocery store... if I'm going to a new place, I'll still look it up on Google Maps. So, Google Maps have been my best friend. (P26, Female, Domestic-out-of-state, VA, USA)

P26 from Virginia just Googled for most of her local information seeking. She used Google Maps so frequently and effectively that she called Google Maps as her best friend. Domestic out-of-state students were quite familiar and confident searching for local information such as housing and other place information through web search and online maps.

4.2.4. Cognitive maps

During the interview, participants were asked to draw their own maps of their local area (cognitive maps) on a blank sheet of paper, using their knowledge and perspective that they had during their early adjustment period, their first few weeks, in College Park and surrounding areas. By virtually going back to early adjustment period and describing about the local environments that they perceived during the time, participants were able to immerse themselves in their life contexts during their early adjustment period. Also, cognitive mapping helped them verbalize their information practices in new environments. Participants were able to draw their cognitive maps without trouble using their initial knowledge and perspectives about the local area. When participants were concerned about their map drawing skills, they were assured that they did not need to draw precise or correct maps.

The cognitive maps provided participants' contextual data and depicted participants' significant localities during early adjustment to their new environments (Figure 9, 10, and 11)—primarily places such as their houses/apartments, new student essentials (e.g., school-related places), groceries/retail stores, and transportation-

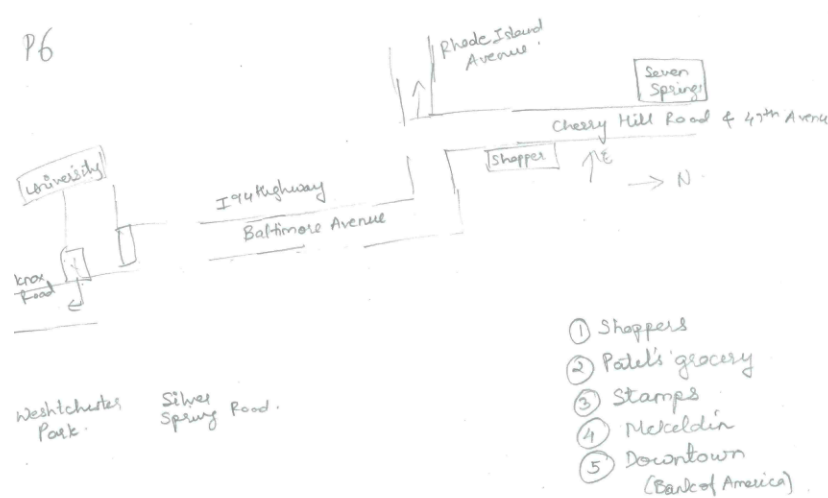


Figure 9. P6's early adjustment period map (International-common)

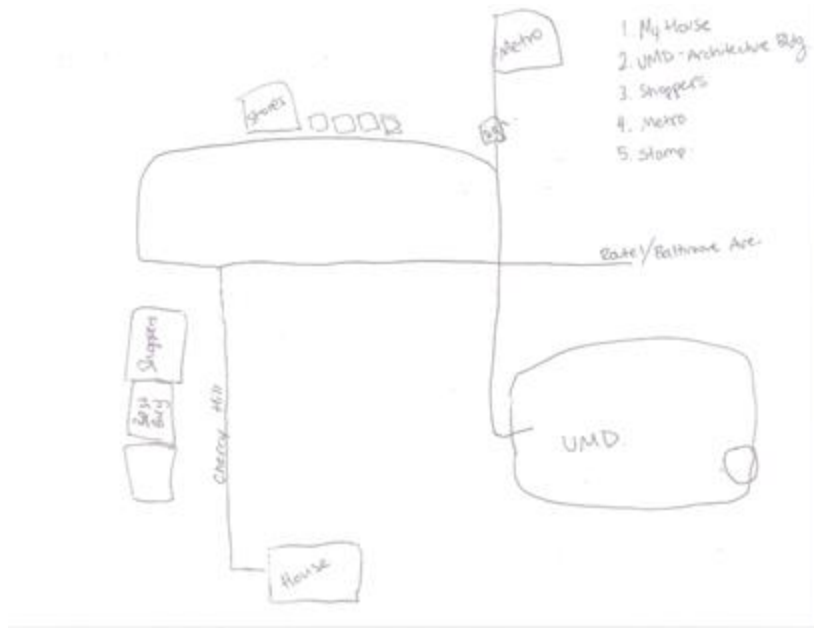


Figure 10. P51's early adjustment period map (International-less-common)



Figure 11. P47's early adjustment period map

related places. The places that appeared on the cognitive maps were mostly related with their basic, essential life needs as newcomer students.

Also, during the cognitive mapping process, participants were asked to list the top five places on the map, which were most important to them during their early adjustment period (these results are summarized in Figure 12). Most participants perceived their houses/apartments as the most important place, and next was new student essentials, such as school-related places and banks, followed by groceries/retail stores and transportation-related places. Relatively fewer participants perceived recreation-related place information and café/restaurants information as important, and these types of information tended to appear at lower ranks on participants' top 5 place lists. These top 5 most important places listed on participants' cognitive maps matched the theme of their local information needs, “survival first, recreation next,” during their early adjustment period.

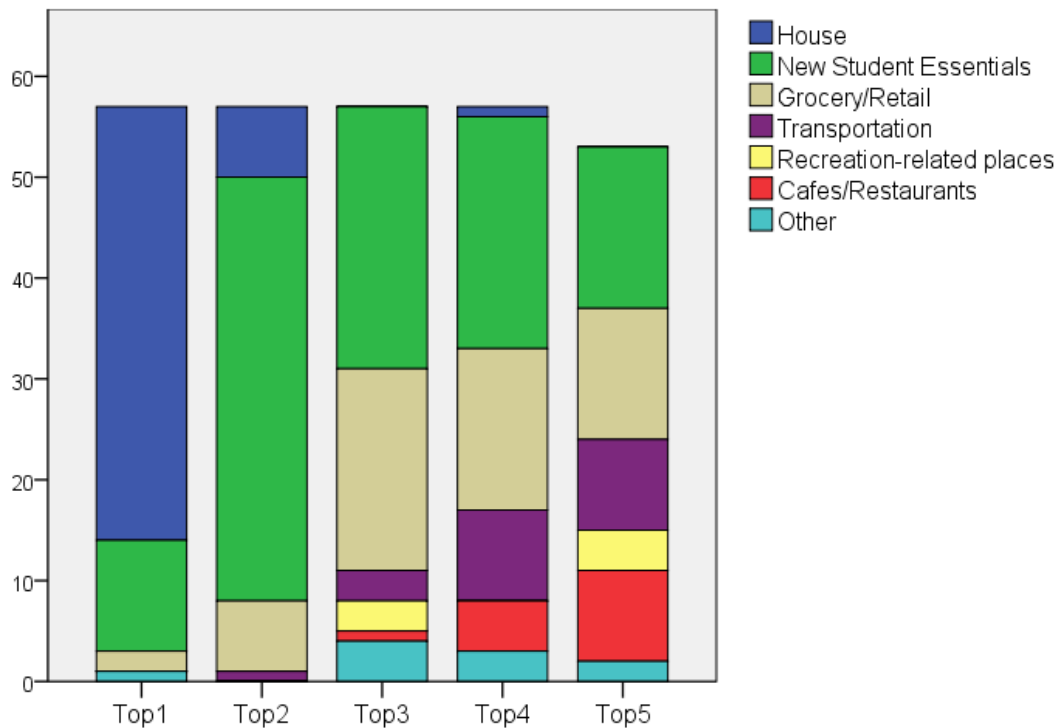


Figure 12. Top 5 important places on the cognitive maps (unit: number of participants)

Also, cognitive mapping and listing the top five most important places helped bring participants' significant localities to mind, which sometimes did not come into light during the survey and interview process. Those places that participants remembered during the cognitive mapping process include their friend's house, church, and local public libraries. Also, while drawing their own maps of their local areas, participants often realized that they use specific buildings and stores to locate themselves or find ways to specific places. They used those buildings and stores as landmarks, which are more easily identifiable and are helpful for newcomers to guide themselves in their new areas (Lynch, 1960, *pp.* 78-83).

4.3. Discussion

In this section, I discuss the findings of the study, drawing on prior studies, related theories, and information behavior models. This analysis and discussion aim to bring a better understanding of international students' information behavior in the contexts of adjustment to a new country and in terms of socio-national contexts that involve small and larger worlds of influences shaping international newcomer students' LIBs.

4.3.1. Survival first, recreation next: Only for international students?

In the survey, International-common, International-less-common, and Domestic-out-of-state students all considered basic, survival-related local information, such as information about Housing and Transportation, more important than recreation-related local information. So the patterns for perceived importance of various types of local information were similar among the three groups of different

socio-national contexts. This result indicates that “survival first, recreation next” is not a unique characteristic of new international students’ local information needs. As newcomers from other areas, Domestic out-of-state students also first sought information related with their basic, essential life needs. Also, there were no statistically significant differences in perceived importance of each type of local information between International-common and International-less-common students. In a way, this trend might be seen to reflect the hierarchy of human needs where satisfying basic, physiological and safety needs are people’s first priorities (Maslow, 1943). The current finding also goes with Maslow’s statement regarding the *generality of needs*. He stated that people in different societies are quite alike in terms of their basic needs. He also said that these basic needs are relatively more universal than superficial desires, which are more likely to vary across different societies (Maslow, 1943, pp. 389-390).

However, international students in the current study perceived basic, essential local information as significantly more important than did Domestic-out-of-state students. International-common students perceived information about Transportation ($p = .004$), Groceries/retail stores ($p = .004$), and New student essentials ($p = .000$; e.g., school-related places) as significantly more important than did Domestic-out-of-state students. International-less-common students also perceived information about New student essentials as significantly more important ($p = .004$) than did Domestic-out-of-state students. The intense needs for basic, essential local information are illustrated in a comment from a Chinese student in a fairly serious tone:

I mean, where is the school related place, banks, and public transportation?

For my life, during the life around here, the first thing you study is... the first one, you survive. You have to survive.

(P5, Male, International-common, China)

The sense of uncertainty being in an unfamiliar environment induced some degree of tension, challenges, and urgency to international newcomer students. They were eager to figure out new local environments, but at the same time many of the international students got lost or were worried about being lost in an unknown area. A Chinese student shared her experience of having trouble with the public transportation system and getting lost in the middle of a local highway:

The first time I got lost was the first, the second day, maybe the third day I came to the US... I know nothing about this area. I just remember those maps in my head but that's not enough because I'm also not aware, I'm not familiar with how the bus works here because when we tried to go to the... AT&T in Greenbelt. That is August, we took a bus maybe 83 or C2 or something like that. And we searched on the Google; it says there 20 stops to AT&T... So okay. After about seven or eight stops, I suddenly felt this is not right because it's already more than half an hour. They just stopped for eight times. But in the US, if there's no one push, press the bell or no one's waiting, then the bus won't stop. So we didn't know that at that time, so after eight stops, I felt strange and I asked the bus driver. He told me, "Oh, you have already passed AT&T for many stops." So we get off immediately and found us in a remote

place where there is no one there, no house, just a highway there.

(P41, Female, International-common, China)

P41's story is a good example of the challenges and difficulties originating from different systems and conventions of the host environments that international newcomer students may experience and need to cope with. Using public transportation was a significant challenge to many international students, as was also reflected in their perceived importance of Transportation information.

In addition, a student from Argentina expressed her anxious feeling of adjusting to unfamiliar environments and how much she needed a smartphone and its geospatial technology to locate herself and find ways around the area:

I decided I really needed one smartphone to walk around and be more confident about the surroundings and stuff... and also to communicate with other people in case I got lost... I thought that it was one of the priorities when I got here, and I was actually true about it. And some other people that came here before me actually told me the same thing, which is true. Once you get the access to a smartphone it's something you can use online everywhere. It's more helpful for you.

(P12, Female, International-less-common, Argentina)

Overall, it could be understood that the sense of challenges of living in unfamiliar environments and in different systems naturally led international students to perceive their needs for basic, essential local information as relatively more important than did Domestic-out-of-state students. Also, these challenging and

unfamiliar contexts might have influenced some international students' eager use of social information sources and the active information behavior of Wandering around.

4.3.2. Wandering around and information encountering in the field

During adjustment to new geospatial environments, most of the newcomer students “wandered around” the area and often “encountered local information” (Figure 7). The survey results indicate that both international and domestic students used Wandering around as an information seeking behavior to learn about new environments. However, there was a statistically significant difference in the frequencies of “Wandering and encountering” as a LIB among the three groups ($F(2, 143) = 3.260, p = .041$). There was no statistically significant difference in “Wandering and encountering” between International-common and International-less-common students. But the frequency of “Wandering and encountering” for international students (when the two international student groups were combined) was statistically significantly higher than for domestic out-of-state students ($F(1, 144) = 5.712, p = .018$). This can be explained, in part, by international students' more intense needs for gathering basic local information during their early adjustment to the host environment, compared to domestic students. It is likely that international students' sense of challenges in a new country led them to explore and learn about their new environment and different systems more than domestic-out-of-state students. Also, the result that international students wandered around and encountered local information by chance (e.g., in the street) more often than did domestic-out-of-state students might imply that international students were more eager to absorb

various kinds of new information for their future or immediate needs, as seen in comments below:

When I come to a shopping plaza, I first come to buy some essentials in the supermarket. And then I maybe go around to seek some, maybe there are... To look if there are some interesting shops, or some stuffs maybe I need, so I go around and try these things. And if I like it, I come again.

(P5, Male, International-common, China)

I think in my first few weeks I just wanted to sort of see what there is to see, so I walked along Route 1 and I went up and down the side roads here. I walked down to the Metro stop in PG Plaza and then I saw there's a Target there, and there's a Giant Foods. That's how I found the Giant Foods actually... I walked a lot. Probably two hours a day or so when I first arrived... I was also walking around looking for places where I maybe want to stay and getting an idea of the areas and things like that.

(P19, Female, International-less-common, South Africa)

They wanted to explore surrounding areas in hopes they would come across some places that might be helpful for them. In this aspect of checking or saving local information in their mind for future use, this “Wandering and encountering” behavior contains a component of “squirreling behavior,” where people gather information potentially for their future information consumption (Rowlands et al., 2008).

Also, as briefly discussed based on the findings in Study 1 in the Chapter 3, the unique characteristics of “Wandering and encountering” behavior mean that it might include various types of information seeking behaviors, such as *active search*

and *passive attention* (Wilson, 1997). However, in Study 2, the interviews with a larger sample allowed for a better understanding of “wandering and encountering” behavior, suggesting that this unique behavior could involve all of the four types of information seeking behaviors identified in Wilson’s (1997) “revised general model of information behavior.” The four types include *passive attention*, *passive search*, *active search*, and *ongoing search*. Firstly, *passive attention* “such as listening to the radio or watching television programs, where information acquisition may take place without intentional seeking,” (p. 562) applies to “Wandering and encountering” in that local information acquisition can take place without intentionally seeking specific information. Secondly, *passive search*, where “one type of search” results in the “acquisition of information that happens to be relevant to the individual,” (p. 562) was found in the behavior of “Wandering and encountering” as participants found other places when they were looking for a specific place, as seen in this experience of a Chinese student:

So I'm wandering around there and I found... It's not very far from the school so I have got time to wander around and I found some services like barber shop, like pizza, like banks here. 'Cause basically, I needed to grab some cash from the BOA (Bank of America), but when I see there are some different services here so I spend an afternoon in that street area searching around.
(P5, Male, International-common, China)

Thirdly, *active search*, “where an individual actively seeks out information,” (p. 562) was part of “Wandering and encountering,” specifically part of “Wandering” behavior. Some of the international newcomer students intended to figure out the

local area (that is a form of seeking local information) by wandering around College Park and surrounding areas and directly interacting with the local space and places. Considering that local information is embedded in the physical local area and the geospatial environment, newcomer students' Wandering around behavior was to actively and directly search for local information in the field. Lastly, *ongoing search*, "where active searching has already established the basic framework of knowledge, ideas, beliefs or values, but where occasional continuing search is carried out to update or expand one's framework," (p. 562) was part of "Wandering and encountering" behavior of international newcomer students. They not only wandered around once or twice, but rather did that in an ongoing, procedural fashion. An Argentinian student continually built her local knowledge as she got familiarized with the surroundings, wandered around, checked for various places in the streets, and often encountered other places in her surroundings by chance through the process:

Once I felt more confident about the surroundings, I just started walking around and checking for different places and trying to figure out whether it could be a good idea to actually have that in mind or not. Yeah, I started doing exactly that, especially to locate the metro station at first and then the bank. And also when I went to the bank to actually open the account, I also found all the other stores around.

(P12, Female, International-less-common, Argentina)

However, in addition to these four types of information seeking behaviors, this dissertation proposes two more types of information seeking behaviors, specifically with regards to LIBs in new environments. The two types of information seeking

behaviors are *active attention* and *ongoing attention*. Newcomer students in the current study intended to actively wander around to get to know their new environments without seeking specific information. It is not just passive behavior of listening to radio (as in *passive attention*), but rather active behavior without the specific target of searching, thus *active attention*. Also, this activity of “attention” does not take place as a single event. Newcomer students’ LIB, which includes “Wandering and encountering,” involves their constant exposure to local environments, and they are likely to “acquire” some local information as they move around the areas over time without intentionally seeking information. In this sense, “Wandering and encountering” is also characterized as *ongoing attention*, which can take place over time during newcomers’ adjustment to unfamiliar environments.

Overall, LIB of “Wandering and encountering” entails complex information seeking behaviors that include the four types of Wilson’s (1997) information seeking behaviors—*passive attention*, *passive search*, *active search*, and *ongoing search*—and also two other types of information seeking behavior that are proposed in this work—*active attention* and *ongoing attention*.

4.3.3. Socio-national contexts and LIB

Including “Wandering and encountering,” international and domestic newcomer students exhibited various kinds of local information practices, and their frequencies of using each information source varied across the three groups of different socio-national contexts. While the use of “Web and online maps,” the most frequently used sources of local information, did not significantly vary across the three groups, participants’ use of social or human information sources significantly

varied across the three socio-nationally different groups. In particular, significantly different use of co-national information sources by the three groups requires more attention. Living in a new location, away from their previous local social networks, provides a setting where it is likely for newcomer students to establish new social networks in their new area. Particularly, this new social networking is inevitable for international students who are not only in a new location, but also in a foreign country, physically far separated from their existing social networks in their home countries. They often try to maintain their relationships with their family and friends in home countries through online social media and other information communication technologies as many international newcomers do (Komito & Bates, 2011; Mehra & Papajohn, 2007). However, living in different countries far away, international newcomer students in this study were less likely to acquire information needed for living in College Park and surrounding areas in U.S. from their existing social networks in home countries. Thus, international students were more likely to build new social networks and social capital in host environments, often forming or entering new small worlds which influence their information behaviors (Burnett & Jaeger, 2011; Chatman, 1991).

The online survey and interview data from this dissertation research suggested that “International-common” group students were more likely to get connected to co-nationals in the local area; join various forms of co-national groups (offline, online, and mobile); and acquire much local information from their co-national senior or fellow students. For these International-common students from China, India, and Korea, most of them had access to quite a few local co-nationals, mostly senior or

fellow co-national students, when they came to College Park and the surrounding areas. Also, online co-national social networking spaces, such as their student organization websites (e.g., website for UMD Korean Graduate Student Association), their countries' own social networking sites (e.g., QQ for Chinese students), and/or their Facebook groups, enabled them to connect to existing co-national students and other new co-national students. These online communities became part of their small worlds in new environments. In addition, connecting with various groups of co-national students in these online communities allowed them to form multiple small worlds in mobile social networks that are small or large in terms of their group size and that are strong/close or weak/far in terms of the tie/distance of the relationships among the group members. In most cases of “International-common” students, their online-community-based small worlds (e.g., QQ for Chinese participants, Facebook groups for Indian participants) allowed them to form or join various groups of mobile social networks (e.g., through mobile social networking/messaging applications—WeChat for Chinese students, WhatsApp for Indian students, and KakaoTalk for Korean students), where they continued to interact with other co-national UMD students, as described below:

...before entering the university like we find rent, places to live or we use QQ to find roommates. After we getting more familiar with each other, then we will add each other's WeChat... So we use, it's like a process.

(P33, Female, International-common, China)

We usually discuss (local information) online, a very famous online chat application, WeChat. And we have groups, we see a new student group,

and we'll see Chinese student group, and we just post a question there and others will answer for us. There's another group for Chinese grad students in my department. (P2, Male, International-common, China)

Many different groups on co-national mobile social networks provided instant Q&A environments, as one Korean student described:

I have a group chat with my church and for some friends in my department. So for church, there is 22 people, and then another KakaoTalk group chat that is exclusively with the first year PhD students, there's 17 of them, but the most recent message is October 20th, so I don't think anyone looks at it. And then some close students that I know, there's another group chat with four people and another one with three as well, I think. For getting information, for example, I think someone asked about what the bankers check is, a few months ago, and then instantly someone replied back.

(P34, Female, International-common, Korea)

International-common students' social information practices in host environments were very local and co-national-based. These co-national networking and information practices may appear to be simple gatherings of people from the same countries and their information sharing. But when viewed through the lens of socio-national context and the theory of information worlds, it is understood that International-common students' access to many local co-nationals for co-national information practices is a product of complex interactions that involve small, intermediate, and large worlds of influences as follows (Burnett & Jaeger, 2011).

First, “International-common” students’ social interaction is based largely on their immediate co-national community network on campus and surrounding areas, which becomes a major layer of their “small world” in new environments. But this co-national network in the local area is influenced by the university/institution (intermediate world) which may bring in people from around the world and from specific countries, which in turn affect the local composition of people from specific countries around the world over time. This institutional composition of nationalities is also not a mere product of the associated education institutions. International students and other migrants move to other countries for various reasons, such as economic situations in their home countries or better opportunities in new destination countries (Hakim Silvio, 2006; Hazen & Alberts, 2006). Thus, local and institutional composition of nationalities also can be based on “large world” of societal influences which attract international students and enable them to pursue their intended goals (e.g., academic, professional, or other life goals). As such, large world of influences, such as economy, politics, and nationality, interact with intermediate (e.g., institutions) and small (e.g., various small groups and communities) worlds of influences to shape specific “socio-national contexts” of a local area for students from specific countries of origin.

As implied in the articulation of socio-national contexts so far, another influence on socio-national contexts is location. Due to the various reasons and influences described above, international students migrate to different parts of the world. Thus, the local composition of nationalities can vary depending on the students’ new locations. For example, Korean international students in Stockholm,

Sweden may not have the same socio-national contexts that Korean international students tend to have in Washington DC in the U.S., where there are much more Koreans and Korean communities than in Stockholm. People from different countries of origin may have different socio-national contexts in a specific country and in a specific area.

Also, technology is another factor that affects the formation of socio-national contexts. In this study, the socio-national contexts and the associated co-national information practices of International-common students were augmented by their active use of online and mobile social technologies. Although prior studies showed that co-nationals are important information sources for international newcomers regardless of the involvement of online and mobile technologies (Lingel, 2011; Poyrazli & Grahame, 2007), “International-common” students in the current study effectively connected to various groups of co-nationals in the local area and acquired information from their co-nationals through online and mobile social technologies. This result does not mean that International-less-common students did not have access to online and mobile social technologies. Even though International-less-common students also used social media platforms or mobile social network services, they mostly did not have active online networking with local co-nationals or seek local information from co-nationals as frequently as International-common students did. The socio-technical context of international students in a given area, which could be shaped by the interaction of local socio-national contexts and available social technologies, influenced their LIBs during adjustment to a new country. Overall, various small, intermediate, and large worlds of influences, including locations,

institutions, host countries, nationalities, social networks, and technologies, interacted with one another to shape socio-national contexts and socio-technical contexts in a local area which, in turn, affected international newcomer students' LIBs—offline, online, and mobile.

However, careful examination of the interviews showed that some *International-less-common* students from relatively more common countries of origin (e.g., Taiwan and Iran, the fourth and fifth most common countries of origin for international students at UMD, respectively; University of Maryland OISSS, 2016) exhibited co-national information practices which were similar to those of Chinese, Indian, and Korean students (“International-common”) to some extent. P50 tried to connect with Taiwanese students through the UMD Taiwanese student association’s Facebook group. He found some general local information (e.g. information about housing) through the online community and had online interaction (one limited Q&A about registration process) (*P50, Male, International-less-common, Taiwan*). Another Taiwanese student also knew about the Facebook group, but did not seek co-national connections or information from the group (*P53, Female, International-less-common, Taiwan*). P53 only kept in touch with another female Taiwanese (peer) student that she met in Taiwan. She used a mobile social networking service, Line (<http://line.me>), which is popular in Taiwan, for communicating with family back home, but not for local co-national networking. Iranian students also had their Facebook group. They connected with co-national Iranian students and shared some event information through the Facebook group. Their online networking developed into offline co-national information practices (*P25, Male, International-less-common, Iran*) and

small group mobile social networking through Viber (www.viber.com) (*P39, Male, International-less-common, Iran*). Co-national information practices (i.e., seeking and acquiring information from co-nationals) of these “Relatively- or Intermediate-common” group of international students were not as active as the ones of “International-common” students, but were different than the ones of most “International-less-common” students, who rarely experienced such co-national information practices. This finding indicates that the degree to which international students’ co-national LIBs take place may depend on the degree of development of their socio-national contexts in new environments. This finding also implies that co-national networking and co-national social information practices of international students can take place not only among the students from the most common countries of origin, but also among students from other countries as long as their local socio-national contexts allow for their co-national networking and co-national information practices. Socio-national context could be understood as a variable on the continuum between having a large number of local co-nationals and few to no local co-nationals or on the continuum of the degree to which local co-national networks developed for individuals from specific countries of origin, rather than a dichotomous variable. Future research on the influences of varying degrees of socio-national contexts on the information behaviors of international newcomers may enhance our understanding of the complex social factors that influence human information behavior in global and migrational contexts.

4.3.4. Social and non-social information behavior and socio-national contexts

As seen in the story of P41 (*Female, International-common, China*) who got lost in the middle of a local highway, being in the “International-common” group did not mean that they did not experience any challenges in getting local information and adjusting to new environments. Without much understanding of American systems, cultures, and customs, International-common group students, as well as International-less-common students, experienced various challenges during their adjustment. However, International-common students, who had many co-nationals in the campus environment and online and mobile co-national social networks (e.g., QQ groups for UMD students), tended to acquire local information relatively easily. They were able to get rich, context-specific local information from their senior co-national students who already knew the local area and had an understanding of the needs of their co-national newcomer students. Specifically, senior co-nationals were most International-common students’ main information sources for specific types of essential local information that involve some level of decision making during their adjustment to their new environments. These types of local information include information about housing and groceries/retail stores, as seen in the experiences of P15 (from China), who easily found his current housing through his co-national friend, and P17 (from India), who learned from a senior Indian student about the most conveniently located grocery store considering his living environment. Especially for housing information, the differences in LIBs were evident between the three groups. While senior co-nationals were the main sources of housing information for most International-common group students, the Web was the main source of housing

information for most International-less-common and Domestic-out-of-state group students. International-common group students received rich, context-specific local information from their co-nationals, which was particularly helpful for their LIB for their basic, essential needs. Having local co-nationals that they could turn to for information and help provided a unique expediency for International-common students in acquiring local information during their adjustment to new, unfamiliar environments.

In contrast, most International-less-common group students did not engage in these types of co-national social information practices in the local area. Some International-less-common students often acquired local information from “Other nationals (i.e., people from other countries),” such as cohort students from other countries or their housemates, but in most cases, they used online sources, such as “Web and online maps,” as their main sources of local information. Most International-less-common group students did not use social sources which otherwise might have provided rich local information in a more convenient and effective way. There were some co-nationals in the local area for these International-less-common group students, but the number of co-nationals was generally not large enough to reach a critical mass to form online or offline co-national communities to expand their co-national relationships in the local area. These different socio-national contexts of International-common and International-less-common students influenced their different patterns of LIBs during adjustment to new environments.

Including both social and non-social information practices, “Web and online maps” were the most frequently used sources of local information by all three groups.

Also, while the use frequencies of all the other types of information sources significantly varied across the three groups, the use frequencies of “Web and online maps” did not significantly vary across the three groups ($F(2, 143) = 2.509, p = .085$). Specifically, the visual analysis of the main information source matrix (Figure 8) indicates that the patterns of using online sources (e.g., web, online maps) were similar between “International-less-common” and “Domestic out-of-state” group students. Most participants in both groups used online sources as their main information sources for most types of local information.

However, the interviews with participants suggest that the two groups did not rely on online sources in the same contexts. International-less-common students mainly used online sources because they did not have many social sources through which they might get rich local information and ask about local systems and conventions during their early adjustment period. Most of the International-less-common students did not get rich, context-specific local information from co-national or other social sources, but instead they had to utilize online sources to seek local information for themselves. On the contrary, Domestic-out-of-state students mainly used online sources because generally they did not need to learn from other co-national American or other national students about the basic American systems, cultures, and conventions. Thus, for most of the Domestic-out-of-state students, getting local information from online sources was largely sufficient to meet their local information needs. Also, Domestic-out-of-state students were relatively more adept and familiar with using U.S. online sources to find local information than were International-less-common students. For example, while Domestic-out-of-state

students tended to use web search and explored diverse housing options in the local area as shown in the case of P54, International-less-common students tended to rely on relatively limited sources of housing information as shown in the cases of P23 from Greece and P19 from South Africa who both mainly relied on the UMD housing website for their housing information. Although Domestic-out-of-state students were also not familiar with the local area of College Park in Maryland, they gathered local information through online sources equipped with a basic understanding of various systems and convention in the U.S. (e.g., about housing searches and lease, groceries/retail shopping, and transportation systems). International-less-common group students and Domestic-out-of-state group students exhibited similar patterns of LIBs, but the associated challenges and outcomes varied between the two socio-nationally different groups.

4.4. Conclusions

Whether they are from other parts of the nation or from other countries, adjusting to an unfamiliar environment can be challenging for newcomer students. Study 2 examined international and domestic newcomer students' local information needs and information source use and focused specifically on examining how socio-national contexts play a role in shaping international students' LIBs during adjustment to new environments. Although the patterns of their local information needs followed "survival first, recreation next" for all three groups of newcomer students, statistically significant differences were found among the three groups in terms of the perceived importance of basic, essential local information. This demonstrated that the needs of survival-related, essential local information were more

intense for international students than for domestic out-of-state students. To meet these intense information needs, international students used various types of information sources, but their information source use patterns, specifically for social information sources, significantly varied depending on their socio-national contexts. Controlling for other demographic factors—age, gender, and study level—, the socio-national context of participants was found to have a significant impact on their LIBs, especially for their use of social information sources. Online and mobile social technologies played important roles in facilitating International-common students’ co-national social networking and co-national information practices in the local area. By identifying and demonstrating the influence of socio-national context on shaping the LIBs of international newcomer students, Study 2 proposes that socio-national context is a crucial theoretical construct to consider when trying to understand and support international students’ information behavior during adjustment to their new environments in their host countries. This proposal of a theoretical construct, socio-national context, contributes to the development of information behavior theories and related models, specifically the ones involving social, global, and migrational contexts.

Regarding the influence of other factors—age, gender, and study levels—on participants’ LIBs, a few specific types of LIBs significantly varied depending on gender. Female students perceived geospatial and transportation-related information as more important than did male students, and they used online and mobile geospatial technologies—“Web and online maps” and “Mobile maps and LBS”—more frequently than did male students, which corresponds with their highly perceived

importance of geospatial and transportation-related information. Other types of local information needs or information source use did not significantly differ depending on participants' gender. Age was only correlated with participants' needs for café/restaurants information and was not correlated with any other types of local information needs or information source use. Participants' local information needs or information source use did not significantly differ depending on their study level. Future studies examining the roles of these demographic and other factors in shaping information behavior in different situational contexts or with other types of international newcomers, such as immigrants or refugees, could add to our knowledge on the complex contexts that potentially affect international migrants' information behavior.

Also, Study 2 discussed and analyzed a unique field-based information practice of international newcomer students—"Wandering and encountering"—through the lens of Wilson's model of information seeking behavior and other prior work. Newcomer students' LIB of "Wandering and encountering" is a dynamic local information practice that can involve squirreling behavior and multiple types of information seeking behaviors in active, passive, and ongoing forms. The in-depth analysis of "Wandering and encountering" behavior through the lens of Wilson's model of information behavior allowed for a new proposal of two additional types of information seeking behaviors—*active attention* and *ongoing attention*, contributing to the further development of information behavior models.

Drawing on these findings in Study 1 and 2, the following chapter examines how international newcomer students' LIBs change over time as they adjust to new environments and thus expects to answer research question 4.

Chapter 5: Study 3 – Follow Up Study

Despite a range of information behavior studies of international migrants, it is unclear how information behaviors of international migrants, including international students, change during their adjustment process in new environments (Caidi et al., 2010, pp. 520-521). Also, in most existing information behavior studies of international students or other migrants, temporal contexts or lengths of stay of international migrants in new countries were not necessarily used when analyzing their information behavior. A few studies considered temporal contexts as they examined information behaviors of relatively new immigrants and longer established immigrants (Khoir et al., 2014; L. Quirke, 2012). However, still little is known about the changes in information behaviors of international students during their adjustment to new environments. In the research area of migrant information behavior, more empirical research is needed to identify the longitudinal changes in their information behaviors. Through the findings in Study 3, which is a follow-up of Study 2 on international newcomer students' LIB during adjustment to a new environment, this chapter addresses longitudinal changes of international students' LIB, including whether it changes during their adjustment to new environments and, if so, how it changes and what factors shape the changes.

Although existing information behavior models provide basic frameworks to explain some aspects of the LIBs of international newcomers, these models do not necessarily include temporal factors and contexts that might influence international newcomers' LIB during the adjustment process. However, Dervin's (2005) call for attention to the possibilities of space-time in influencing situationally/temporally

patterned information behavior provides a basis for examining the potential longitudinal changes in international students' LIBs. In this aspect, the current chapter contributes to both theoretical understanding of international student information behavior over time in different temporal contexts and empirical understanding of the longitudinal changes in international student information behavior during adjustment to new environments. The following research questions summarize the research motivations and goals of Study 3:

RQ4. How do international students' LIBs change over time as they adjust to new environments?

RQ4-1. What factors and contexts shape the changes in LIBs of international students during their adjustment to new environments?

5.1. Methods

To answer the above research questions, Study 3 was designed as a longitudinal follow-up study with the same students who participated in Study 2 and used the same data collection methods, including online survey, interviews, and cognitive mapping. This follow-up study was conducted approximately one year after the Study 2 sessions on UMD's campus. Participants who had been in their first year at UMD in Study 2 (during 2014/2015 school year) were in their second year of their programs at UMD when this follow-up study was conducted during 2015/2016 school year. When contacted, most Study 2 participants showed their willingness to participate in the follow-up study (Study 3), and 50 of 57 (87.7%) Study 2 participants participated in Study 3.

5.1.1. Participants

In the Fall semester of 2015, one year after their initial participation—Study 2 (Time 1), all 57 participants from Study 2 were contacted for the follow-up study. Except for 7 students, who were no longer on UMD campus, who were too busy to participate, or who did not respond, 50 of the 57 Study 2 participants attended the follow-up study. In terms of their groups, 18 of 20 students from the International-common group, 16 of 20 students from the International-less-common group, and 16 of 17 students from the Domestic-out-of-state group participated in Study 3.

One student in the International-common group (P5, Male, International-common, China) spent his first year at UMD and was temporarily back in his home country. He was willing to participate in this follow-up study and participated in it from Shanghai, China, through Skype video meeting. But in another case, when P24 (Male, International-less-common, Brazil) was contacted, he had already moved to a different area in the U.S. (California) and lived in that area for several months due to his doctoral advisor moving to a different university. A follow-up session with P24 was not conducted. Some students were too busy to participate in the follow-up study. One student from India replied to the follow-up study invitations that she would love to participate again (P6, Female, International-common, India). However, due to her busy schedule, the initially scheduled follow-up session had to be postponed, and later she had to leave College Park for her early graduation and new job. In her interview in Study 2 (Time 1), she had mentioned about her search for campus jobs at that time in her first year at UMD. The interview data and email correspondences with her through the recruitment process for Study 3 (Time 2) seem to suggest

financial challenges in her international studies and busy life in finishing her study in three semesters and seeking jobs. Although the recruiting process was not intended as a data collection method, the recruiting-related challenges allowed the researcher to get a better sense of the challenges and dynamics that international students may experience in host environments. This incidental finding may reflect a theme of international students' information needs "survival first, recreation next" at least potentially during their time of study.

In another case, one student from Turkey replied briefly that she was very busy and could not participate in the study (P58, Female, International-less-common, Turkey). Some other students (P23, Male, International-less-common, Greece; P27, Female, International-common, India; P29, Male, Domestic-out-of-state, USA; P40, Male, International-less-common, Canada) did not reply to the invitation emails or stopped replying in the corresponding process.

In sum, there were several types of challenges in arranging follow-up sessions with the same participants of the earlier study. But 50 of 57 students from Study 2 participated in Study 3, and this allowed for a longitudinal examination of participants' LIBs during adjustment to new environments. Among the 50 students, 18 were students in the International-common group (from the top 3 countries of origin—China, India, and Korea), 16 were students in the International-less-common group (from countries other than China, India, and Korea; Greece was the only country missing in Study 3, compared to Study 2), and 16 were students in the Domestic-out-of-state group.

5.1.2. Time frame of the study

The main purpose of Study 3 was to understand how participants' LIB changes over time as they adjust to new environments. Study 3 aims to examine LIBs of international students after their initial adjustment to new environments, which is in their second year in the local environments, and compare their LIBs between their two different temporal contexts of Study 2 (first year, Time 1) and Study 3 (second year, Time 2). Study 3 sessions were conducted between October 2015 and March 2016 with most of the sessions (39/50) being held in November and December 2015. Since all of the participants entered UMD in Fall 2014, they were likely to be in their second year at UMD at the time of their participation in Study 3. Most students in Master's programs were moving towards the end of their programs and considering their future plans, while students in PhD programs were mostly focused on working hard in their coursework and in their area of research.

However, a few students were experiencing significant changes in their immediate life contexts. One doctoral student (P37, Female, Domestic-out-of-state, USA) was looking forward to her wedding and moving to her new home in Washington DC, which is near College Park, in the near future. Another student (P42, Female, International-less-common, Russia), who used to live with a roommate in an apartment in her first year, got married during the summer after her first year. Her fiancé moved from Russia to the U.S., and they moved to their new home. Another example was a student from Brazil (P9, Female, International-less-common, Brazil) whose husband moved to join her at the beginning of her second year at UMD. These three students were all in doctoral programs and had at least a few more years to

spend in College Park and surrounding areas. Overall, at the time of Study 3, the participants had lived in College Park and surrounding areas for more than one year, up to about one and a half years. In general, the participants had become more familiar with their local environments.

5.1.3. Research sessions: Survey, interview, and cognitive mapping

Study 3 sessions were conducted either at the open office space at the College of Information Studies, which is the same space that was used for Study 2, or at places more convenient to participants, such as their research offices or their department buildings, as long as the place was quiet enough for conducting interviews. There were two reasons to provide these options to participants. First, based on Study 1, which was conducted with 20 international graduate students early in their second year at UMD, it was expected that the participants would be very busy in their second year completing their programs and preparing for their next steps. Thus, first, to help save participants' time at least to some extent and increase the possibilities of their participation in the follow-up study, this convenient location option was included. Second, based on the interview data in Study 2, many participants frequently interacted with, asked questions of, and shared information with people in their department, whether co-nationals or other-nationals. Also, their department or office space is where they spend significant amount of time of their daily lives as graduate students. Thus, it was expected that conducting a follow-up session in their Department building or related environments could bring more contextual senses into the interviews. As a result, 10 participants chose their convenient places for the follow-up session. As mentioned earlier, as a special

occasion of temporarily being back in his home country, one student participated in a session from his home through Skype (P5, Male, International-common, China). For the 10 students, convenient places included their department (offices or other space; 6 participants), libraries (2 participants), and the student union building (2 participants) where there are food courts, seating areas, and many other places. Among the 10 participants, 2 were from the International-common group, 5 were from the International-less-common group, and 3 were from the Domestic-out-of-state group. In addition to these 10 students, another 40 students participated in Study 3 sessions at the open office space at the College of Information Studies at UMD.

For Study 3, each individual session with participants began with some degree of rapport building because it was almost one year after the previous interview meetings. Students were first asked about how their first year was. Generally, most students appeared more comfortable and better adjusted to their daily lives in College Park and surrounding areas, but at the same time many students expressed their feelings about their busy life of following academic coursework and research projects. Participants signed their consent forms for this specific study and agreed to audio recording of the sessions. After rapport building and the consent process, participants were informed again about this research project and were reminded of the topic of LIBs—how they need, seek, and use local information in an everyday life setting. Then participants were asked to take the online survey on a laptop prepared for the study. The survey questions were adapted from the survey used for Study 2. The key aspect of the online survey in Study 3 was to eventually compare participants' local information needs (perceived importance of each type of local

information), information seeking practices (frequencies of using each type of information source), and main information sources for each type of local information need between Study 2 and Study 3. In terms of the temporal context, the survey questions in Study 3 asked how participants currently needed, sought, and used local information, one year to one and a half years after their arrival in College Park and surrounding areas.

For the interview, participants were first asked about their LIB during their adjustment to College Park and surrounding areas in their first year through the time of their participation in Study 3. Participants were also asked how much they think they have adjusted to living in new environments, studying at school, and interacting with new people. Participants were also asked to talk about their most recent experience of seeking local information. Next, participants were asked about their LIBs involving people, technology, and wandering around. Also, participants were asked to draw their own maps of their local area on a blank sheet of paper (cognitive maps) as they did for the Study 2 session one year ago. First, they were asked to draw a cognitive map of their local area using their knowledge and perspective of the areas that they had during their early adjustment period (early adjustment period maps; during their first few weeks in the local area). After that, they were asked to draw another cognitive map of their local area using their knowledge and perspective of the areas that they had at the time of their participation in Study 3 (current maps; one to one-and-a-half years after their arrival in the local area). For each map, participants were asked to list their top five most important places within the temporal contexts of the maps. Lastly, when they finished drawing the two kinds of maps, participants

were asked to mark the orientations (cardinal directions) of their maps. Throughout the cognitive mapping process, most participants talked about their life, daily routines, or their experiences related to specific places on the maps. As with Study 2, when appropriate, more questions were asked of participants to help the researcher better understand participants' LIB and the associated contexts.

5.1.4. Analysis methods

The data generated from Study 3 were analyzed both quantitatively, qualitatively, and visually and were compared with the data from Study 2. As in Study 2, participants' local information needs and information source use were examined, and the changes in their social information practices, technology use, and wandering around behavior were further analyzed. The survey data in Study 3 helped to identify the patterns in participants' LIB in their second year in the host environment and the changes during the period of time since their initial adjustment. Qualitative analyses of the interviews and cognitive maps in Study 3 supplement longitudinal quantitative analyses of the survey data and enrich the comparison of the data between Study 2 and Study 3—that is between *Time 1* (early adjustment period) and *Time 2* (during participants' second year in their new environment).

With regards to analyzing the factors and contexts that shape longitudinal changes in international students' LIB, Study 3 also focused on participants' socio-national contexts, as with Study 2. Additionally, participants' gender and study level were also used to examine other influences on the changing patterns in the LIBs of international students during the adjustment process.

For the comparison of the data between Study 2 and 3, only the data from the 50 students who participated both Study 2 and Study 3 were used. Thus, the data for the longitudinal analysis were generally from the 50 students who were classified into the three socio-nationally different groups: International-common (18 students), International-less-common (16 students), and Domestic-out-of-state (16 students). And specifically, for the analysis of the influences of gender and study level on international students' perceived importance of local information, the data from the 34 international students who participated both Study 2 and Study 3 were used.

The survey data were analyzed using SPSS with descriptive statistics analysis and paired sample t-tests. Paired sample t-tests were used since the samples of the two studies were dependent samples, while the related variables (socio-national groups, gender, and study levels) were expected to remain the same for them between Study 2 and Study 3 (Lomax & Has-Vaughn, 2012). For the clear comparison of the perceived importance of each type of local information and the frequencies of using information sources between Time 1 and Time 2 for the 50 participants, the original 12 types of local information and the 18 types of information sources were used without reducing the number of types through factor analysis.

To analyze the main information sources for each type of local information, as with Study 1 and 2, descriptive statistics were used to visually analyze the patterns in the participants' main information sources for specific types of local information. From the descriptive statistics, a circle was created for each information type-information source pair with its size being dependent on the number (percentage) of participants who mainly used the specific information source for the specific type of

local information. The main information sources for each type of local information were visually examined for their patterns within each group, among the three groups, and between Study 2 and Study 3 for their longitudinal, relative changes.

While the survey data were used to statistically examine the longitudinal changes in participants' LIB between Study 2 and Study 3, data from other methods—interviews and cognitive mapping—were used to triangulate and supplement the quantitative findings of the studies. The 50 individual interviews were audio-recorded, with participants' permission, and transcribed. For the current analysis of the Study 3 data, the interview data were used to validate the findings from the longitudinal analysis of the survey data and identify more details and specific contexts and rationale of participants' LIBs.

With regards to the cognitive mapping data, participants' cognitive maps from Study 3—"current period (second year) maps"—were compared with their "early adjustment period maps" from Study 2, using quantitative, qualitative/visual, and geospatial approaches. The number of places included in those maps of the two different temporal contexts were compared with each other. And the maps were visually and qualitatively analyzed for their emerging characteristics and themes. In addition, again, the orientation of each cognitive map (cardinal direction) in Study 3 was identified to examine participants' perspectives and geospatial understanding of their local environments in the temporal context of Study 3. The cognitive map data were used to explain, validate, and supplement the findings from the survey and the longitudinal analysis, all of which helped enrich the answers to my research

questions, specifically RQ4 regarding the longitudinal changes in international students' LIB during their adjustment to new environments.

5.2. Findings

The survey identified participants' perceived importance of each type of local information, frequencies of using each type of information source, and their main information sources for each type of local information as of the time of Study 3. When compared with the results from Study 2, in general, participants' perceived importance of basic, essential local information decreased while their perceived importance of recreational local information increased. This pattern largely appeared for all three socio-nationally different groups, for both male and female, and for both Master's and PhD students. However, despite this general pattern, different dynamics were found among the three groups with regards to the changes in their perceived importance of local information between Study 2 and 3. The increase in the perceived importance of recreational information was more prevalent for domestic students than for international students.

Also, the information source use frequencies significantly changed between Study 2 (Time 1) and Study 3 (Time 2) for many types of information sources. While the use of most types of information sources generally decreased, the use of a few sources increased. In general, online and mobile sources remained the most frequently used sources of local information in Time 2. The longitudinal dynamics in the frequency of using each information source varied among the three groups, but did not vary much between male and female and between Master's and PhD students.

Regarding the main information sources consulted for each type of local information, there also was a specific pattern of changes—less use of social sources and more use of online/mobile sources. When analyzed within each group and compared between the three socio-nationally different groups, the types of main information sources used for each type of local information became more uniform both within each group and across the three groups in Study 3 (Time 2). The following sections describe in more detail these changes in participants’ LIBs during adjustment to new environments.

5.2.1. Changes in perceived importance of each type of local information

Between the temporal contexts of Study 2 (early adjustment period in the first year) and Study 3 (second year of living in the area), participants’ perceived importance of basic, essential local information generally decreased. In particular, the perceived importance of Housing information statistically significantly decreased for all three groups (Figure 13 and Table 6). The perceived importance of Banks/ATMs information statistically significantly decreased for both groups of international students. However, the perceived importance of health/well-being/recreational local information (e.g., health-related, leisure/exercise-related, entertainment-related, and

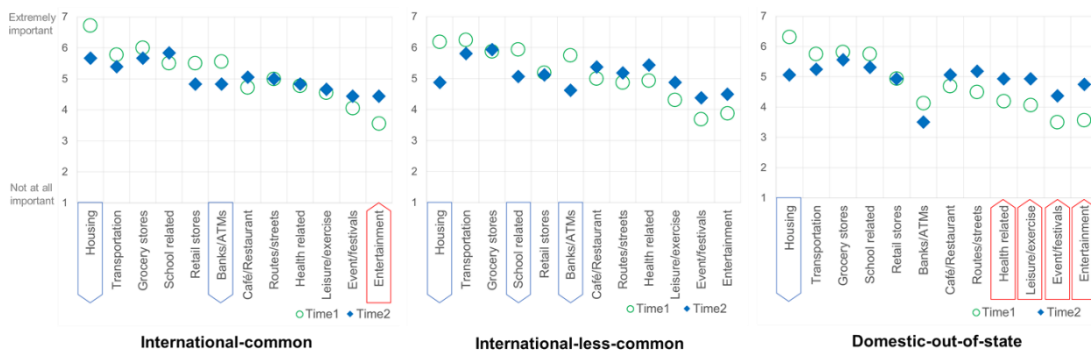


Figure 13. Changing patterns in perceived importance of local information

	Int'l-Common (n=18)				Int'l-Less-Common (n=16)				Domestic-out-of-state (n=16)			
	Time1	Time2	t	p	Time1	Time2	t	p	Time1	Time2	t	p
Housing	6.72	5.67	3.557	.002 **	6.19	4.88	3.238	.006 **	6.31	5.06	2.479	.026 *
Grocery stores	6.00	5.67	1.243	.231	5.88	5.94	-.324	.751	5.81	5.56	.513	.615
Retail stores	5.50	4.83	1.617	.124	5.19	5.13	.222	.827	4.94	4.94	0.000	1.000
Café/Restaurant	4.72	5.06	-1.031	.317	5.00	5.38	-1.031	.319	4.69	5.06	-.899	.383
Health related	4.78	4.83	-0.160	.875	4.94	5.44	-1.464	.164	4.19	4.94	-2.535	.023 *
School related	5.50	5.83	-1.190	.250	5.94	5.06	2.573	.021 *	5.75	5.31	.923	.371
Banks/ATMs	5.56	4.83	2.853	.011 *	5.75	4.63	3.576	.003 **	4.13	3.50	1.576	.136
Transportation	5.78	5.39	1.129	.274	6.25	5.81	1.447	.168	5.75	5.25	1.651	.119
Routes/streets	5.00	5.00	.000	1.000	4.88	5.19	-.735	.474	4.50	5.19	-1.789	.094
Leisure/exercise	4.56	4.67	-0.399	.695	4.31	4.88	-1.415	.178	4.06	4.94	-2.267	.039 *
Entertainment	3.56	4.44	-2.950	.009 **	3.88	4.50	-1.775	.096	3.56	4.75	-3.721	.002 **
Event/festivals	4.06	4.44	-1.129	.274	3.69	4.38	-1.696	.111	3.50	4.38	-2.573	.021 *

Note. * $p < .05$, ** $p < .01$

Increase Decrease

Table 6. Changes in perceived importance of various types of local information

event/fair/festival-related local information) generally increased for all three groups. Specifically, the increase was a more prevailing pattern for Domestic out-of-state students, and this difference was statistically significant. For Domestic out-of-state students, the perceived importance of “Health-related,” “Leisure/exercise-related,” “Entertainment-related,” and “Event/fair/festival-related” local information all statistically significantly increased during the period. But for International-common students, “Entertainment-related” local information was the only type of information for which their perceived importance significantly increased. For International-less-common students, there were no such types of local information for which perceived importance statistically significantly increased. The changing patterns for the two international student groups were largely similar to each other.

This result indicates that newcomer students’ local information needs can change in different degrees between international and domestic newcomer students. Domestic students’ perception of the importance of recreational information significantly increased in their second year in new environments, while the change

was not as significant for international students. A domestic student talked about how her needs for local area information changed over time:

One of the things that I really hope to find in my move is just places that I walk alone, because I do feel like I love this College Park area, but there's not a lot of places that I can walk to entertainment wise or socialize. I'd like to move to a place where those things are closer distance so I won't have to drive and sit in the traffic. I feel like I'll be better connected to the sense of community, and making friends and things like that. Those are holding a higher precedence to me now, whereas when I first moved here, I really wanted to just be close to campus, and I was close to a grocery store and have a nice and safe place to live. Those were the priorities, and now I'm more comfortable moving a half an hour away.

(P32, Female, Domestic-out-of-state, USA).

In her second year of life in College Park area, P32 wanted to live in a location where she can have a better access to recreation and socializing. However, unlike Domestic students, both groups of international students' perceived importance of recreational information (health/well-being/recreation-related local information) did not increase as significantly during the period of time in the new environments. The interview data also suggest that international students did not actively engage in recreational or social activities during their time in the new local environment. When asked about their favorite places during the interview/cognitive mapping process in Study 3, several international participants found it difficult to think of their favorite places.

They tried to come up with some recreational places or places they enjoy going to, but it was hard for them to name those places as shown below:

Favorite places. Okay. You ask a really hard question. Because I don't have many favorite places. Paint Branch Trail, I walk there when I'm going to the office. It's a bit relaxing. Okay, I go to movies from time to time... I generally go alone. As a matter of fact, I always go alone.

(P30, Male, International-less-common, Turkey)

Favorite places? This is more difficult. Oh, it's so difficult. Because most of these buildings, I go there because I need to go there. Favorite places... I'm thinking about places that I can do something recreational or something I can enjoy, but seems to ... I'd say just Ikea. Other than libraries. I don't have many opportunities to go to these places because I go there only my friends are riding, giving me a ride.

(P20, Male, International-common, Korea)

The interview data may imply that even in the second year in the area, international students' life and information practices for leisure and recreation were limited due to various social, study/work-related, and practical (rides) reasons, as described above.

To examine other factors associated with the changes in international newcomer students' local information needs during adjustment, the changes in their perceived importance of local information between Time 1 and Time 2 were further examined based on gender and study level. The results indicate that the patterns of changes are generally similar for both male and female and for both Master and PhD students (Table 7). The decrease in international students' perceived importance of

	Male (International; n = 17)				Female (International; n = 17)				Masters (International; n = 14)				PhD (International; n = 20)			
	Time1	Time2	t	p	Time1	Time2	t	p	Time1	Time2	t	p	Time1	Time2	t	p
Housing	6.29	4.88	4.243	.001**	6.65	5.71	2.626	.018*	6.29	4.86	3.333	.005**	6.6	5.6	3.446	.003**
Grocery stores	5.59	5.41	.643	.529	6.29	6.18	.566	.579	6.07	5.71	1.161	.266	5.85	5.85	0.000	1.000
Retail stores	5.18	4.71	1.255	.227	5.53	5.24	.814	.428	5.50	5.14	.891	.389	5.25	4.85	1.165	.258
Café/Restaurant	4.24	4.59	-.808	.431	5.47	5.82	-1.689	.111	5.29	5.36	-.201	.844	4.55	5.1	-1.718	.102
Health related	4.41	4.71	-.735	.473	5.29	5.53	-.808	.431	5.07	5.21	-.458	.655	4.7	5.05	-.979	.340
School related	5.65	5.24	1.130	.275	5.76	5.71	.187	.854	5.64	5.43	.675	.512	5.75	5.5	.721	.480
Banks/ATMs	5.24	4.47	2.626	.018*	6.06	5.00	3.816	.002**	6.00	4.57	4.163	.001**	5.4	4.85	2.604	.017*
Transportation	5.59	5.12	1.194	.250	6.41	6.06	1.461	.163	6.36	6.07	1.472	.165	5.75	5.25	1.365	.188
Routes/streets	4.65	4.71	-.145	.887	5.24	5.47	-.940	.361	5.14	5.21	-.221	.828	4.8	5	-.593	.560
Leisure/exercise	4.12	4.35	-.746	.466	4.76	5.18	-1.130	.275	4.79	5.07	-.718	.486	4.2	4.55	-1.161	.260
Entertainment	3.06	4.06	-2.828	.012*	4.35	4.88	-1.852	.083	4.29	4.86	-1.963	.071	3.3	4.2	-2.714	.014*
Event/festivals	3.47	4.29	-1.840	.084	4.29	4.53	-.889	.387	4.21	4.86	-1.422	.179	3.65	4.1	-1.406	.176

Note. * $p < .05$, ** $p < .01$

Increase Decrease

Table 7. Changes in perceived importance of local information by gender and study level

Housing and Banks/ATMs information was statistically significant between Time 1 and 2, and the decrease was significant regardless of gender and study level. The increase in the perceived importance of Entertainment-related local information was significant for male international students ($t = -2.828$, $p = .012$) and for international PhD students ($t = -2.714$, $p = .014$), while it was not for female international students and international Master students. However, although marginal ($p < .10$), the increase in the perceived importance of Entertainment-related local information was also observed for female international students (M in Time 1 = 4.35, M in Time 2 = 4.88, $t = -1.852$, $p = .083$) and for international Master students (M in Time 1 = 4.29, M in Time 2 = 4.86, $t = -1.963$, $p = .071$). These results show that the influences of gender and study level on the changes in international students' local information needs were minimal.

Overall, the changes in newcomer students' perceived importance of each type of local information showed similar patterns for all three socio-nationally different groups, for both male and female, and for both Master and PhD students. However, the increased perceived importance of health/well-being/recreational local information was a more prevalent pattern for Domestic-out-of-state students, while

the increase was largely less significant for both International-common and International-less-common students.

5.2.2. Changes in frequency of using information sources

The longitudinal analyses of the survey data indicated that participants' information source use significantly changed between Time 1 and Time 2, mostly decreasing. Especially, the decrease was a prevalent pattern for most types of information sources for International-common students (Figure 14 and Table 8).

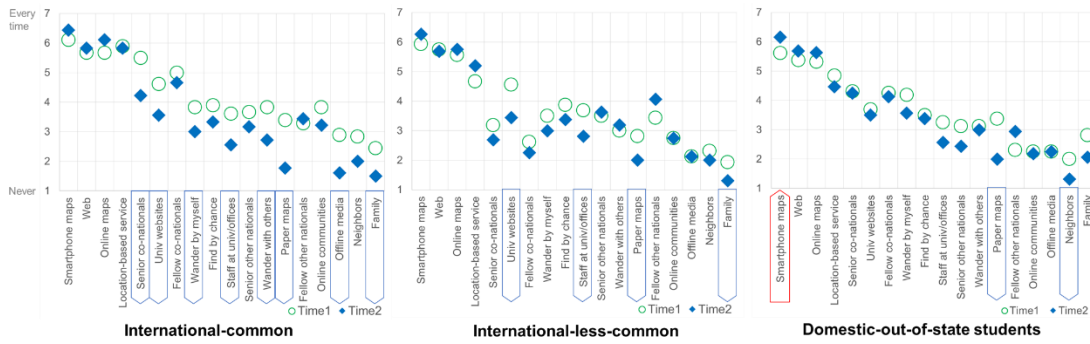


Figure 14. Changes in information source use frequencies by three groups

	Int'l-Common (n=18)				Int'l-Less-Common (n=16)				Domestic-out-of-state (n=16)			
	Time1	Time2	t	p	Time1	Time2	t	p	Time1	Time2	t	p
Fellow co-nationals	5.00	4.67	.900	.381	2.63	2.25	1.145	.270	4.25	4.13	.229	.822
Senior co-nationals	5.50	4.22	3.746	.002 **	3.19	2.69	0.782	.446	4.31	4.25	.109	.915
Fellow other nationals	3.28	3.44	-.766	.454	3.44	4.06	-1.373	.190	2.31	2.94	-1.838	.086
Senior other nationals	3.67	3.17	2.034	.058	3.50	3.63	-.275	.787	3.13	2.44	1.655	.119
Family	2.44	1.50	2.718	.015 *	1.94	1.31	2.440	.028 *	2.81	2.06	1.419	.176
Neighbors	2.83	2.00	1.516	.148	2.31	2.00	0.892	.386	2.00	1.31	2.551	.022 *
Staff at univ/offices	3.61	2.56	3.319	.004 **	3.69	2.81	2.267	.039 *	3.25	2.56	1.741	.102
Univ websites	4.61	3.56	3.217	.005 **	4.56	3.44	2.577	.021 *	3.69	3.50	.436	.669
Online communities	3.83	3.22	1.479	.158	2.75	2.75	0.000	1.000	2.25	2.19	.159	.876
Web	5.67	5.83	-.496	.626	5.75	5.69	.222	.827	5.38	5.69	-.863	.401
Online maps	5.67	6.11	-1.641	.119	5.56	5.75	-0.716	.485	5.31	5.63	-.837	.416
Smartphone maps	6.11	6.44	-1.304	.210	5.93	6.27	-1.234	.238	5.62	6.15	-2.501	.028 *
Location-based service	5.89	5.83	.175	.863	4.67	5.20	-.926	.370	4.85	4.46	.700	.497
Paper maps	3.39	1.78	6.592	.000 **	2.81	2.00	2.282	.038 *	3.38	2.00	3.020	.009 **
Offline media	2.89	1.61	3.976	.001 **	2.13	2.13	0.000	1.000	2.25	2.25	0.000	1.000
Wander by myself	3.83	3.00	2.349	.031 *	3.50	3.00	1.291	.216	4.19	3.56	1.619	.126
Wander with others	3.83	2.72	2.873	.011 *	3.00	3.19	-0.510	.617	3.13	3.00	.259	.799
Find by chance	3.89	3.33	1.567	.135	3.88	3.38	2.070	.056	3.50	3.38	.286	.779

Note. * $p < .05$, ** $p < .01$

Increase Decrease

Table 8. Changes in information source use frequencies by three groups

For International-common students, the use of Smartphone/mobile maps, Web, and Online maps slightly increased while most other types of information source use decreased statistically significantly (e.g., Senior co-nationals, University websites, Wandering around by oneself, Wandering around with others, Staff/personnel in university/offices, Paper maps, Offline media/bulletin boards, and Family). Specifically, one of the significant decreases was for Senior co-nationals ($t = 3.746, p = .002$), who were one of the most frequently used information sources in Time 1 during their early adjustment to new environments. International-common students' use of Fellow co-nationals as local information sources did not decrease significantly, and it remained relatively high ($M = 4.67, SD = 1.237$), replacing Senior co-nationals ($M = 4.22, SD = 1.114$) as the most frequently used social/human source of local information, on average. Due to the general increase in the use of online/mobile sources and the significant decrease in most other types of social and offline sources, the gap between the use frequencies of online/mobile information sources and other sources became larger for International-common group students in Time 2.

For International-less-common group students, the use of several information sources significantly decreased (e.g., Family, Staff/personnel at university/offices, University websites, and Paper maps) while online and mobile sources remained their most frequently used information sources without significant changes between Time 1 and Time 2. Thus, the focused use of online and mobile information sources by International-less-common group students in Time 1 was found to be even more focused in Time 2 in their second year in the environment. In terms of social/human

information sources, there were not many types of sources for which use significantly changed for International-less-common students, but the use of Staff/personnel in university/offices, which was the most frequently used social/human sources of local information for International-less-common group students in Time 1 ($M = 3.69$), significantly decreased in Time 2. Instead, the use of Fellow other nationals slightly increased on average, thus replacing Staff/personnel in university/offices as the most frequently used social information source of local information for them. The use of co-nationals as information sources (Senior co-nationals and Fellow co-nationals), which was already less frequent than their use of other nationals (Senior and Fellow other nationals) in Time 1, generally further decreased for International-less-common group students on average.

Similar to international students' patterns, for Domestic out-of-state students, online/mobile sources remained as the most frequently used sources of local information in Time 2, with a significant increase in the use of Smartphone maps. As with international student groups, domestic students' use of information sources, except online/mobile sources, generally decreased in Time 2, thus increasing the gap between the frequencies of using online/mobile sources and other social/offline sources for their local information practices. Both Senior co-nationals ($M = 4.25$, $SD = 1.342$) and Fellow co-nationals ($M = 4.13$, $SD = 1.500$) (Americans) remained as the most frequently used social/human information sources for Domestic students in Time 2 without significant changes between Time 1 and Time 2. Their use of Fellow other nationals for local information slightly increased on average in Time 2 ($M = 2.94$, $SD = 1.692$), compared to Time 1 ($M = 2.31$, $SD = 1.702$), although it was still

significantly less frequent than their use of co-nationals (Americans) for acquiring local information ($t = 2.449, p = .027$).

The changes in international students' information source use were also examined by gender and study level (Table 9). Overall, male international students' information source use changed for more types of information sources than female international students. Specifically, male international students' use of Fellow co-nationals and Senior co-nationals for acquiring local information statistically significantly decreased between Time 1 and Time 2, while there were no statistically significant changes for female international students. In Time 1, Male international students' use of Fellow other nationals as local information sources was statistically significantly less frequent than their use of Fellow co-nationals ($t = 2.417, p = .028$) and Senior co-nationals ($t = 3.805, p = .002$). But dependent sample t -tests show that, in Time 2, male international students' use of Fellow other nationals statistically significantly increased ($t = -2.167, p = .046$) and was no longer significantly different from their use of Senior or Fellow co-nationals. These significant changes in social information practices were not found for female international students.

	Male (International; n = 17)				Female (International; n = 17)				Masters (International; n = 14)				PhD (International; n = 20)			
	Time1	Time2	<i>t</i>	<i>p</i>	Time1	Time2	<i>t</i>	<i>p</i>	Time1	Time2	<i>t</i>	<i>p</i>	Time1	Time2	<i>t</i>	<i>p</i>
Fellow co-nationals	4.29	3.53	2.889	.011 *	3.47	3.53	-.148	.884	4.29	3.79	1.528	.151	3.60	3.35	.705	.489
Senior co-nationals	4.88	3.59	2.814	.012 *	3.94	3.41	1.000	.332	4.36	3.21	1.560	.143	4.45	3.70	2.319	.032 *
Fellow other nationals	3.06	3.59	-2.167	.046 *	3.65	3.88	-.554	.587	3.57	3.57	0.000	1.000	3.20	3.85	-1.818	.085
Senior other nationals	3.24	3.06	.588	.565	3.94	3.71	.566	.579	3.29	3.00	.618	.547	3.80	3.65	.513	.614
Family	2.12	1.12	2.915	.010 *	2.29	1.71	2.163	.046 *	2.43	1.86	2.280	.040 *	2.05	1.10	2.894	.009 **
Neighbors	2.06	2.00	.142	.889	3.12	2.00	2.239	.040 *	2.71	1.71	2.133	.053	2.50	2.20	.653	.522
Staff at univ/offices	2.94	2.06	3.453	.003 **	4.35	3.29	2.496	.024 *	3.50	2.79	2.110	.055	3.75	2.60	3.359	.003 **
Univ websites	4.47	3.24	3.347	.004 **	4.71	3.76	2.426	.027 *	4.57	3.86	1.735	.106	4.60	3.25	3.943	.001 **
Online communities	3.00	2.47	1.538	.144	3.65	3.53	.247	.808	3.14	3.64	-.959	.355	3.45	2.55	3.214	.005 **
Web	5.41	5.47	-.180	.859	6.00	6.06	-.194	.848	5.93	5.93	0.000	1.000	5.55	5.65	-.335	.741
Online maps	5.24	5.53	-.925	.369	6.00	6.35	-1.689	.111	5.29	5.93	-1.979	.069	5.85	5.95	-.462	.649
Smartphone maps	6.06	6.25	-.716	.485	6.00	6.47	-1.817	.088	6.00	6.46	-1.389	.190	6.05	6.30	-1.157	.262
Location-based service	5.06	5.31	-.605	.554	5.59	5.76	-.368	.718	5.46	5.69	-.524	.610	5.25	5.45	-.456	.654
Paper maps	3.00	1.82	3.636	.002 **	3.24	1.94	4.224	.001 **	3.07	1.86	3.191	.007 **	3.15	1.90	4.626	.000 **
Offline media	2.35	1.71	2.281	.037 *	2.71	2.00	1.622	.124	2.36	1.93	1.000	.336	2.65	1.80	2.669	.015 *
Wander by myself	3.65	2.88	1.922	.073	3.71	3.12	1.712	.106	3.93	2.93	2.385	.033 *	3.50	3.05	1.371	.186
Wander with others	3.24	2.76	1.194	.250	3.65	3.12	1.232	.236	3.57	2.86	2.110	.055	3.35	3.00	.812	.427
Find by chance	3.47	2.88	1.614	.126	4.29	3.82	1.926	.072	4.00	3.43	1.749	.104	3.80	3.30	1.697	.106

Note. * $p < .05$, ** $p < .01$

Increase Decrease

Table 3. Changes in Information Source Use Frequencies by Gender and Study Level

In terms of study level, as with the overall pattern of changes in international students' information source use, online and mobile sources were slightly more frequently used in Time 2 and remained the most frequently used sources of local information for both international Masters and PhD students. The frequencies of using other types of information sources generally decreased for both international Masters and PhD students. International PhD students' information source use significantly decreased for more types of information sources than international Master's students, but the overall patterns and direction of decrease were similar between international Master's and PhD students.

5.2.3. Changes in main information sources for each type of local Information

Through the surveys, participants' main information sources for each type of local information in the temporal context of Time 2 were identified and compared with the main information source data in Time 1 (Figure 15). Visual analyses of the changing patterns of main information sources within each group and across the three groups show several general characteristics in the changes of participants' main information sources for each type of local information between Time 1 and Time 2. First, participants in all three groups demonstrated a relatively uniform pattern of information source use practices for their LIBs. Many circles shown in the Time 2 part of the Figure 15 increased in size. This change indicates that more participants perceived the same types of sources as their main sources for the corresponding local information. For example, in Time 1, main sources of information about School-related places generally varied ranging from Co-nationals, Other nationals, and Staff in university/offices to University websites, Location-based services, and Wandering

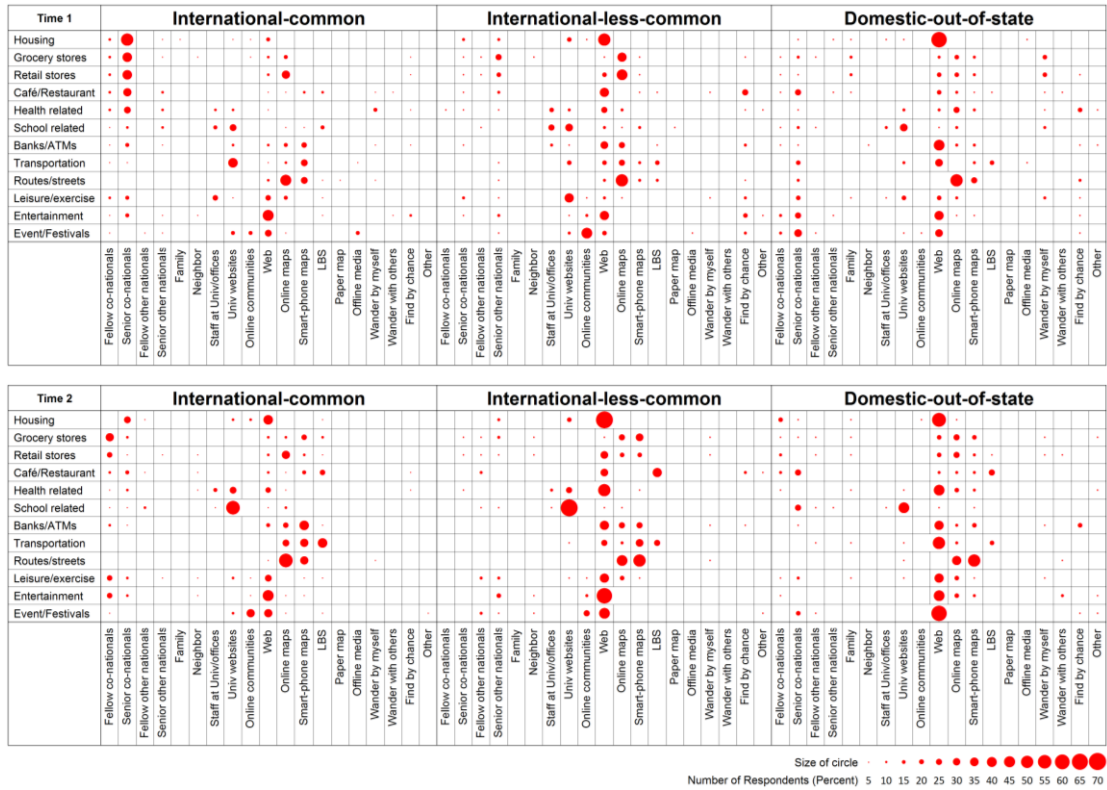


Figure 15. Main Information Sources for Each Type of Local Information for Time 1 vs. Time 2 by Three Groups

around. But in Time 2, most participants answered that their main source of School-related local information was University websites. This result of a more uniform pattern of information source use for a specific type of local information in Time 2 may imply that participants had developed more knowledge about where and how to best find specific local information as they became more adjusted to the new systems and environments in the local area.

Second, online and mobile sources—Web, Online maps, University websites, and Smartphone maps—were at the center of those focused, uniform patterns of information source use in Time 2. More participants identified these online and mobile sources as their main sources for several types of local information (e.g., Housing information, Health-related local information, Entertainment-related, and

Event/fair/festival-related local information) in Time 2, and fewer participants perceived social/human sources (e.g., co-national or other-national friends), Offline media, Wandering, and Information encountering as their main sources for those types of local information in their second year of life in the local area.

Third, while both online and mobile sources were at the center of the focused pattern of information source use in Time 2, it was specifically notable that participants increasingly perceived mobile sources as their main information sources, compared to Time 1. In Time 2, more participants identified Smartphone/mobile Maps (e.g., Google Maps app) and Location-based services apps (mobile applications for place information or local transportation information such as Yelp, Metro bus app, and Campus navigation app) as their main sources of Café/restaurants information, Routes/streets information, and Transportation information.

When it comes to the analysis of changes across the three participant groups, the three socio-nationally different groups exhibited different patterns of changes in their main information source use during their adjustment process. First, International-common group students used co-nationals, especially Senior co-nationals, as their main information sources for basic, essential local information in Time 1. As described in Chapter 4 (4.2.3. Main information sources for each type of local information), in Time 1, International-common group students received rich, context-specific local information from their senior co-national students, especially local information that involves their basic, essential needs and/or decision making, such as information about Housing, Groceries/retail stores, Café/Restaurants, and Health-related places. However, in Time 2, online and mobile sources, such as Web,

Online maps, Location-based services, and University websites, replaced Senior co-nationals as their main sources of those types of local information for many International-common students. In addition, while fewer participants perceived Senior co-nationals as their main information sources in Time 2, the number of participants who perceived Fellow co-nationals as their main information source increased in Time 2. These results might illustrate the changing pattern of social (co-national) information practices for International-common group students during their adjustment process in new environments.

As for International-less-common group students, their main information sources had already been focused on online information sources since Time 1. With relatively limited social information sources, International-less-common group students continued to use online sources as their main information sources for most types of local information. But in Time 2, more International-less-common students considered mobile sources as their main information sources for several types of local information such as information about Grocery stores, Café/restaurants, Transportation, and Routes/streets. A few International-less-common students found several types of local information (e.g., Café/restaurants, Entertainment-related local information, and many other types of local information) mainly by Information encountering (Finding by chance) in Time 1, but few students perceived Information encountering as their main source for these types of local information in Time 2. For all types of local information, online and mobile sources were the main information sources for most of the International-less-common group students.

Online and mobile sources were the main information sources for most types of local information for most of the Domestic-out-of-state students, as well. A few students in the Domestic-out-of-state group considered Senior co-nationals (Americans) and Wandering around as their main information sources for several types of local information in Time 1. Although not many, a few Domestic-out-of-state students considered Senior co-nationals as their main sources of Leisure/exercise-related, Entertainment-related, and Event/festivals-related local information. Also, a few of them considered Wandering around as their main sources of Grocery store and Retail store information. However, in Time 2, fewer students in the Domestic-out-of-state group considered Senior co-nationals or Wandering around as their main sources for those types of local information. Instead, more Domestic-out-of-state students perceived online and mobile sources as their main sources for most types of local information in Time 2.

Overall, participants' main information sources for specific types of local information tended to change during the newcomer students' year of adjustment to new environments. International-common group students' reliance on Senior co-nationals as their sources of local information, observed in Time 1, was not as strong in Time 2. The tendency to use online sources as the main sources of most types of local information by International-less-common group and Domestic-out-of-state group students became even stronger in Time 2. During the period, for all three groups, there were notable increases in the numbers of students who used mobile sources and technologies (Smartphone maps and Location-based services apps) as

their main sources of Café/restaurants-related, Transportation, and Routes/streets information.

5.2.4. Changes in participants' cognitive maps

During the follow-up interview sessions in Study 3, participants drew their own map of their local area by using their local knowledge and perspective that they had at the time of the follow-up interview in their second year of life in the local area. The cognitive maps of the 50 participants in Study 3 (Time 2) were then examined and compared with their early adjustment period maps in Study 2 (Time 1) that they drew based on their local knowledge and perspective that they had during their early adjustment to the local area. The cognitive maps in both times were analyzed visually, quantitatively, qualitatively, and geospatially as following.

First, as with the Time 1 cognitive maps, Time 2 cognitive maps depicted significant localities in participants' everyday lives. But in the second year of life in College Park and surrounding areas, as they became more adjusted to their new environments, their maps included generally more places and elements. When visually and quantitatively compared, 29 of the 50 cognitive maps in Time 2 included more places on them than Time 1 maps (see example in Figure 16). Also, the scales of 17 participants' cognitive maps became smaller (i.e., their maps showed larger areas on the same size of paper), while the scales of the other 33 participants' cognitive maps did not notably change. Most of these 17 participants' cognitive maps in Time 1 covered College Park campus and the immediate surroundings. But in their maps in Time 2, the scale became smaller, and their cognitive maps included other cities, roads/highways, and places outside College Park areas as well, covering larger

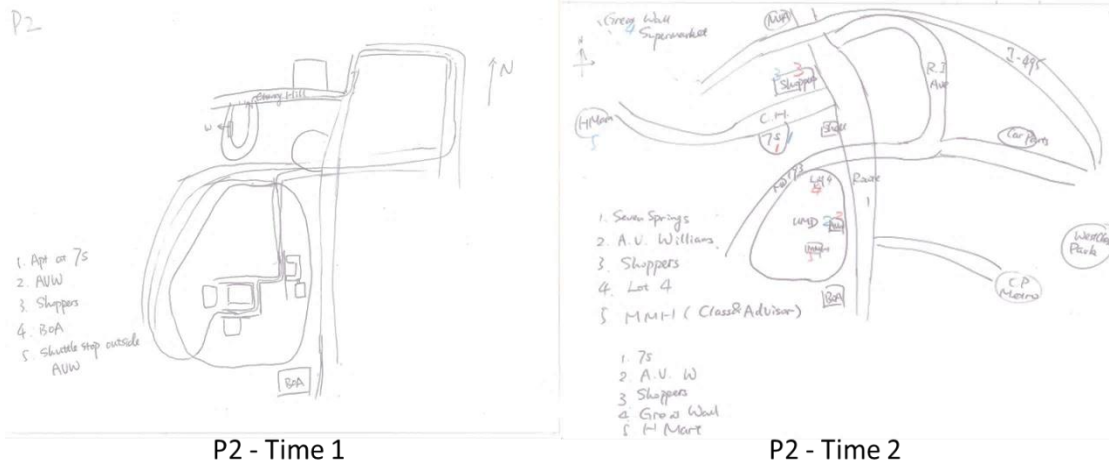


Figure 16. P2's Cognitive Maps at Time 1 and Time 2

areas (Figure 16 is also an example of a map at a smaller scale in Time 2). One interesting pattern was that among the 17 participants, whose cognitive maps' scale was reduced between the two times (i.e., they included a smaller area in their Time 1 maps and a larger area in their Time 2 maps), a majority (15) were international students (10 of 18 International-common students, 5 of 16 International-less-common students), and only 2 were domestic-out-of-state students (2 of 16 domestic out-of-state students). Although there could be various kinds of factors that affect newcomers' perceptions of their geospatial environments, these different patterns of scale changes suggest that international and domestic newcomer students can have different experiences during their adjustment to new environments. This result may also imply that, as newcomers to a different country of unfamiliar geospatial contexts, international students were less likely to have a clear understanding of the broader local areas during their initial adjustment period. It is likely that their geospatial scope and understanding expanded over time as they interacted with various parts of the local environments during the time between the two studies.

Also, through visual and qualitative analyses, the theme of “going to school” that emerged from participants’ cognitive maps in Study 1 was revisited for the cognitive maps drawn in Study 2 (Time 1) and Study 3 (Time 2). Of the 50 students who participated in both Study 2 and Study 3, 12 students drew cognitive maps that involved the theme of “going to school” for either Time 1 or Time 2 (P2, P9, P10, P13, P21, P26, P28, P31, P39, P48, P51, P52). The criteria for the “going to school” theme was the inclusion of specific paths from their home to campus or specifically to their own departments, depicting their commuting routes or paths on their cognitive maps as shown in the maps of P10 (Figure 17). Often, these routes/paths were accompanied by arrows with specific directions or drawings of shuttle buses or bus stops. Of the 12 participants who drew “going-to-school” maps, 9 participants drew maps involving the “going to school” theme for both Time 1 and Time 2. The other 3 participants drew “going to school” themed maps either for Time 1 or Time 2. P48 drew a “going to school” themed map only in Time 2, while her Time 1 map did not have that theme and was limited in scope, focusing only on her immediate home

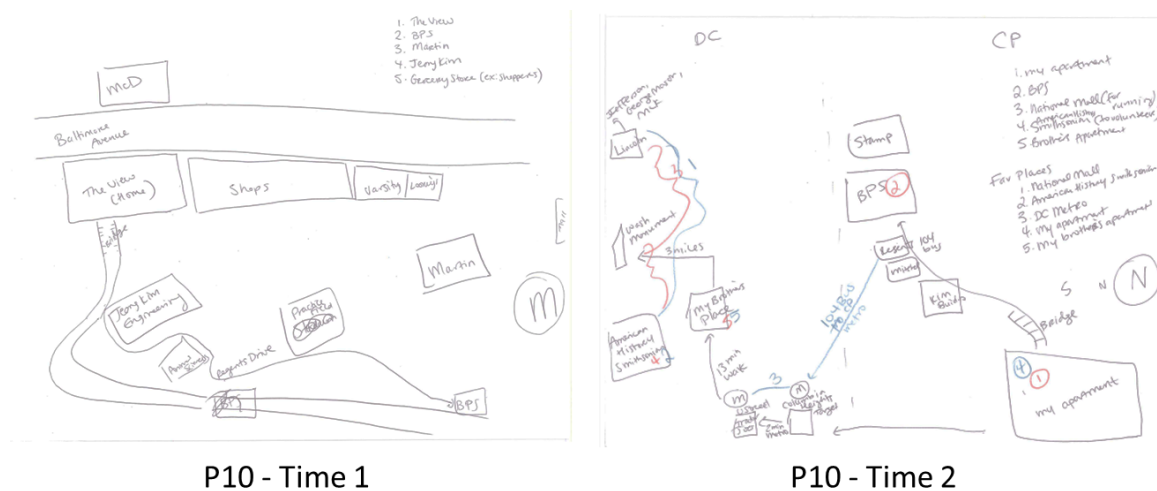


Figure 17. P10's Cognitive Maps at Time 1 and Time 2

neighborhood. Two participants (P39, P51) drew “going to school” themed maps only in Time 1. These two participants’ Time 1 maps were drawn in an unconventional orientation (both in the east-up orientation while north-up is a conventional orientation of cardinal direction of maps). But interestingly, these two participants’ Time 1 maps included their home at the bottom of their maps, and the maps were oriented in the east-up direction. While their homes were located at the bottom, their commuting routes were facing upper side of the maps, which was east. For example (see Figure 18), P39’s home is at the bottom of his Time 1 map and the campus is located in the upper side of the map, and his map is oriented as east-up along his commuting route from home to campus. For P51, although her shuttle commuting route is quite complex, when she gets out of her apartment complex, the first road she takes in her commuting route is Cherry Hill Road that is facing east, and her map is oriented in the east-up direction. It was visually and geospatially identified that these maps were not oriented by a conventional cardinal direction, but potentially by the map drawers’ personally contextualized direction, which involves a significant daily life pattern of these students—“going to school.” But in Time 2, the orientation of the

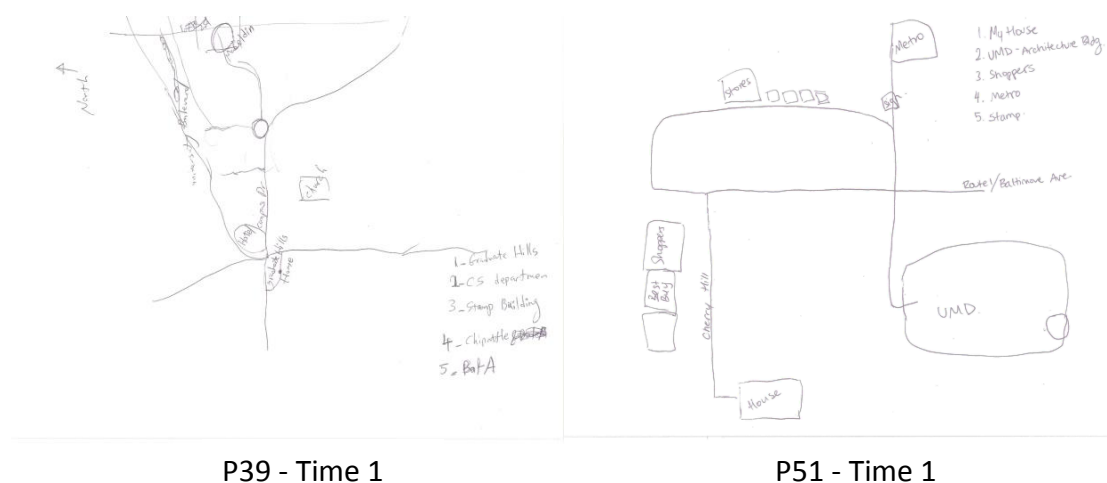


Figure 18. Cognitive maps of P39 and P51 in Time 1

cognitive maps of the two participants (P39 and P51) changed to be north-up, which is a conventional cardinal direction of maps. These results may indicate that, before newcomer students' geospatial understanding is established to certain extent, their significant *way of life* or *habit* of "going to school" (Savolainen, 1995), instead of absolute cardinal directions, could play a role in shaping their cognitive perceptions of their local geospatial environments during their adjustment to a new area.

Related to the above mentioned unique orientation of the maps (having home at the bottom and being oriented along the commuting routes to school), there were more students whose cognitive maps included their homes at the bottom and their commuting routes facing the upper side of their maps. However, their cognitive maps were drawn in a general, north-up cardinal direction, and thus, it was hard to judge whether the maps were drawn under the theme of "going to school" or merely following a conventional cardinal direction.

Between Time 1 and Time 2, several students' cognitive maps changed in terms of the orientation (e.g., east-up to north-up, west-up to east-up). While the cognitive maps of 39 students (of the 50 participants) remained in the same orientation between Time 1 and Time 2 (e.g., mostly north-up to north-up, some west-up to west-up or east-up to east-up), the orientation of cognitive maps of 10 students changed. The remaining one participant's (P34) cognitive maps were excluded for this longitudinal comparison due to the unidentifiable orientation of her Time 1 cognitive map). Among the 10 participants' cognitive maps whose orientations changed between Time 1 and Time 2, four participants' cognitive maps changed from east-up or west-up orientations to north-up standard orientation in Time

2. Except these four participants' maps whose orientations changed to the standard north-up orientation, the cognitive maps of the remaining 6 of the 10 participants changed in various directions of orientations, but with the same characteristic—having home at the bottom and school at the upper side of the maps or having home at the bottom and commuting routes to school drawn toward the upper side of the maps. This unique change of map orientation between Time 1 and Time 2 might also imply that newcomers' geospatial understandings of the new environments can be shaped by their daily routine that is established during their adjustment to new environments.

Along with the participants' way of life and daily commuting routine, participants' use of geospatial information technologies might play a role in the development of their cognitive understanding of their environments. P25 mentioned that he did not usually think about cardinal directions in the local area, but inferred the correct cardinal directions (North, South, East, and West) based on his visual memory of the smartphone map screen of the local area:

I really wasn't sure because every time I look at the Google map on my phone it shows me something like this, but I think it's not set to north... Since you asked, I was surprised with myself that I couldn't tell the north right away. Maybe because the page I have on Google Map, like I said, it's always like this. I have this tendency to think this is north because on the standard map this is how they put it in on the map and because my home is in the other direction so my view into the campus is something else. Maybe that was the reason I got confused (P25, Male, International-less-common, Iran).

Also, he explained that his confusion on the cardinal directions might have been due to his home location (which is in the west side of the campus). His account also provides some contexts and supports for the commuting route-based or “going to school” routine-based understanding of the geospatial orientation of the local area, which was discussed in previous paragraphs.

In addition, the analysis of the cognitive maps and the interview data showed that a significant proportion of newcomer students did not perceive or know the cardinal directions of their local area during their early adjustment period. During the Time 1 interviews, 16 of the 50 participants (32%) answered that they could not tell the orientation of their cognitive maps or provided wrong cardinal directions on the maps. Most of them (15 of 16) were unsure of the orientation and cardinal directions on their own cognitive maps, and one student was sure of the cardinal direction, but provided incorrect cardinal direction on the map. The proportion of participants who did not know correct cardinal directions of the cognitive maps decreased in Time 2. In Time 2, four participants could not tell cardinal directions on their cognitive maps, and two students provided incorrect cardinal directions on their cognitive maps. All these six participants were among the 16 participants who did not know correct cardinal directions on their maps in Time 1. So, of the 16 participants who did not know correct cardinal directions on their cognitive maps in Time 1, six still could not tell the cardinal directions on their cognitive maps in Time 2, and 10 picked up the cardinal directions sometime between their early adjustment period and the time of the follow-up study (Time 2) in their second year of life in the local area. These findings demonstrate that it can be hard for some significant portion of newcomers or

visitors to follow directions or find ways to a place based only on cardinal directions (e.g., If the location of an entrance of a building is explained as following, it may be difficult to find: “The entrance is on the East side of the building.”).

Lastly, during the cognitive mapping in the follow-up study (Study 3), participants were asked to list their top 5 most important places. These top 5 most important place data on their Time 2 maps (“current period maps”) were analyzed and compared with top 5 most important place data on each participant’s corresponding “early adjustment period maps” in Time 1. As shown below in Figure 19 (See also Appendix 4), while most basic, essential types of local places (House/apartment, School-related places, Grocery/Retail stores, and Transportation-related places) were still considered as participants’ most important places, filling the majority of the slots in their top 5 most important place lists, the proportion of Café/restaurants and Recreation-related places increased in Time 2. For both Recreation-related places and Café/restaurants, a greater number of participants included them to their top 5 most important places lists and ranked them higher in Time 2. A slightly higher proportion of participants answered that their top 1 most important place is their

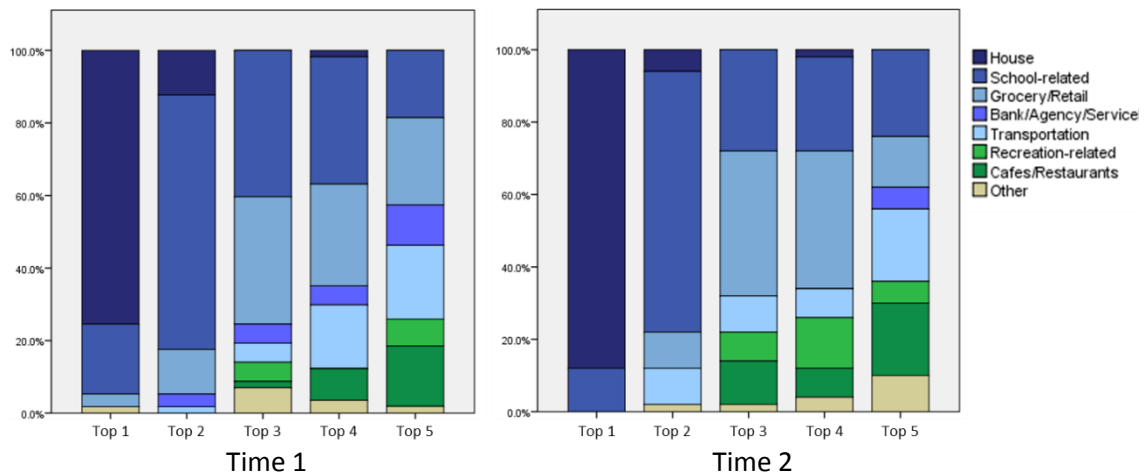


Figure 19. Top 5 Important Places on Cognitive Maps in Time 1 and Time 2

House/apartment in Time 2, and House/apartment remained as the most importance place for most participants.

However, the survey data revealed that participants' perceived importance of Housing-related information significantly decreased in Time 2. The interview data indicated that, in their second year of life in the local area, quite a few participants had already moved to new places which were generally more satisfying than were their first places. Or they were satisfied with their first house/apartment, and so they did not feel the need to move to other places. Some participants in Masters programs were planning to find jobs or to go back to their home countries, in which case they would be leaving the local area and, as a result, were not very interested in Housing information. Thus, these contexts might have affected the significant decrease in the perceived importance of Housing information in Study 3 (Time 2). Several participants moved to other places during the period between Time 1 and Time 2 studies, and in most cases, they enjoyed their new home (houses/apartment) more as shown below:

Previously, I was renting a room from a family near campus. Now, I live in a house with a friend from my department. Well, it was unexpected. Things weren't really working out where I was living before. So it was kind of a mid-year move. But I do like where I live a lot better... I don't want to move again. So not looking for a new place...My roommate used to be a contractor so we do projects around the house. (P11, Female, Domestic-out-of-state, USA)

For P11, it appeared that she enjoyed her new home more and did not have much need for housing information anymore for the time being. Another participant moved

to a new place as she wanted to move to a bigger place after one year of living in a small apartment with other housemates. She sounded excited when talking about her new house:

*She (friend) was seeking a house at the end of semester. I was also thinking of living in a big house. Previously, where I live is a very small apartment. I think very close to school, just 5 minutes walk. Now I'm living a little bit further, near Shopper's, but it's still convenient, and the house is a very big house... In apartments, you stay only in your room or just going out to kitchen. The house, you have backyard and barbecue place.
(P53, Female, International-less-common, Taiwan)*

Overall, as they adjusted to new environments, some newcomer students decided to move to new places that were better for them for various reasons. Often they gave up the practical convenience of living close to campus and instead chose more recreational quality of life in their new places which were located some distance away from campus. More participants considered their home as their most important place, but at the same time, participants exhibited increased needs for recreational activities as reflected by the increased appearance of café/restaurants and recreation-related places (e.g., lakes, trails, gym, movie theaters, concert halls, and sports stadiums) on participants' top 5 most important places lists in Time 2.

5.3. Discussion

This section will discuss the changes in international newcomer students' LIBs during their adjustment to unfamiliar environments, considering the series of studies together to better understand these findings and get at better answers to the

research questions addressed by this research. First, international newcomer students' local information needs will be discussed through the lens of a prevalent pattern of newcomer students' information needs—"survival first, recreation next," and through Wilson' information needs and seeking model (Wilson, 1981). Second, longitudinal changes in social information practices of international newcomer students will be discussed in terms of participants' different socio-national contexts. Third, the discussion of socio-national context will be continued to address its theoretical and practical implications.

5.3.1. Survival first, recreation next: Is it true?

Through a series of studies on international newcomer students' LIBs, this research identified a unique theme of newcomer students' local information needs—survival first, recreation next. As identified through the findings of the three studies, this theme was observed across the participants' LIBs during their adjustment process for one to one and a half years' time. Through the process, this theme was realized in somewhat different forms and different degrees for international newcomer students of different socio-national contexts. For International-common group students and International-less-common group students, their local information needs followed "survival first, recreation next" in Time 1 during their early adjustment to the environments. But for both groups of international students, greater emphasis was placed on "survival first" than "recreation next." Survey data showed that international newcomer students perceived most types of basic, essential local information as statistically significantly more important than did domestic newcomer students. However, international students' perceived importance of recreational local

information was not significantly different than that of domestic newcomer students. When international newcomer students' perceived importance of each type of local information was measured again in their second year in the area (Time 2), perceived importance of most types of basic, essential local information did not significantly change. Only Housing information and Bank information were perceived as significantly less important by both International-common and International-less-common groups. In terms of the perceived importance of recreational local information, broadly including Leisure/exercise-related, Entertainment-related, Event/festival-related, Health-related, and Café/restaurant-related local information, only the perceived importance of Entertainment-related local information significantly increased, and this was the case only for International-common group students. International-less-common group students did not have any types of recreational local information for which the perceived importance significantly increased for them during their one year of adjustment to new environments. These results imply that the theme of "survival first" was a strong theme of new international students' local information needs, but the theme of "recreation next" was not as strong a theme as "survival first" for international students during their one to one and a half years of adjustment to new host environments. For many international students in their second year of life in a new country, recreation might be still something to come "next."

In contrast, Domestic-out-of-state students exhibited a less intense version of the theme of "survival first" in Time 1 during their initial adjustment to a new area, compared to international newcomer students. Domestic newcomer students'

perceived importance of most types of basic local information (Transportation-related, Grocery/retail store-related, and New student essentials—school-related places, banks, wireless service provider, etc.) were significantly lower than that of international students. In general, domestic newcomer students perceived these basic types of local information as more important than recreation-related local information in Time 1. But compared to international students' intense needs for these types of basic, essential local information, domestic out-of-state students' needs for these types of local information could be better characterized by "basics first" or "first things first" rather than "survival first."

Being new to an area, especially being new to a country, creates a unique context of local information needs for those newcomers, which often impose various challenges on them. This is even more the case when not just visiting the area for a short term, but living in that area—finding mid to long term housing, buying various supplies, furniture, and daily essentials, and figuring out one's local geospatial environments for navigating around. The findings of this research suggest that there are a range of factors that influence the formation of their local information needs. First, in an unfamiliar geospatial environment, newcomer students' formation of local information needs are affected by their "Physical environment" as Wilson explained in his *Information need and seeking model* (Wilson, 1981). For example, "student A" beginning her international education in a small college town in a mountain area and "student B" arriving in New York City for her international education would have somewhat different local information needs. Different physical environments may affect what kinds of local information they need more, how intense their local

information needs would be, and how long they would have certain local information needs. Thus, it is likely that the local information needs of the participants in this series of studies have been shaped by the physical environment of UMD's campus, College Park, and the surrounding areas including Washington DC. On a micro level, the immediate physical environment can affect the formation of one's local information needs, as exemplified by the story of P53 (*Female, International-less-common, Taiwan*) who needed housing information again at the end of her first year in College Park. She realized that she did not like her small apartment environment, and then she sought housing information again with her friend at the end of her first year and moved to a large house.

In addition to "Physical environment," Wilson (1981) also included three other types of environments that influence human information needs in his model—"Work environment," "Socio-cultural environment," and "Politico-economic environment." These four types of environments are helpful to explain the complex environmental contexts that may shape the unique local information needs of international newcomer students. In the current study, "Work environment" can be the study and research environments of the graduate school at UMD, which are likely similar across the participants in general. In preparation for their study and life adjustment, both international and domestic newcomer students considered recreation-related local information as less important than basic, essential local information, such as information about Housing, School-related places, Transportation, and Grocery/retail stores, especially at the beginning of their life in College Park and surrounding area in their first year.

Also, “Socio-cultural environment” played a role in shaping international newcomer students’ local information needs. In an environment where there are many co-nationals, International-common group students had a unique socio-cultural environment in the host country. Due to active co-national (Chinese, Indian, and Korean, among others) ethnic communities in the Washington DC metro area, most International-common group students knew that there would be their ethnic grocery stores and their ethnic restaurants in the surrounding areas, and they sought those kinds of ethnic local information in the local area. Many participants in International-common group exhibited common LIBs related to their ethnic “supermarkets (grocery stores)” and restaurants and included these ethnic places among their lists of the top five most important places on their cognitive maps (Chinese, Indian, and Korean grocery stores and restaurants).

When it comes to “Politico-economic environment,” little influence of this type of environment was explicitly identified in the LIBs of newcomer students participating in this research. The effects of “the economic climate and the differential stratification of resources” were not specifically observed in the participants’ LIB and their contexts in this research, and there did not appear to be information that was limited only to a specific group of people due to political systems (Wilson, 1981). But when this “Politico-economic environment” is broadly interpreted to include newcomer students’ economic and financial situations, it did appear to have some effect on students in specific situations. For some international students, local information about Banks and ATMs were important because they usually got money or managed their finance through local banks or ATMs:

Survive, yes. So you need money. You need money so you need to know where the ATM is, where to know where the money could come... comes out, so it's extremely important. (P5, Male, International-common, China)

There were several international students who perceived Banks/ATMs as one of the top 5 most important places on their cognitive maps, however, no domestic newcomer students listed Banks/ATMs on their top 5 most important places lists. Survey results also indicated that international students, who might have brought some funds from their home countries for their study and/or living in their host country, perceived bank-related local information as statistically significantly more important than domestic students who were likely already familiar with and established in their finance management or banking practices. Thus, in a broad sense, considering the economic and financial situations of newcomer students, the “Politico-economic environment” had influenced specific types of local information needs and information seeking practices of international newcomer students.

As discussed above, Wilson’s information needs and seeking model provides a good framework to examine international newcomer students’ local information needs and their changes over time. However, I would like to suggest the addition of other factors and interactions that shape newcomer students’ local information needs, which are not necessarily specified in Wilson’s model. International newcomer students perceived most types of basic, essential local information as significantly more important than did domestic-out-of-state students during their early adjustment period. To better explain this difference, we need a more systematic understanding of the environmental changes that international newcomer students experience, rather

than these environments themselves as factors affecting people's information needs. In the current studies, international newcomer students came from many different countries of the world—hence from different physical environments, different work environments, different socio-cultural environments, and different politico-economic environments—all different compared to these types of environments in the local area of the host country. It is likely that international newcomer students were accustomed to their knowledge and perspectives about these four types of environments of their home country when they came to a new country. Thus, in their host country, they experience challenges and differences in terms of physical, work, socio-cultural, and politico-economic environments in greater degrees than do domestic newcomer students. These bigger challenges and differences that international students experience may have led them to perceive the uncertainty, unfamiliarity, and knowledge gaps in greater degrees during their adjustment than did domestic newcomer students, hence influencing the formation of more intense local information needs for international students.

These differences might also help explain the different degrees of longitudinal changes in their local information needs for international vs. domestic newcomer students in this study. It is likely that the perceived differences and related challenges continued in their second year of life in the host country to some extent. Many international participants shared their challenging life contexts even in their second year, which might have kept them from having significantly increased needs for recreation-related local information in Time 2. Compared to domestic-out-of-state students whose recreation-related local information needs of all kinds significantly

increased between Time 1 and Time 2, the increase of recreation-related local information needs of international students (either International-common or International-less-common) was generally less significant. This may be explained by the challenging work environments that international students still experienced in their second year, especially those international students who needed to read, write, communicate, and compete using a language that is not their first language. For international students, the perceived differences in the work environments and the associated challenges in their new country might not have changed much between Time 1 and Time 2. For example, the different work environment where they need to be in good standing by using a different language is still the same in their second year of life in the area. Then, in a sense, the work environment in a host country would still be different from the work environment in their home country for international students in the second year of life in College Park. Thus, this kind of challenge and hence limited amount of time for leisure might have contributed to the less significant increases in their recreation-related local information needs during the one year period, as compared to domestic newcomer students.

Summing up, the influences of these four types of environments—"Physical environment," "Work environment," "Socio-cultural environment," and "Politico-economic environment"—on the formation of local information needs of international newcomer students are not merely coming from those four types of environments in the host country. Rather, it should be taken into account that international newcomer students bring their knowledge and perspectives about those four types of environments in their own country when they come to a host country. The perceived

discrepancies or differences in these four types of environments between their home country and their new host country can create more intense local information needs for international newcomer students that are different from the local information needs of domestic newcomer students who come from relatively similar environments and systems. Also, the continuously existing differences in these environments and the challenges they pose may restrict the increase in recreation-related local information needs for international students.

Thus, in the contexts of international newcomers adjusting to a new country, the findings from these studies suggests that the local information needs of newcomer students are not merely shaped by the direct influence of the four types of environments in a host country, but rather shaped by the perceived differences between these types of environments in newcomer students' previous areas of residence and these types of environments in their new areas of residence.

However, it is possible that there are other factors that affect the formation of different local information needs among newcomer students. For example, the different degrees of increase in recreation-related local information needs for international vs. domestic newcomer students might have also been shaped by factors other than the challenging work environment and the differences experienced by international newcomers in unfamiliar environments. International students, who were mostly from oriental cultures in this study, might have different degrees of needs for leisure and recreational activities in their life than domestic students who mostly grew up in American, western cultures. Or international graduate students who made the decision to pursue further studies in a foreign country away from home

might have been more likely to have different preferences as to how they spend their leisure time. These possible other factors, such as cultures or personal preferences, that may influence the formation of local information needs or the changing patterns of local information needs need to be further explored by future studies.

5.3.2. Effect of socio-national context and how it changes over time

Previous information behavior studies tended to regard international students as a single group of foreign students whose cultures and languages are different from those of host countries. However, based on the findings from the current set of studies, it is argued that international students are not the same single group of students, especially in terms of their information-related contexts and information behaviors during their adjustment to host environments. Their LIBs differed specifically due to their different local socio-national contexts that involve complex interactions of factors including nationalities, locations, institutions, and social networks. International-common group students, who have many local co-nationals in the local area and local co-national social networks in the university environment, acquired rich, context-specific local information from their co-nationals, while International-less-common group students did not engage in such social information practices with their co-nationals or other nationals. International-less-common group students were less likely to acquire rich local information from social sources, but mainly used non-social, online and mobile sources for their local information practices. Domestic out-of-state students, who had general knowledge and understanding of American systems (e.g., transportation, housing, grocery/retail shopping), did not rely much on social and human sources; their use of online and

mobile sources was largely sufficient for meeting their general local information needs. The different socio-national contexts of newcomer students shaped different patterns in their LIBs during adjustment to new environments.

Also, the interview data suggest that newcomer students' socio-national contexts interact with their socio-technical contexts (e.g., development and availability of specific social technologies), co-shaping their LIBs. To be specific, International-common group students' co-national information practices were augmented by their active use of online and mobile social technologies. For example, Chinese students used Chinese online and mobile social technology platforms QQ and WeChat to quickly connect with other co-national students, and local information instantly flowed through the interconnected ties and networks among local co-nationals. International less-common students in different socio-national contexts did not exhibit this type of online and mobile social networking and information sharing practices. Although they had access to some local co-nationals and various social technologies, most international-less-common students did not exhibit active co-national information practices through online and mobile social technologies. This may suggest that, without critical mass of local co-nationals (i.e., socio-national context), international-less-common students were less likely to develop local co-national online communities and co-national information practices. On the contrary, International-common students' socio-national contexts of many local co-nationals and their socio-technical contexts (i.e., access to popular social technologies to connect with local co-nationals), allowed for a more effective and extensive social networking and information sharing among co-nationals in new environments. This

type of technology-based social information practices would not have been possible for International-common students if they did not have socio-national contexts that include many local co-nationals, among which these social technologies could be employed.

In addition to socio-national and socio-technical contexts in a local area, the findings in Study 3 demonstrated that temporal contexts should be taken into account if we are to better understand international newcomer students' LIBs during adjustment to new environments. Newcomer students' information source use patterns significantly changed between Time 1 and Time 2, and the varied patterns of information source use among the three groups tended to become more similar as they became better adjusted to their new environments during the period. In Time 2, the participants' second year of life in new environments, their LIB changed, especially in terms of their social information source use. International-common group students' local information acquisition from co-nationals statistically significantly decreased in their second year in the local area while online and mobile sources remained the most frequently used sources of local information with slight increases in Time 2. International-common group students who had acquired rich local information from their co-nationals during early adjustment in Time 1, especially from their senior co-nationals, did not get much local information from their co-nationals in their second year in Time 2. In the temporal context of their second year, International-common group students had already figured out how local systems (e.g., public transportation) work; had made most decisions regarding their local life needs (e.g., housing, banks, grocery/retail stores, and café/restaurants); and

had become relatively more comfortable navigating around the local area. Interview data also suggest that International-common students did not rely on senior co-nationals or interact with them as much in their second year of life in the new environment. Some co-national mobile social network groups that had been very active in Time 1 were not so active any more in Time 2 since most members of the mobile social network groups had already acquired most types of essential information for their adjustment and were busy with their own work and life in the temporal context of Time 2. Other online and mobile sources were helpful enough for International-common group students in Time 2, just as those sources had been largely sufficient for Domestic out-of-state students during their early adjustment. Although the use of information sources greatly varied among the three socio-nationally different groups during their early adjustment period, newcomer students' local information seeking behavior tended to converge into a pattern similar across the three groups in Time 2 when they were more adjusted to their local environments. As such, temporal contexts, as well as their socio-national and socio-technical contexts, should also be considered when understanding LIBs of international newcomer students in unfamiliar environments. This dissertation summarizes these theoretical considerations and interactions in "A Model of Influencing Factors for International Newcomer Students' Local Information Behavior" (See Figure 19).

Overall, the findings imply that the influence of socio-national context on shaping LIBs of international newcomer students change over time as they adjust to their new environment. The effects of socio-national contexts on newcomer students'

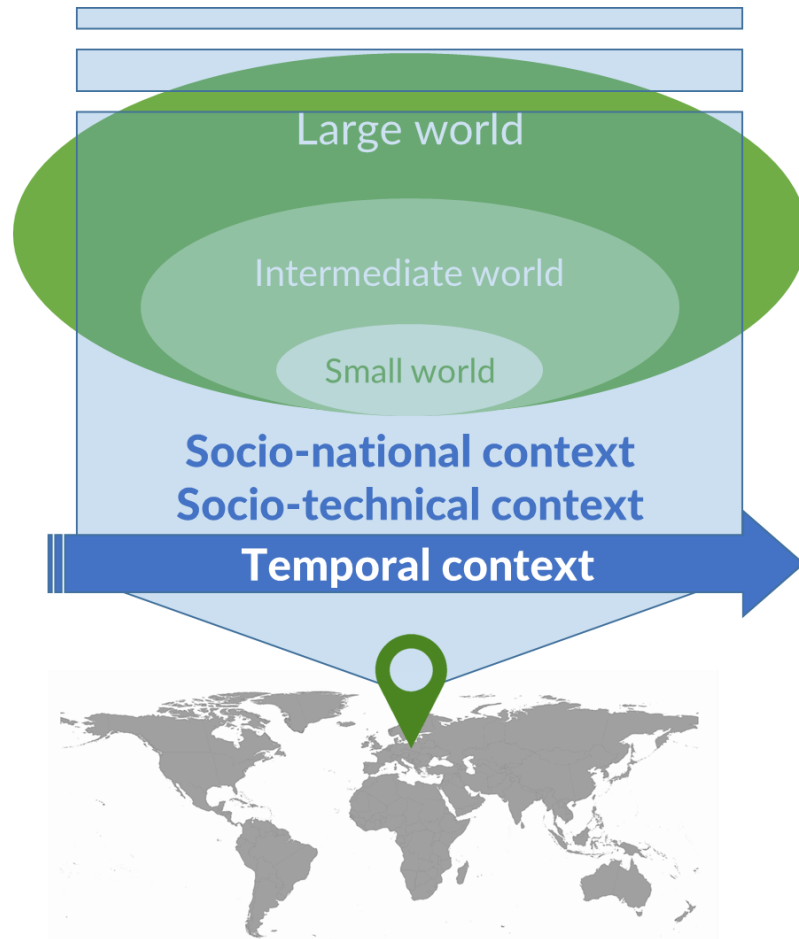


Figure 19. A Model of Influencing Factors for International Newcomer Students' Local Information Behavior

local information source use diminished over time, specifically for International-common students who frequently and mainly acquired many types of local information from their co-nationals in Time 1. During the early adjustment period when international newcomer students did not have much understanding of local systems and local areas, they were in greater need of local information and were more likely to benefit by learning from social sources, especially from senior students who already knew the local area and newcomer students' needs. In this context, International-common students who had available social resources—local senior and peer co-nationals—frequently sought and acquired the local information from their

co-national social sources. However, International-common students' information seeking through co-nationals decreased over time as their local information needs were met and their local knowledge developed during their adjustment to new environments. Along with the socio-national context and the socio-technical context, the temporal context comprises complex interwoven contexts that shape the LIBs of international newcomer students in unfamiliar environments.

5.3.3. Theoretical implications of socio-national context

In this section, the discussion of socio-national context is continued to address its theoretical and practical implications. Socio-national contexts, as discussed in above sections, are shaped by complex interactions of small and larger worlds of influences such as nationalities, geographic locations, local composition of nationalities, institutions, co-national communities, and social networks. Some of these factors have been considered in previous information behavior theories and models as factors that affect human information behaviors. But socio-national context is a unique and specific application of those factors, which can be used to explain the complex social contexts shaping the varied LIBs of international newcomer students in global contexts.

Wilson's (1999) "1996 model of information behaviour" explains that psychological, demographic, role-related or interpersonal, environmental, and source characteristics variables intervene in the process of determining the types of "information seeking behaviours." There is overlap between these variables and some of the factors that influence LIBs of international newcomer students, as discussed in this study. International newcomer students' country of origin is a demographic

variable, and their social networks and co-national ties are interpersonal variables. Also, their location and institution could be considered environmental variables in a broad sense, and the existence of local co-nationals who have rich local information can be a source characteristics variable which might influence international newcomer students' information source selection and LIB. However, mere consideration of these individual variables does not provide a holistic theoretical explanation of international newcomer students' LIBs in the current study. Drawing on these variables in a specific way, this research suggests a theoretical concept of socio-national context that explains the unique information environments of international newcomer students. Demographic, geographic, institutional, environmental, and social variables, such as nationalities, locations, institutions/departments, and social networks, are interwoven to form specific socio-national contexts for international newcomer students that play a key role in shaping their LIBs in their new environments. Some newcomer students (International-common) in this study had access to many local co-nationals in a new country, while some others (International-less-common) did not have this kind of local co-national network in their new host country. The other newcomer students (Domestic out-of-state) had access to many co-nationals in an unfamiliar environment in their home country, but they did not necessarily form or actively access local co-national networks where they can acquire local information. The different socio-national contexts of these three groups of newcomers played roles in shaping newcomer students' LIBs involving both online (and mobile) and offline sources and both social/human and non-social/non-human information practices. Therefore, building

on the intervening variables in Wilson's "1996 model of information behaviour," this work argues that the complex interwoven socio-national contexts of international newcomer students should be taken into account when seeking to understand and model their information behaviors in global contexts during their transition to host countries.

Aside from Wilson's information behavior models, a more holistic theoretical explanation of socio-national contexts is possible through the theory of information worlds (Burnett & Jaeger, 2011). The theory of information worlds posits that complex, multi-tiered social contexts shape human information behaviors. Burnett and Jaeger (2011) state that information behavior is shaped by the interaction of people's immediate influences (small worlds), such as friends and family, intermediate influences (intermediate worlds), such as institutions, and larger influences (large worlds), such as media, politics, and other culture-wide information worlds. These multi-tiered social influences explain a great deal about the various factors comprising socio-national contexts.

Conversely, the theoretical construct of socio-national context, suggested in this work, demonstrates how the multi-tiered information worlds specifically work together to shape the information environments of international newcomer students in global contexts. While the uniquely formed small worlds (e.g., local co-national networks) of international newcomer students might immediately affect their information behaviors, the intermediate to large worlds of influence, such as institutions, locations, technologies, and nationalities, augment or affect the formation and development of specific types of small worlds and the subsequent social

information practices of international newcomer students in their new local environments.

Also, this dissertation adds the temporal context as another dimension of complex contexts to consider adding to Wilson's model of information behavior. As temporal contexts change over time, the intervening variables of information seeking behaviors—psychological, demographic, role-related or interpersonal, environmental, and source characteristics variables—may also change as they did in the experiences of the participants in this study. These changes over different temporal contexts, in turn, would affect the related individuals' information behavior. This perspective of considering the influence of temporal contexts would be important, especially if this consideration is applied to research and practices involving human migration and adjustment. If one is to understand human information behavior in global migratory contexts, it would be essential to examine the interactions between socio-national, socio-technical, and temporal contexts as well as the interplay between the multi-tiered small, intermediate, and large worlds of influences surrounding the given information phenomenon.

5.4. Conclusions

As an answer to the call for longitudinal research on international migrants' information behaviors (Caidi et al., 2010), Study 3 in this chapter addressed how the information behaviors of international newcomer students change during their adjustment to new environments. Through this follow-up study of international and domestic graduate students in their second year, this chapter reported their LIB in the second year of life in local environments and compared it with their LIB during their

early adjustment period in their first year to better understand international newcomer students' LIBs during their adjustment process in new environments.

The findings included significant longitudinal changes in the local information needs and information source use of newcomer students. Regardless of socio-national contexts, newcomer students' perceived needs for basic, essential local information generally decreased in Time 2, while their needs for recreational local information overall increased. However, the increase in recreational local information needs was more significant for domestic students than for international students. The varied patterns of participants' information source use among the three groups, especially pertaining to social information sources, became more congruent to each other in Time 2. International-common students' information seeking through co-nationals decreased in their second year in the local area, and online and mobile sources were used as the main information sources for most types of information for all three groups.

These longitudinal changes in the information behavior of international newcomer students suggest both theoretical and practical implications. First, this result demonstrates the need for consideration of temporal context in understanding human information behaviors in migratory or transitional situations. People's information needs and information seeking behaviors can change as the temporal contexts change during their migratory or transitional period of time. Thus, temporal context or the "time" dimension can be a crucial factor to include when theoretically analyzing or explaining human information behaviors especially in global migratory contexts.

In addition, this consideration of temporal contexts sheds light on efforts to provide information and services, design systems and programs, and plan for recruiting or supporting international newcomer students and potentially other international newcomers. The findings in this dissertation provide empirical results that the early transition period is when international newcomer students are in greater need of information and help, compared to later periods when they are relatively more adjusted to their new environments (Caidi et al., 2010; Poyrazli & Grahame, 2007). Thus, educators and practitioners who work with international newcomer students or support their adjustment could benefit by focusing and managing their resources to provide necessary information and services before and during their early transition to new, unfamiliar environments. In addition, the content of information and services could reflect the changing information needs of international newcomer students during their adjustment process. During the early transition period, providing essential local information, such as information about housing, transportation, banking, and groceries, would be critical, while local information about recreation and well-being would be more useful to international newcomer students later, after they have adjusted more to their life in a new country.

Overall, international newcomer students' socio-national context, along with its interaction with the socio-technical context and the temporal context, plays an important role in shaping their local information needs and information seeking behaviors in new environments. The findings and discussions of this chapter contribute to the information behavior literature through the empirical results from a longitudinal study of international newcomer students' information behavior. These

considerations also offer practical implications for those who engage with or support international students regarding the design and provision of information, systems, and services to assist international newcomer students with their information needs in more timely and effective ways.

Chapter 6: Conclusions

In the ever-globalizing world of today, identifying the information challenges and information seeking behaviors of international migrants is an important part of the efforts to facilitate their migration and help them achieve their associated goals. As one of the rapidly growing groups of international migrants, international students move to different countries to pursue educational and other life goals, also contributing to the societies and economy of both origin and destination countries. This dissertation addressed international students' local information challenges and information seeking practices as these information behaviors are inevitable parts of their adjustment process in new countries. This work first examined international newcomer students' LIBs during their early adjustment to new environments, during which period international newcomer students experience the biggest information and other life challenges in host countries (Poyrazli & Grahame, 2007). Then, through a follow-up study in participants' second year of life in the local area, this work examined the longitudinal changes in international newcomer students' LIBs in their new country. This chapter will conclude the dissertation by summarizing the key findings, as the answers to the research questions of this research, and the implications for research and practice.

6.1. Summary and Research Implications

Through a series of studies of international and domestic newcomer graduate students, this dissertation empirically examined how international newcomer students need and seek local information during adjustment to new environments (RQ1).

Although local information needs of international newcomer students were similar to the ones of domestic newcomer students, international students were more eager to acquire basic, essential local information to adjust and survive in new societal systems in unfamiliar geospatial environments. International students' information seeking patterns were different between International-common and International-less-common students, with International-common students frequently acquiring local information from their co-nationals in the local area and International-less-common students mainly acquiring local information from non-human, online sources. These different patterns of information seeking behaviors among international students were suggested by the findings from Study 1 (a small sample study) and were confirmed through the findings from Study 2 .

Study 2 investigated how newcomer students' socio-national context, the degree to which there are local co-nationals available to connect with one another, plays a role in shaping international newcomer students' LIBs during their early adjustment to new environments (RQ2 and RQ3). Drawing on the finding from Study 1 and the related theories including the theory of information worlds, a theoretical construct of socio-national context was introduced and used to distinguish the three newcomer student groups which differed in terms of their socio-national contexts. Thus, Study 2 was designed to compare the LIBs of International-common (students from the top 3 countries of origin of international students—China, India, and Korea), International-less-common (students from other less-common countries), and Domestic-out-of-state students (from U.S. states other than Maryland). They were all newcomers to College Park, Maryland, but were in different socio-national contexts.

The three groups' LIBs significantly varied depending on their socio-national contexts. While both International-common and International-less-common students needed social information sources to help with their early adjustment and learn about the various different systems and unfamiliar environments in a new country, International-common students were able to acquire detailed, context-specific local information through abundant co-national social sources, while most International-less-common students did not exhibit such co-national social information practices. International-common students acquired much local information through online, mobile, and offline co-national social networks in their new local area, augmented by their use of online and mobile social technologies (e.g., QQ, WeChat, Facebook groups, WhatsApp, KakaoTalk). In contrast, most International-less-common students did not necessarily use available social technologies to engage in such co-national social information practices in their new local environment. International-less-common students mainly sought local information through non-human online sources, such as web, university websites, and online maps, and often through some social information sources which were not their main information sources in most cases. This result not only presents a theoretical understanding of socio-national context and its interaction with socio-technical context as factors shaping international students' information behavior, but also calls for a keen attention to information challenges and information environments of International-less-common students. If international education is to invite more diverse members around the world to participate in the global migration for international learning and knowledge exchange, more attention and support are needed for International-less-common

students who otherwise experience more challenges and difficulties in host countries, especially during the period of early adjustment.

Lastly, this dissertation examined how international students' LIBs change over time as they adjust to new environments (RQ4). International students' serious information needs for survival-related, basic local information was more prevalent during their early adjustment period than in their second year of life in the local environment. However, although international students' needs for basic local information generally decreased to some degree in their second year, these needs were still higher than their needs for recreational local information. International students' needs for recreational local information did not significantly increase in Time 2; however, while domestic out-of-state students' needs for recreational local information significantly increased during the time. These patterns applied to both International-common and International-less-common students, regardless of their socio-national context. International students who migrated to a new, unfamiliar country, with the temporal boundary of specific study periods, were more in need of basic, essential local information that is needed for their fundamental daily living management during their overseas studies. In terms of the longitudinal changes in information source use, international newcomer students' LIBs converged into a similar pattern of mainly using online and mobile sources as International-common students' use of social, co-national sources significantly decreased in their second year in the local environment. Conversely, this result indicates that international students are more in need of social information sources, human help, and context-specific local information and detailed guidance during their early adjustment period

rather than after they have gone through the initial transition and faced early challenges in new countries. This result provides insights for designing information systems, services, training, programs, and materials to provide better and more timely support for international student recruitment/application, adjustment, retention, and achievement, ultimately contributing to the success of international education around the globe. In this respect, along with socio-national and socio-technical contexts, temporal contexts must be considered when examining international newcomer students' information behaviors as well as providing support to facilitate the information behaviors and adjustment of international students in host countries.

6.2. Implications for Practice

As a newcomer and stranger in an unfamiliar environment, new international students are in need of a variety of types of information in order to be able to successfully deal with a range of challenges around them. Specifically, during their early adjustment period, international students face greater challenges than in other times of their stay in host countries, and human and social help from those who have more local knowledge and experiences can play a crucial role in international students' successful adjustment to new living environments. Also, peer support from those who face the same challenges can be of help to international newcomer students. For this kind of social information practices, International-common students had access to co-national information grounds (Pettigrew, 1999), and they interacted with senior co-nationals and peer co-nationals in the local area. These interactions often began even before their arrival to their host country and developed further after their arrivals. Their co-national information practices took place in all possible forms

through online, mobile, and offline interactions. However, most International-less-common were not able to benefit from these co-national information practices due to the small number of co-nationals in the local area or the lack of co-national communities developed in new environments. International-less-common students' local information practices were different from those in the International-common group. International-less-common students are in a relatively disadvantaged situation in terms of their social information sources. Then what would be effective ways to support International-less-common students for their social information practices and acquisition of quality local information in an effective and efficient way? In this matter, this dissertation suggests several organizational efforts to help with International-less-common students' LIBs based on the findings and the multi-tiered framework of the theory of information worlds (Burnett & Jaeger, 2011).

First, in terms of intermediate and large worlds of influences, higher education institutions or other agencies could consider effective ways to support or build online communities where local information and related Q&As are generated, accumulated, and managed over time by students—whether international or domestic. The findings of the series of studies in this dissertation indicate that newcomer students' local information needs tend to be similar each year and are mostly known or expected in advance. Thus, if these various types of local information are well-managed, organized, accumulated over time, as well as accessible, browsable, and searchable by future international and domestic newcomer students, the accumulated information in the online communities would be able to continue to serve many newcomer students in coming years. Importantly, the use of this type of online community and

online social interactions could lessen the disparity of information and social resources experienced by international students, particularly International-less-common students, during their early adjustment to new countries.

Second, in terms of small, intermediate, and large worlds of influences, colleges and universities could make efforts to help international students, specifically International-less-common students, to connect with those who are from the same countries, whether senior or peer students, through offline events, group emails, or other forms of on-/off-line interactions. If there are not many students from certain specific countries, supporting them to effectively connect with people who speak the same languages, share similar cultures, or are from the same region might be considered. Additionally, helping them connect with other International-less-common students from different countries might provide them with opportunities to offer and receive peer support. While Domestic out-of-state students and International-common students are more inclined to mingle within their co-national groups, more organizational and voluntary efforts to foster interactions, networking, and information sharing among all newcomer students of varying socio-national contexts, regardless of their nationalities, could also help improve the potential successfulness of their information behavior and the quality of information acquired by all newcomer students on campus.

Third, in terms of small and intermediate worlds of influences, various levels of efforts from departments, organizations, or individuals could be used to help International-less-common and other newcomer students build their new social networks and gain an awareness of potential social information sources. P34 (*Female*,

International-common, Korea) talked about the doctoral student office settings at her department where all the doctoral students who entered the program in the same year shared a large office space. She often acquired local information through interactions and Q&As with peer new students at the office space through conversations taking place naturally. Departmental efforts or decisions, such as the one in P34's case that allows new students to have common spatial environments where they can easily connect with each other or work in a nearby place, could help them build social information practices with other students sharing the same space. In addition, newcomer students could benefit by choosing to live with other housemates or roommates at least during their early adjustment period. P46 (*Male, International-less-common, Sri Lanka*) and P53 (*Female, International-less-common, Taiwan*) knew only a few co-nationals in their new local environment in the host country, but each of them lived in a house or an apartment with several other housemates who played significant roles as their social information sources in their immediate, social, and living environment. Colleges and universities might encourage newcomer students to consider having housemates, whether peer or senior students, whether international or domestic students. Also, education institutions could help newcomer students with finding housemates, which would result in not only economic benefits through lower housing costs, but also social and informational benefits through building their social information resources.

Lastly, based on the findings of this study, I argue that these above listed organizational efforts and supports should be prepared and provided before they arrive in their host countries, if available and appropriate. The findings indicate that

international newcomer students' LIBs begin before their arrival, and they need various kinds of essential local information, such as housing information, well before they begin their studies in a new country. Providing rich, appropriate local information and opportunities to connect with other helpful social resources in a timely manner will allow international students from various countries of origin to better prepare for their migration and adjustment to new, unfamiliar environments.

Overall, while the findings from this series of studies revealed the relative lack of social information practices of International-less-common students, less was discussed about the implications pertaining to International-common students' co-national social information practices. However, strong co-national information practices and co-national community building by International-common students in host countries may have an influence on their overall international education experiences. The findings showed that International-common students and Domestic out-of-state students acquired local information from co-national students more frequently than from other-national students in both Time 1 and Time 2. This may imply that newcomer students who have socio-national contexts that include many local co-nationals tend to interact with their co-nationals rather than other-national students in their new environments. However, having more interactions with students from various countries in everyday lives as well as in classrooms will allow newcomer students—whether international or domestic—to learn more and understand better about diverse perspectives, different cultures, and the unique knowledge and experiences of people from around the world. These active interactions with diverse students will enrich international students' international

education experiences. Thus, education institutions, international offices, or related organizations could consider designing courses, programs, events, and policies so that international students of different socio-national contexts and domestic students can have more opportunities to interact with one another more effectively. Having them interact with one another for information sharing through campus-based online communities during early adjustment could be one of the potential ways to let them connect with students from different backgrounds and help each other through information sharing when the challenges are specifically high for newcomer students during transition to new, unfamiliar environments. Also, conversely, education institutions might consider utilizing the strong co-national networks of International-common students as effective channels to communicate with them and to provide them with information.

6.3. Contributions

A key contribution of this research is that it proposes the idea of international newcomers' "socio-national context" and its importance as a factor influencing their information behavior in their new host environment. Through conceptualizing the socio-national context, this work contributes a specific interaction of small, intermediate, and large worlds of influence on human information behavior in global and migratory contexts (Burnett & Jaeger, 2011). Also, this research presents the complex interaction between socio-national, socio-technical, and temporal contexts, which shaped international newcomer students' information behavior in online, mobile, and offline settings during their adjustment process. By examining information behaviors of international and domestic newcomer students in different

socio-national contexts through a longitudinal mixed methods approach—surveys, interviews, and cognitive mapping tasks, this work contributes to existing research on information behavior of international students and other migrants. In addition, by examining newcomer students’ wandering behavior and incidental information acquisition, this study extends research on “wandering as information behavior” and information encountering. By analyzing the characteristics of newcomer students’ wandering behavior, this study proposed adding two more types of information seeking behavior—active attention and ongoing attention—to Wilson’s (1997) four types of information seeking behavior—passive attention, passive search, active search, and ongoing search. In terms of practical contributions, this study provides an analysis of international newcomer students’ local information needs, the resulting theme “survival first, recreation next,” and its change over time, which have relevance for practitioners and educators. Also, drawing on Wilson’s (1981) four types of environment (physical, work, socio-cultural, and politico-economic environments) that influence the formation of human information needs, this study analyzes the contexts behind international students’ intense needs for basic local information and presents the importance of the perceived differences between the four types of environment in home country vs. host country. The contribution of this study also includes its presentation of the varied social information practices of international students with different socio-national contexts, emphasizing the need for more attention to international students from less common countries of origin pertaining to their development of social information sources during adjustment.

6.4. Limitations and Suggestions for Future Research

As with other empirical studies, there are limitations in this research that should be taken into account when interpreting the findings and implications. First, the participants of this series of studies were all from a single university in College Park, Maryland, that is largely in a metropolitan area of Washington D.C. in the U.S. These environmental and geospatial contexts, which would be different from those of other parts of the U.S. or other countries, may have had an influence on participants' LIBs during adjustment. Also, the time period of this series of research between 2014 and 2016 could be an important context—temporal context—that comprises the complex information environments of the research participants of these studies. Various aspects of the contextual factors involved in this research, such as location, host country, host institution, student nationalities, global and national economies, politics, time, and technologies, should all be carefully considered when interpreting the results. However, this caution in a way reiterates and corroborates a major argument of this dissertation that the interactions of socio-national, socio-technical, and temporal contexts shape the information behaviors of international newcomer students during adjustment. Future studies conducted with different combinations of these contexts and other contextual factors, such cultures, personalities, and other demographics, would enhance our understanding of the information behaviors of international newcomers during their adjustment to unfamiliar environments. Second, another limitation lies in the retrospective nature of these studies conducted during participants' first year (Study 2) and after their first year (Study 1) of living in new environments. Although these studies captured relatively fresh memories of

newcomer students about their information behaviors during early adjustment, compared to prior studies, future studies could examine their LIBs and lived experiences during the adjustment process in a more real-time fashion, garnering more vivid descriptions of the information-seeking experiences of international newcomers. Third, surveying and interviewing more participants from more countries would increase the representativeness of international students from many different countries. With a larger sample, some of the differences that were not statistically significant in these studies may be detected. Also, with a larger sample of International-less-common students, their information challenges, coping strategies, and co-national information practices could be further explored and identified. Lastly, while the findings and implications of these studies may inform research and practice involving other types of international newcomers, at least some of the current findings are likely context-specific for international students. Future studies could also examine how socio-national, socio-technical, temporal, and other related contexts work to shape the information behaviors of other types of international newcomers, such as immigrants, refugees, sojourners, and travelers.

6.5. Conclusions: Who was a neighbor to those from the other side of the globe?

As noted at the beginning of this dissertation, international students are a rapidly growing group of people in many countries with the increasing popularity of international education around the world and the benefits it provides to the global economy and the societies involved. However, international students have been continually reported to face challenges and difficulties during their studies in host countries. Also, globally a majority of participants in international education come

from a few common countries of origin, such as China and India, and there are long tails of countries which send far fewer students for their participation in international education. Although there would be various reasons for this pattern, the findings of this dissertation indicate that international students from the countries in the long tail experience more challenges in local information seeking during their adjustment to a new country. Thus, it is worth paying more attention to the different information environments of international students and provide more support specifically for international students from less-common countries of origin. These efforts will also help to promote the diversity of international education and thus help more people from various parts of the world to benefit from international education.

Although there are many other aspects of challenges that international students face in new countries, such as culture shock and social discrimination, this dissertation focused on the information challenges of international newcomer students in their everyday lives during adjustment. This study examined their information seeking behaviors in new local environments and discussed implications for improving related theories and information behavior models as well as supporting the success of international students. Education institutions could consider the implications of this research and better support new students from around the world to have more social resources and build more small worlds and information grounds in their new environments (Pettigrew, 1999). Then these small worlds and information grounds will be places where newcomer students with varying levels of information resources can go to get information and help and to make neighbors and

friends, thus sharing their unique information, knowledge, and experiences with one another in the local communities.

For many decades, colleges and universities, government agencies, various organizations (such as religious and social institutions), and numerous individuals have put their resources and efforts in to providing help, information, and support for international newcomers, including international students and immigrants (Sandercock & Attili, 2009). However, despite these efforts, international students around the world continue to experience various challenges in an unfamiliar country as “non-citizens,” “temporary migrants,” and “newcomers,” often relegated to outsider status (Paltridge, Mayson, & Schapper, 2010). More attention and support are needed for international students, especially for those who are in a socio-national context with few local co-nationals. In this series of dissertation research, 20 international newcomer students (Study 1) and another 149 international and domestic newcomer students, including 57 interviewees (57 in Study 2 and 50 of 57 in Study 3), participated, and many of them shared their stories of challenges and information seeking and coping strategies during their adjustment to new environments. Some participants also shared in the interviews that their local information seeking and adjustment was successful due to the kind help of some people in the new area. Then, if we consider these people as their neighbors who were around them, talked to them, and often provided information and help to them, who specifically were those neighbors to the students from the other side of the globe? For some participants, luckily there were these “neighbors.” The neighbors were sometimes their local co-national students, other-national students, American

students, professors, department/university staff, housemates, landlords, members and volunteers of local churches, bus drivers, as well as people in the malls, shoppers in grocery stores, or even unknown locals in the streets who kindly showed them the directions to places. Tuan (1977) noted in his classic book, *Space and Place: The Perspective of Experience*, that a new local environment is at first a confusion of images and blurred space “out there” for newcomers until it becomes familiarized through various interactions, meaning making, and experiences of going through the challenges in the new environments. Various supports for new international students’ social resource building and information practices through small, intermediate, and large worlds of influence will help them effectively acquire necessary information during transition and successfully overcome the challenges that they face during their adjustment and acculturation in the host environments. Also, information behavior models and theories must better account for socio-national context and its complex interactions with other contexts, such as socio-technical, geospatial, and temporal contexts, which in turn influence international students’ LIBs. This theoretical consideration is specifically crucial if those theories and models are to be more relevant in global and migration contexts and to provide practically helpful insights for the designs of systems and services that help the information behavior and adjustment of internationally mobile students around the globe.

Appendices

Appendix 1. Interview Questions for Study 1

Category	Purposes	Interview Questions
Introduction	Rapport formation	How are you today? How do you like living in this area?
	Having subjects recall their early experiences in the U.S.	Would you describe and tell me about how you arrived in the U.S.?
		Would you tell me about the important things you did when you first arrived here?
Having subjects recall their local information seeking experiences in the U.S.	<p><i>We are interested in your experience with local information or local knowledge such as locations of grocery stores, banks, or school offices, transportations, or names of streets/roads.</i></p> <p>How was your experience in figuring out or finding these local knowledge and information?</p>	

		<p>Would you tell me about important places that you had to go to or regularly visit during your early times in the U.S?</p>
Questionnaire and interview questions	<p>Having subjects rate each type of local knowledge/information for its importance for their adjustment to the area</p>	<p>Now please see this questionnaire (Appendix 2 - Part I – Importance of each type of local information).</p> <p>Here in this questionnaire, you can see various types of local knowledge and information.</p> <p>The questions ask how important each type of local knowledge/information was when you first arrived here and adjusted to this area.</p> <p>Please answer each question by choosing one in the 7 point scale, ranging from 1 as “not at all important” to 7 as “Extremely important.”</p>
	<p>Investigating the frequencies of using each type of local information sources</p>	<p>And now please see another questionnaire here (Appendix 2 - Part II – Frequency of using each type of local information sources). Here in this questionnaire, you can see various types of local information sources.</p> <p>The questions ask how frequently each type of local knowledge/information sources was used when you first arrived here and adjusted to this area.</p> <p>Please answer each question by choosing one in the 7 point scale, ranging from 1 as “Never” to 7 as “Every time.”</p>
	<p>Examining major information sources for each type of important local information</p>	<p>Thank you.</p> <p>Now let us go back to each type of local information in Part I.</p> <p>For each of the selected local information types, could you tell us the most used information source?</p> <p>Please refer to the list of types of local information sources in Part II questionnaire.</p>

		For example, for “grocery stores” information, you may pick “Online Maps on PCs” as the most used one.
	Examining how easy or difficult it was to get desired local information through the sources used.	Also, for each pair of the selected local information type and the most used information source for that information type, could you tell us how easy or difficult it was for you to get satisfactory local information? If it was easy or difficult, why was that? Could you explain it?
Demonstration	Observing the subjects’ real behavior of their major online/mobile local information seeking	For each information type, could you tell me how you sought the local information through those sources? If it was on your mobile device, please feel free to use your device. If it was a PC or laptop, please use this laptop, prepared for this interview session.
Information storing/utilizing/sharing	Exploring the subjects’ information storing/utilizing/sharing behaviors	<p>Once you obtained local information, how did you record or store it? And how did you utilize the local information that you obtained?</p> <p>Also, have you shared the local information you obtained with others? If yes, how did you forward, disseminate, or share it? What was the case where you shared the local information? Could you explain it?</p> <p>Why do you think you shared local information?</p> <p>How easy or difficult was it for you to share the local information? And why?</p> <p>How did you feel when you shared the local information?</p>
Creative tasks (Drawing maps)	Drawing out the subjects’ mental model of the area and indirectly	Now, let us move to creative tasks.

	look into their local information needs	<p>You may have your own understanding of the local area including campus, your place of living, and various places and space.</p> <p>On this blank paper, could you draw your own map of the area where you move around for your daily life?</p>
(Putting stickers)		<p>And now you will need to pick 5 important places for you.</p> <p>Would you pick your top 5 important local places for your adjustment to this area, in the order of importance?</p> <p>Please write the name of the place and the rank (#1 to #5) and explain your reasons for your choices.</p>
Free questions	Further drawing out the subjects' unmet information needs or their desires for information tools	<p>Now, finally it is our last question.</p> <p>Let us assume that you would go through your adjustment process in this environment all over again.</p> <p>Other than the types of local information you discussed today, what else kinds of local information would you find useful?</p> <p>What kinds of information systems/tools/applications would you find useful? What are desired features/functions?</p>
Closing	Gentle closing	Thank you very much for participating.

Appendix 2. Survey Questions for Study 1

- ❖ Gender:
- ❖ Age:
- ❖ Student status (circle one): in a Master's program / in a PhD program

1. How long have you been in the U.S.?

Less than a month	1-2 months	3-4 months	5-6 months	7-8 months	9-10 months	11 months or more
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2. Have you had a car to drive during the time? (Yes/No)

3. After arriving in the U.S., how long did it take for you to buy/get your car?

Less than a month	1-2 months	3-4 months	5-6 months	7-8 months	9-10 months	11 months or more
-------------------	------------	------------	------------	------------	-------------	-------------------



4. How often do you use online maps on a PC or laptop? (circle one)

Once a year or less	More than once a year	Once a month	More than once a month	Once a week	More than once a week	Daily
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5. How often do you use map applications on a mobile device (Smartphones, Tablets, etc.)? (circle one)

Once a year or less	More than once a year	Once a month	More than once a month	Once a week	More than once a week	Daily
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Importance ratings on each type of local knowledge/information

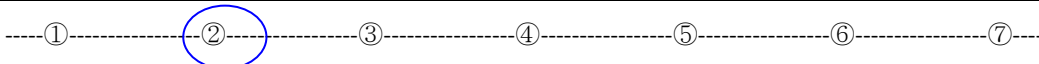
Part I. How important was this local information for your adjustment to new environments?

(Circle one that applies)

(Example)

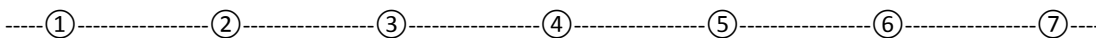
Name of the city—College Park (“The name of the city was too obvious to me... so was not very important for my adjustment.”)

Not at all important	Of Little Importance	Slightly important	Moderately important	Important	Very important	Extremely important
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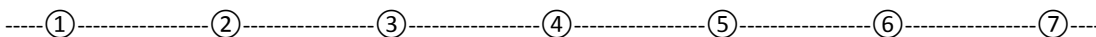


Not at all important	Of Little Importance	Slightly important	Moderately important	Important	Very important	Extremely important
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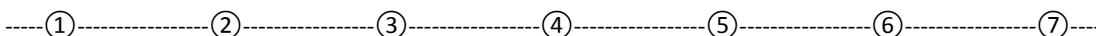
1. Places for living (apartments, houses, roommates-wanted, etc.)



2. Grocery stores



3. Discount retail stores (e.g. Wal-mart, Target, etc.)



4. Café/Restaurants (of all kinds--including dessert and fast-food places)
 ---①-----②-----③-----④-----⑤-----⑥-----⑦---
5. University/School related places (School/College, Gym, Office of International Services, etc.)
 ---①-----②-----③-----④-----⑤-----⑥-----⑦---
6. Documentation/license related places (MVA/DMV, Social Security Administration, etc.)
 ---①-----②-----③-----④-----⑤-----⑥-----⑦---
7. Health related places (Drugstores, hospitals/clinics, health center, etc.)
 ---①-----②-----③-----④-----⑤-----⑥-----⑦---
8. Banks/ATMs
 ---①-----②-----③-----④-----⑤-----⑥-----⑦---
9. Religious places
 ---①-----②-----③-----④-----⑤-----⑥-----⑦---

Not at all important	Of Little Importance	Slightly important	Moderately important	Important	Very important	Extremely important
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(Continued)

10. Mobile phones/Electronics stores
 ---①-----②-----③-----④-----⑤-----⑥-----⑦---
11. Public transportation information (e.g. Metro/Bus systems, Shuttle systems, etc.)
 ---①-----②-----③-----④-----⑤-----⑥-----⑦---
12. Driving/routes/road-related information
 ---①-----②-----③-----④-----⑤-----⑥-----⑦---
13. Names of streets/roads/areas
 ---①-----②-----③-----④-----⑤-----⑥-----⑦---
14. Leisure/sports/exercise/recreational places
 ---①-----②-----③-----④-----⑤-----⑥-----⑦---
15. Movies/concerts/entertainment places
 ---①-----②-----③-----④-----⑤-----⑥-----⑦---
16. Event/Festivals

①-----②-----③-----④-----⑤-----⑥-----⑦-----

17. Please list any other types of local information that were important for your adjustment to this area. (if any)
()

Part II. How frequently did you use each type of local information sources for your adjustment to this area? (Circle one that applies)

Never	Rarely (10% of all)	Occasionally (30% of all)	Sometimes (50% of all)	Frequently (70% of all)	Usually (90% of all)	Every time
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1. Friends with face-to-face communication (offline, in person)
①-----②-----③-----④-----⑤-----⑥-----⑦-----

2. Friends with tele-communication (e.g. messenger apps, phone calls, text messages, e-mails, social networks, video chats, etc.)
①-----②-----③-----④-----⑤-----⑥-----⑦-----

Never	Rarely (10% of all)	Occasionally (30% of all)	Sometimes (50% of all)	Frequently (70% of all)	Usually (90% of all)	Every time
-------	------------------------	------------------------------	---------------------------	----------------------------	-------------------------	------------

3. Family members with face-to-face communication (offline, in person)
①-----②-----③-----④-----⑤-----⑥-----⑦-----

4. Family members with tele-communication (e.g. messenger apps, phone calls, text messages, e-mails, social networks, video chats, etc.)
①-----②-----③-----④-----⑤-----⑥-----⑦-----

5. Religious group members with face-to-face communication (offline, in person)
①-----②-----③-----④-----⑤-----⑥-----⑦-----

6. Religious group members with tele-communication (e.g. messenger apps, phone calls, text messages, e-mails, social networks, video chats, etc.)
①-----②-----③-----④-----⑤-----⑥-----⑦-----

7. Neighbors
①-----②-----③-----④-----⑤-----⑥-----⑦-----

8. Forums or Q&As in online communities (e.g. Korean Graduate Students Association site)
①-----②-----③-----④-----⑤-----⑥-----⑦-----

9. Web content (e.g. Various web content, searched through Google or other search engines)
①-----②-----③-----④-----⑤-----⑥-----⑦-----

10. Official university/school/college homepages

-----①-----②-----③-----④-----⑤-----⑥-----⑦-----

11. Paper maps (e.g. campus map, city/metropolitan area map, etc.)

-----①-----②-----③-----④-----⑤-----⑥-----⑦-----

12. Online maps website (e.g. Google Maps, Bing Maps website, etc.)

-----①-----②-----③-----④-----⑤-----⑥-----⑦-----

13. Smartphone map applications (e.g. Map apps on smartphones, etc.)

-----①-----②-----③-----④-----⑤-----⑥-----⑦-----

14. Local bulletin boards/flyers/advertisements

-----①-----②-----③-----④-----⑤-----⑥-----⑦-----

15. Books/magazines

-----①-----②-----③-----④-----⑤-----⑥-----⑦-----

16. Wandering around by oneself (offline, physically)

-----①-----②-----③-----④-----⑤-----⑥-----⑦-----

17. Please list any other types of local information sources that you used for your adjustment to this area. (if any)

()

Appendix 3. Interview Questions for Study 2

Intro + Rapport Building

How are you today?

How do you like living in this area?

Contextual Immersion

Would you describe how you arrived in College Park in the U.S.? (from the airport)

“We are interested in your experience with local information or local knowledge such as locations of grocery stores, banks, or school offices, transportations, or names of streets/roads.”

General Impression + Critical Incidents

How was your experience in figuring out this kind of local knowledge and information?

Could you tell me any problem you experienced during adjustment?

Have you ever got lost in this new area?

Reasons for Importance/Unimportance

Now please see this questionnaire that you filled out. [*Pointing at the part about the **importance** of each type of local information*]

- 1) Could you tell me why THIS (6,7 rating, if any) was important?
- 2) Could you tell me why THAT (1,2 rating, if any) was NOT important to you?

Investigation of Certain Sources

[*Pointing at the part about the **frequency** of using each type of local information sources*]

- **FRIENDS**

Could you tell me about who are these FRIENDS?

- **ONLINE COMMUNITY**

Could you tell me more about how you used Q&As/Forums in online communities?

- **Maps + Mobile Tech**

1) Could you tell me more about using Smartphone maps, Online maps on computer, and Location-based smartphone apps for seeking local information for your adjustment?

2) Do you think this kind of map use is helpful in increasing your geospatial knowledge in this area or NOT?

- **Wandering Around**

1) Could you tell me more about wandering around by yourself and/or together with friends?

2) Was wandering around a pleasant experience for you?

3) Was wandering around your daily routine embedded in your life?

- **Information Encountering**

Did you find local information by chance when you were intentionally wandering around or unintentionally just by chance?

- **Asking in the Streets**

Also, have you asked questions about local information to anybody on the streets, in a building or in any public places?

Accounts of Main Information Sources

[*Pointing at the part about the **main information sources** for each type of local information*]

It looks like _____ was your main information source for most types of local information, could you tell me more about how you used these main information sources during your adjustment?

Information Sharing

1) Also, have you shared the local information you obtained with others?

If yes, to whom and how did you share it?

2) Did you voluntarily share or did you share only when you were asked?

3) Did you share local information by posting something on social networks or online forums/ communities?

“Now, let us move to creative tasks.

You may have your own understanding of the local area including campus, your place of living, and various places and space.”

Cognitive Maps

- 1) On this blank paper, could you draw your own map of the local area where you move around for your daily life?
- 2) And now could you list your top 5 important local places during your adjustment in this area in the order of importance (first one being the most important)?
- 3) *(after drawing)* Could you tell the orientation of their cognitive map here?

Closing

Now, we are done with the interview questions. Do you have any questions or more comments?

Thank you very much for participating.

Appendix 4. Top 5 Important Places in Time 1 and Time 2

Top 5 Most Important Places in Time 1 (Study 2)

Table (unit: number of participants)

	CogMapTop1	CogMapTop2	CogMapTop3	CogMapTop4	CogMapTop5
House	43	7	0	1	0
School-related	11	40	23	20	10
Grocery/Retail	2	7	20	16	13
Bank/Agency/Service Provider	0	2	3	3	6
Transportation	0	1	3	10	11
Recreation-related	0	0	3	0	4
Cafes/Restaurants	0	0	1	5	9
Other	1	0	4	2	1

Top 5 Most Important Places in Time 2 (Study 3)

Table (unit: number of participants)

	CogMapTop1	CogMapTop2	CogMapTop3	CogMapTop4	CogMapTop5
House	44	3	0	1	0
School-related	6	35	13	9	12
Grocery/Retail	0	5	20	19	7
Bank/Agency/Service Provider	0	0	0	0	3
Transportation	0	5	5	4	10
Recreation-related	0	0	4	7	3
Cafes/Restaurants	0	0	6	4	10
Other	0	2	2	6	5

Appendix 5. Survey Questions for Study 2

Thank you for participating in this survey.

Please answer following questions.

1. How long have you been in the College Park, Maryland area since your arrival?
1 week or less, 2 weeks, 3 weeks, 4 weeks, 5 weeks,
6 weeks, 7 weeks, 8 weeks, 9 Weeks, 10 weeks,
More than 10 weeks

1-1. If you have been in College Park area more than 10 weeks, are you a new student in your first semester now?

Yes, I am a new student in my first semester.

No, I am not a new student.

1-3. If more than 10 weeks, how long have you been in the College Park, MD area since your arrival? (Please specify.)

2. Which country are you from?

* For international students: [Your home country]

* For domestic students: United States

(Domestic students)

2-1. In which state were you living before moving to the University of Maryland College Park area?

3. Do you drive (a car) here?

Yes

No

4. Did you use a smartphone when you were adjusting to this new environment?

Yes

No

5. On your smartphone, in general, how often do you use map applications (e.g. Google Map application)?

Once a year or less --- More than once a year --- Once a Month --- More than once a month --- Once a Week --- More than once a week --- Daily

6. In general, how often do you use online maps (e.g. Google Map website) on a PC or laptop?

Once a year or less --- More than once a year --- Once a Month --- More than once a month --- Once a Week --- More than once a week --- Daily

7-1.

How important was each type of local information for your adjustment in a new environment in College Park, MD, U.S.?

Answer choices for each information type:

Not at all Important (1) --- Very Unimportant (2) --- Somewhat Unimportant (3) --- Neither Important nor Unimportant (4) --- Somewhat Important --- (5) Very Important (6) --- Extremely Important (7)

1. Housing/Places for living
2. Grocery stores
3. Retail stores (Wal-mart, Target, Ikea, etc.)
4. Café/Restaurants
5. Health related places (Health center, Drugstores, Clinics, etc.)
6. University/School related places (School, Gym, ISSS)
7. Banks/ATMs
8. Public transportation (Metro/Bus, Shuttle)
9. Routes/Names of streets
10. Leisure/sports/ exercise /recreational places
11. Movies/ concerts/entertainment places
12. Event/Fair/ Festivals

7-2.

(Section 2/3) And there can be many kinds of information sources for the local information, such as friends, online forums, online maps, web search, etc.

The following questions ask about frequency of using each type of information sources during adjustment.

How frequently did you use each type of local information sources for your adjustment in a new environment in College Park, MD, U.S.?

Answer choices for each information source item:

Never --- Rarely (10% of all) --- Occasionally (30% of all) --- Sometimes (50% of all) --- Frequently (70% of all) --- Usually (90% of all) --- Every time

1. Friends--New students from the same country
2. Friends--Existing students from the same country
3. Friends--New students from other countries
4. Friends--Existing students from other countries
5. Family
6. Neighbors
7. Staff/Personnel in University office / Library / Leasing office
8. University/school homepages
9. Forums/Q&As in online communities (e.g. Facebook groups, Korean Students Association website)

10. Web search / Web content
11. Smartphone map applications (e.g. Google Map)
12. Online maps website (e.g. Google Map)
13. Location-based smartphone applications (Yelp, Metro-bus app, etc.)
14. Paper map (campus map, etc.)
15. Offline media (Bulletin boards/ads/flyers/books/newspaper)
16. Wandering around by yourself
17. Wandering around together with friends/others
18. Finding it by chance (as you walk by or pass by)

7-3.

(Section 3/3) Following questions ask what information source you MAINLY used for each type of local information when you were adjusting to the new environment.

When you were adjusting to this new environment, what was your MAIN information source for each type of local information shown below?

Tip. Main information source: The most frequently used or the most important source

1. Housing/ Places for living
2. Grocery stores
3. Retail stores (Wal-mart, Target, Ikea, etc.)
4. Café/ Restaurants
5. Health related places (Health center, Drugstores, Clinics, etc.)
6. University /School related places (School, Gym, ISSS)
7. Banks/ ATMs
8. Public transportation (Metro/ Bus, Shuttle)
9. Routes/ Names of streets
10. Leisure/ sports/exercise /recreational places
11. Movies/concerts/ entertainment places
12. Event/ Fair/Festivals

7-4.

(Optional - if any)

If you have additional information about your answers or more description about your experience in seeking local information, please feel free to provide it here.

8. Basic Demographic Information

8-1. Your Age

8-2.

- Male
- Female

8-3.

- in a Master's program
- in a PhD program
- Other (please specify below)

8-4. Major

Appendix 6. Interview Questions for Study 3

Intro + Rapport Building

Now it's your second year. How was your first year? How did you feel when you got back to College Park area?

Contextual Immersion

Like in our previous interview, we are interested in your experience with local information and local knowledge. And now that it is your second year in this area, we would like to know how you seek and use local, geospatial information now—information about places, directions, space, and local area.”

Could you fill out this online survey?

Interview

(Go to their survey result on screen!)

Perceived Satisfaction

In terms of satisfaction of your information seeking during adjustment, could you tell me the reason of your answer? dissatisfied-----satisfied

Perceived Adjustment

- **How much do you think you have adjusted in this environment?**
 - 1) **Geo-spatially** (local geography, place & transportation information)
 - 2) **At school** (academically)
 - 3) **Socially**

Specific Cases of LIBs

Not only when you first got here in College Park, but also still you are probably seeking and using geospatial and local information in this area.

- **Could you tell me some specific cases?**
 - When and why** do you seek and use geospatial/local information?
 - How?**

Investigation of Certain Sources (from the survey answers)

Now let's talk about specific information sources. Specifically, "FRIENDS or PEOPLE"

- **FRIENDS (PEOPLE SOURCES)**
 - 1) Could you tell me about who are these PEOPLE?
 - 2) Are they co-national Friends?

3) These friends are **the same friends** that you got local/geospatial information from **during your early adjustment?**

- *Maps + Location-based systems*

- *Wandering Around*

1) Could you tell me more about how you wander around by yourself and/or together with friends?

“Now, let us move to creative tasks.

This time, again, let’s do the time travel.

Let’s go back to the times when you first arrived in the College Park area, your early adjustment period, your first few weeks in College Park and surrounding area.

Cognitive Maps

- Based on your knowledge that you had during your first few weeks in 2014, could you draw your own map of the local area?

→ This map is based on your initial geospatial/local knowledge and perspective during your first few weeks in College Park.

- “Could you list your top 5 important places at that time?”
- Could you **mark them on the list and on the map** with this *red-colored* pencil?

And now, let’s come back to the present.

- Using your **current** knowledge and perspective, could you draw a map of your local area?
- Could you list your **current top 5** important places?
- If the 5 places are already drawn in the map, could you **circle them both on the list and on the map** with this *red-colored* pencil?
- Lastly, could you list your **5 favorite places or spots** in College Park and surrounding area?
- If the 5 places are already drawn in the map, could you draw **stars on them both on the list and on the map** with this *blue-colored* pencil?

Closing

Thank you! This is the end of the interview.

Thank you very much for participating.

Appendix 7. Survey Questions for Study 3

Thank you for participating in our second round of interview!

In our first round of the study, we discussed your experience of seeking **local, geospatial information** in this new area (which is information about local geography, various places, such as grocery stores, restaurants, banks, or school buildings, walking/driving routes, local transportation, etc.)

We discussed what kinds of places were important to you, what information sources were frequently used, and how you sought and acquired local/geospatial information in this unfamiliar environment.

Could you tell me how you first arrived in this College Park area?

And also, could you briefly talk about your experience of seeking and acquiring local/geospatial information at the beginning?

Not only when you first got here in College Park, but also you may be still seeking and using geospatial and local information in your everyday life in this area— information about various local places, routes/directions, transportation, etc.

Currently, how important is each type of below local/geospatial information to you?

*** Example: Currently, information about (e.g. Banks/ATMs) is.....**

Not at all Important (1)	Very Unimportant (2)	Somewhat Unimportant (3)	Neither Important nor Unimportant (4)	Somewhat Important (5)	Very Important (6)	Extremely Important (7)
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1. Housing/Places for living
2. Grocery stores
3. Retail stores (Wal-mart, Target, Ikea, etc.)
4. Café/Restaurants

5. Health related places (Health center, Drugstores, Clinics, etc.)
6. University/School related places (School office, ISSS, etc.)
7. Banks/ATMs
8. Public transportation (Metro/Bus, Shuttle)
9. Routes/Names of streets
10. Leisure/sports/ exercise /recreational places
11. Movies/concerts/ entertainment places
12. Event/Fair/ Festivals

(Optional) Other type of local/geospatial information
(Please specify)

And there can be many kinds of sources to use to get the local, geospatial information.

Currently, how frequently do you use each type of sources for local/geospatial information?

*** Example: Currently, as a source to get local/geospatial information, I use (e.g. University/school homepages).....**

	Never (1)	Rarely (2)	Occasionally (3)	Sometimes (4)	Frequently (5)	Usually (6)	Every time (7)
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1. Friends--FELLOW students from the SAME COUNTRY (who entered UMD in the SAME year)
2. Friends--SENIOR students from the SAME COUNTRY (who were in their second year or higher when you entered UMD)
3. Friends--FELLOW students from OTHER COUNTRIES (who entered UMD in the SAME year)
4. Friends--SENIOR students from OTHER COUNTRIES (who were in their second year or higher when you entered UMD)
5. Family

6. Neighbors
7. Staff/Personnel at University office / Library / Orientation / Leasing office
8. University/school homepages
9. Q&As/Forums in online communities (e.g. Facebook, Facebook groups, Korean Students Association website)
10. Web search / Web content
11. Smartphone map applications (e.g. Google Maps app)
12. Online map websites (e.g. Google Map)
13. Location-based smartphone applications (Yelp, Metro-bus app, etc.)
14. Paper map (campus map, etc.)
15. Offline media (Bulletin boards/ads/flyers/books/newspaper)
16. Wandering around by yourself
17. Wandering around together with friends/others
18. Finding local information by chance (as you walk by or pass by)

(Optional)

Other type of information source

(Please specify)

Currently (or if you are to seek the information today,) what is your MAIN information source for each type of local/geospatial information shown below?

Tip. Main information source: Your most frequently used or most important source of information

(1) Friends--FELLOW students from the SAME COUNTRY (who entered UMD in the SAME year)

(2) Friends--SENIOR students from the SAME COUNTRY (who were in their second year or higher when you entered UMD)

- (3) Friends--FELLOW students from OTHER COUNTRIES (who entered UMD in the SAME year)
- (4) Friends--SENIOR students from OTHER COUNTRIES (who were in their second year or higher when you entered UMD)
- (5) Family
- (6) Neighbors
- (7) Staff/personnel at University office / Library / Orientation / Leasing office
- (8) ONLINE - University/school homepages
- (9) ONLINE- Q&As/Forums in online communities (e.g. Facebook, Facebook groups, Korean Students Association website)
- (10) ONLINE - Web search / Web content
- (11) ONLINE - Online map websites (e.g. Google Maps website)
- (12) Mobile - Smartphone map applications (e.g. Google Maps app)
- (13) Mobile - Location-based smartphone applications (Yelp, Metro-bus app, etc.)
- (14) OFFLINE - Paper map (campus map, etc.)
- (15) OFFLINE - Paper-based media (Bulletin boards/ads/flyers/books/newspaper)
- (16) OFFLINE - Wandering around by yourself
- (17) OFFLINE - Wandering around together with friends/others
- (18) OFFLINE - Finding it by chance (as you walk by or pass by)
- (19) Other

For each of below information item:

- 1. Housing/Places for living
- 2. Grocery stores
- 3. Retail stores (Wal-mart, Target, Ikea, etc.)
- 4. Café/Restaurants
- 5. Health related places (Health center, Drugstores, Clinics, etc.)
- 6. University/School related places (School, Gym, ISSS)
- 7. Banks/ATMs
- 8. Public transportation (Metro/Bus, Shuttle)
- 9. Routes/Names of streets
- 10. Leisure/sports/ exercise /recreational places
- 11. Movies/concerts/ entertainment places
- 12. Event/Fair/ Festivals

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