Socialization and Information Horizons:

Source Use Behavior of First-Generation and Continuing-Generation College Students

By

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DEDICATION

This dissertation is dedicated to my parents, Ming-che Tsai and Hui-Ying Wu.

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ABSTRACT

SOCIALIZATION AND INFORMATION HORIZONS: SOURCE USE BEHAVIOR OF
FIRST-GENERATION AND CONTINUING-GENERATION COLLEGE STUDENTS

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First-generation college (FGC) students have been described as an underrepresented group in comparison to their continuing-generation counterparts (non-FGC students). Studying college students' socialization experiences and their use of academic resources can help us understand how to facilitate their academic success.

Incorporating Sonnenwald's *information horizons (IH)*, Astin's *Input-Environment-Outcome (I-E-O)* model, and Weidman's model of *undergraduate socialization*, this study examines FGC and non-FGC students' socialization experiences in relation to their information behavior. The theoretical framework of *IH* describes how contexts, situations, and social networks shape individuals' information behavior; this framework emphasizes the role of social networks in information-seeking activities and the relationships among sources used by

individuals. *I-E-O* and *undergraduate socialization* models emphasize the interaction aspect in

undergraduate socialization. To delineate the complex networks in college students'

information-seeking activities, this study investigates how students position various information

sources on their academic IH maps and examines the sequential and referral relationships

among sources. Specifically, the study focuses on the roles of peers, professors, and parents in

IH.

With an explanatory mixed-methods research design, this study investigates how students'

backgrounds and college socialization experiences influence their IH. A survey was used to

examine students' information behavior in academic situations. Using critical incident

techniques, interviews and participants' IH map-drawings were also used to solicit students'

personal accounts of their socialization and source use experiences.

The study finds that frequently-used sources are typically placed in the preferred zones on

the IH map, are consulted as one of the first steps, and possess a referral quality. The findings

also demonstrate that students with different FGC status and in different class cohorts have

different socialization experiences. Socializing agents, such as parents, peers, and professors, are

important factors affecting students' academic source use behavior; information literacy courses

positively affect students' use of the library and experts.

The study reveals that socialization elements are an important aspect to be added to the

framework of IH and helps advance the use of mixed-method approaches to study information

behavior. Practical implications for the university and university library as well as research

implications for theory and methodology are discussed.

SOCIALIZATION AND INFORMATION HORIZONS: SOURCE USE BEHAVIOR OF FIRST-GENERATION AND CONTINUING-GENERATION COLLEGE STUDENTS

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1. INTRODUCTION

1.1 Problem Statement

With the growing number of bachelor's degree-holders, attaining post-secondary

education has become even more important for the job-hunting process. According to the Digest

of Education Statistics (National Center for Education Statistics [NCES], 2012a), only 31.5% of

the U.S. population between ages 25 and 64 have a bachelor's degree, and 57.4% of full-time

college students complete their bachelor's degrees within six years after starting. In Wisconsin,

about 21% of adults between ages 18 and 44 have a bachelor's degree (University of

Wisconsin—Madison [UW-Madison], 2007a). Not surprisingly, about 30% to 50% of students in

colleges and universities across the United States are first-generation college (FGC) students

(NCES, 2005; NCES, 2012b).[1] While using academic resources effectively is essential for all

college students to successfully attain their degrees (Gonzales, 2010), FGC students are less

familiar with available resources in college (Pascarella, Pierson, Wolniak, & Terenzini, 2004)

and tend to restrict themselves to fewer sources of information than their continuing-generation

counterparts (non-FGC students) (Davis, 2010). Due to the significant number of FGC students

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[1] National Center for Education Statistics [NCES] defines first-generation college students as students with neither parent who has education beyond high school.

(NCES, 1998, 2001, 2005), there have been many studies recently involving this population with

the ultimate goal of helping them access resources and succeed in college (e.g., Acker-Ball, 2007;

Chonwerawong, 2006; Davis, 2010; Logan & Pickard, 2012). However, most of these studies

have been done in the field of education; very few have been done in the field of library and

information studies (LIS), where researchers facilitate the access to information and examine

the use of information sources. A theoretical framework such as Sonnenwald's (1999)

information horizons (IH) provides a perspective for researchers to examine individuals' source

use behavior.

Among various definitions of first-generation college (FGC) students, this study defines

FGC students as those with neither parent who graduated from a four-year college or university

(Stephens, 2011; Stephens, Fryberg, Markus, Johnson, & Covarrubias, 2012; UW-Madison,

2008, 2011, 2012a, 2012b, 2012c).[2] Studies reveal that FGC students face unique challenges,

including lack of economic support from family and lack of experience using a library (Tyckoson,

2000). These studies mainly discuss FGC students' identity, motivation, integration, adjustment,

transition, persistence, and academic performance (Vargas, 2004). For instance, FGC students

have been observed to primarily come from low-income or working-class families, drop out of

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[2] See section 2.2.1 for further discussion of variations in the definition of FGC students.

college at a higher rate than their non-FGC peers, and struggle with the family culture and

academic culture (NCES, 1998; Nava, 2010; Ohl-Gigliotti, 2008; Olive, 2008; Stephens et al.,

2012; Terenzini, Springer, Yaeger, Pascarella, 1996; Tyckoson, 2000). More recently, an

increasing class divide affected by the education gap has also been reported (Brooks, 2012;

McManus, 2011). Compared to college-graduate parents, high-school-graduate parents cannot

afford to spend enough time and money on their children. Therefore, FGC students may face

more difficulties in college than their non-FGC counterparts in using various information

sources and receiving advice from their families, especially when seeking academic information.

In order to remedy these educational inequalities and the resultant class divide, we may need to

pay more attention to helping FGC students get the resources they need.

College socialization experiences, including academic engagement and social support,

are essential to student retention in college (Jensen, 2011; Kuh, 2003). The concept of

socialization was first applied in university contexts much later than it was applied in family and

cultural contexts. Based on Astin's (1977, 1984), Pascarella's (1985), and Tinto's (1975) work,

Weidman (1989) applied the concept of socialization to the college context and developed a

model of undergraduate socialization. He considered learning university culture a form of

organizational socialization. In his model, students' socio-economic status (SES) and precollege

experiences are important to how they experience the college life. Astin's (1991, 1993)

Input-Environment-Outcome (I-E-O) model examines college students' background

characteristics, the university culture with which they interact, and the resultant changes in

students' behavior. Astin's (1991, 1993) and Weidman's (1989) models, along with other models

of organizational socialization in higher education (e.g., Tinto's (1993) *student integration*

model), introduced psychological factors and environmental factors to investigate college

students' socialization. All these college socialization models emphasized the individuals and

groups that influence the students. The socializing agents of most interest to the current study

are students' parents, peers, and professors. These socialization experiences are closely related

to how students develop social networks in college (Corwin & Cintrón, 2011; Ekimyan, 2008;

Jackson, 2010; Lacy, 1978; Zappa, 2008) as well as how they interact with human sources to

meet their academic information needs (Tomlinson, 2002).

Diane Sonnenwald's (1999) *information horizons (IH)* is a theoretical framework

emphasizing individuals' social networks and source use behavior in their information-seeking

processes. IH propositions (Sonnenwald, 1999, 2005) (see section 2.3.1.1) also imply similar

concepts to socialization. For instance, the reflective nature in the information-seeking

processes implies the importance of learning in the information-seeking behavior; the

individually- and socially-determined nature of source selection implies the influences of

interactions with other people on an individual's source use behavior. Since the emphases of

this framework serve to illustrate the interest of the current study, this study adopts IH and

incorporates IH with the concept of socialization to explore FGC and non-FGC students'

academic information behavior.

1.2 Purpose and Methods of the Study

The general purpose of this study is to understand the information source use behavior

of FGC versus non-FGC students and its relationship to their socialization experiences, so that

we learn how to help each of the groups better utilize various sources and succeed in college.

Specifically, the purposes of this study can be addressed at three levels:

At an observational level, the study aims to examine the practices of academic

information use and the college socialization experiences of FGC versus non-FGC students in

terms of student-faculty and peer interactions. In order to achieve this goal, a questionnaire was

used to identify similarities and differences in socialization experiences and in source use

patterns between the two groups of students. This quantitative data was also used to identify the

relationships between students' demographic profiles and socialization profiles each compared

with information source use. Interviews were used to discover students' preferences for using various sources, including how they position these sources on their IH maps, and to explain the results derived from the questionnaire.

At a theoretical level, this study aims to expand IH by adding socialization elements to the framework. In order to achieve this goal, a conceptual framework (see Figure 2.4) is proposed to study this topic based on the literature review. The findings from both quantitative and qualitative methods were used to test and enrich this framework.

At a methodological level, the study aims to consolidate data-collection and data-analysis techniques used in IH research. In order to achieve this goal, the researcher develops a mixed-methods design by adding a questionnaire in addition to the qualitative instruments (i.e., an interview protocol and an IH map-drawing guide) which used to be employed to study IH. Specific techniques are discussed in chapter three.

Overall, among various information behavior theories and empirical studies, the theoretical framework of IH is an under-utilized framework (Tsai, 2010) and FGC students are an under-studied population. This study aims to bridge the gap in literature and in methodology. To address all of the above issues, an explanatory sequential mixed-methods design is used. This

involves collecting quantitative data first and then explaining the quantitative results with

in-depth qualitative data. In the first phase, an online questionnaire was used to collect data

from undergraduate students at a Midwestern research university. In the second phase,

semi-structured interviews were conducted as a follow-up to the quantitative results.

Interviewees were also asked to draw their IH maps during the interview sessions.

1.3 Research Questions (RQs)

In order to understand the source use behavior (both information sources and human

sources) of FGC versus non-FGC students and its relationship to their socialization experiences

and to achieve the purposes mentioned in the previous section, research questions guiding this

study were derived based on the IH propositions (Sonnenwald, 1999) and the concept of

socialization (Weidman, 1989, 2006):

1. IH and source usage in academic situations: (1a) How do FGC and non-FGC students

   position information and human sources on their IH in different academic situations? (1b)

   How frequently do they use these sources?

2. Process of using sources: (2a) What steps do students' information-seeking processes

   typically involve? (2b) What sources are consulted in each step? (2c) Do certain sources

direct students to other sources? (2d) Which sources possess this quality of directing

students to other sources?

3. Socialization and source use: (3a) What college socialization processes, particularly

    student-faculty and peer interactions (e.g., quality of non-classroom interactions with faculty,

    collaborative learning, and meaningful discussions with diverse peers), do FGC and

    non-FGC students experience? (3b) How do these college socialization experiences influence

    their academic source use behavior?

1.4 Assumptions

This study is grounded in the following assumptions based on related literature:

1. As for freshmen, FGC students are less familiar with college culture than their non-FGC

    counterparts (Davis, 2010; Housel & Harvey, 2009; Stephens et al., 2012);

2. FGC students use fewer sources of information, especially human sources (Davis, 2010),

    than non-FGC students;

3. FGC students rely more on peers as socializing agents in college (Davis, 2010; Logan &

    Pickard, 2012; Weidman, 2006) than non-FGC students;

4. Upperclassmen utilize a wider range of information sources and use the library more often than underclassmen (Head & Eisenberg, 2010a; Tenopir, 2003);

5. The differences in source use behavior between FGC versus non-FGC students are more obvious among freshmen than among seniors (Logan & Pickard, 2012).

1.5 Definitions of Terms

1.5.1.1 First-Generation College Students (FGC Students)

Most research universities, including the university where the sample was drawn from, include students whose parents attended some college but did not have a bachelor's degree as first-generation college students (Hong & Kircher, 2010). In this study, a *first-generation college student (FGC student)* is defined as a student without any parents who holds a bachelor's degree.

1.5.1.2 Continuing-Generation College Students (Non-FGC Students)

A *continuing-generation college student*, or a *non-first-generation college student (non-FGC student),* is defined as a student with at least one parent who holds a bachelor's degree.

1.5.1.3 Socialization

In the university context, a *socialization experience* can be defined as one through which a student is exposed to various socializing influences while attending college; the socializing influences that have an impact on the students' values, aspirations, personal goals, and behavior can be developed via social relationships with faculty and peers, family pressures, and involvement with reference groups outside the institution (Weidman, 1989).[3] According to Weidman (1989, 2006), *undergraduate socialization* occurs through processes of interpersonal interaction, learning, and social integration that link students with their college environment. In the context of the current study, *socialization* is a process by which college students' background characteristics and the college environments in which they interact with faculty, peers, parents influence their source use behavior. The main elements used in this study to measure students' socialization experiences in their college environment (see also Wabash College, 2011; Padgett et al., 2010; NSSE, 2011; Weidman, 2006) are: (1) quality of non-classroom interactions with faculty, (2) collaborative learning, (3) meaningful discussions with diverse peers (e.g., serious conversations on social and various other issues), and (4) parental direct teaching.

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[3] This is one aspect of Weidman's (1989) definition of socialization. See section 2.1.2 for a complete definition by Weidman (1989).

1.5.1.4 Information Horizons (IH)

According to Sonnenwald (1999) and Kari and Savolainen (2003), *information horizons*

(IH) are defined as an imaginary field where an individual positions information sources,

including human sources, he or she used in a specific situation within a context.

1.5.1.5 Source Use Behavior

Source use behavior is defined as the interactions individuals choose to make with

information sources—specifically, in the preferences for some information sources over others

(Bronstein, 2010).

1.6 Significance of the Study

This study has several potential contributions in theoretical, practical, and

methodological aspects. Theoretically, even though information use has been a widely studied

area in LIS, the framework of IH, especially of college students, has not been studied much.

Additionally, variations of the IH frameworks can be found in empirical studies (e.g., Huvila,

2009; Kari & Savolainen, 2003, 2004; Savolainen, 2006, 2007, 2008; Sonnenwald, Wildemuth,

& Harmon, 2001). This study aims to consolidate the variations and expand the framework with

the concept of socialization in order to highlight the important concepts for studying FGC versus

non-FGC students' information-seeking behavior. This expansion adds not only a socialization

dimension to the spatial dimension of the IH framework more explicitly, but also a

societal/environmental level to the individual level.

Methodologically, this study enriches the mixed-methods design for IH research. Most

IH studies use interviews with map-drawings to examine individuals' source use behavior (e.g.,

Chen & Tang, 2011; Kari & Savolainen, 2003, 2004; Savolainen, 2007, 2008; Sonnenwald et al.,

2001). In addition to interviews, this study also employs a questionnaire to investigate students'

demographics, socialization experiences, and information source use behavior. This helps not

only to develop the IH research methodology and the instrument, but also to increase the

generalizability of the findings. In practice, by examining the socialization and IH of FGC versus

non-FGC students, this study can offer suggestions to universities, academic libraries, and both

FGC and non-FGC students. It can also help these students manage coursework and persist in

obtaining their bachelor's degree. The implications may provoke thoughts on not only how to

help FGC students fit the university culture, but also how to better understand this population.

2. LITERATURE REVIEW

This chapter consists of five sections: (1) literature on FGC students versus non-FGC students, (2) socialization experiences of college students, (3) foundations of the IH theoretical framework and methodology, (4) information source use behavior of college students, and (5) the conceptual framework of this study. The first section discusses FGC students' characteristics as well as their learning experiences in contrast to their non-FGC counterparts. The second section introduces undergraduate socialization in higher education and its socialization models. The third section addresses the theoretical framework of IH and the application of mixed-methods approach to IH. The fourth section focuses on empirical studies in information source selection of undergraduate students, including the sources they use as well as their perceptions of sources. The concluding section proposes a conceptual framework for studying FGC and non-FGC students' socialization experiences and IH.

2.1 First-Generation College (FGC) Students and non-FGC Students

This section of the literature review first discusses the definitions of FGC and non-FGC students, and then focuses on FGC students' characteristics, including their demographics, family support, and academic performance. This section of review draws literature mainly from higher education, educational psychology, and social psychology, and emphasizes how college

students, both FGC students and non-FGC students, learn in college. Literature addressing

issues of FGC students versus non-FGC students provides academic libraries with implications

for better serving FGC students, especially how to facilitate their use of academic resources.

2.1.1.1 Definitions of FGC and non-FGC Students

There are various definitions of *first-generation college students (FGC students)*. Some

define *FGC students* as those without a parent who attended college (e.g., NCES, 1998, 2005,

2011), while others define them as students without a parent who has a college degree (e.g.,

Davis, 2010; Hong & Kircher, 2010; Ishitani, 2003; Nava, 2010; Stephens, 2011; Stephens et al.,

2012; UIC, 2002, 2009, 2011; U.S. Department of Education, 2008; UW-Madison, 2008, 2012a,

2012b, 2012c). Still others define *FGC students* as those with neither parents nor siblings who

attended college (e.g., Tyckoson, 2000; York-Andersen & Bowman, 1991). Many studies leave

FGC students undefined or do not specify which type of college degrees they refer to

(Ohl-Gigliotti, 2008). In the current research setting, a *college degree* refers to a bachelor's

degree from a four-year institution, and an *FGC student* is defined as one without a parent who

has a bachelor's degree.

Most research universities, including the university where the sample was drawn from,

included students whose parents attended some college but did not have a bachelor's degree as

FGC students (Davis, 2010; Hong & Kircher, 2010; UW-Madison, 2008, 2012a, 2012b, 2012c).

NCES studies (1998, 2005, 2011) conducted nationwide surveys and emphasized that FGC

students are the "first member in their families" to attend college, and thus defined FGC

students are those whose parents did not attend college at all. However, the current study drew

the sample from a four-year research university. The research focuses on students' college

experiences and the sources they used. Parents who did not graduate from a four-year

postsecondary education institution have not experienced what the student is and will be going

through, and thus may not be able to provide the students with guiding information. Therefore,

an *FGC student* in this study is defined as a student without a parent who has a bachelor's

degree, while a *non-FGC student* is defined as a student with at least one parent who has a

bachelor's degree.

One could argue that students with parents who were partially exposed to postsecondary

education but did not obtain a degree may receive different academic support than students

with parents who never attended college (Attewell & Lavin, 2007). With this in mind, some

scholars discuss the differences among the threefold scheme in addition to the dichotomous

FGC versus non-FGC student discussion (e.g., McGregor, 2003; Pascarella et al., 2004; Riehl,

1994). Regardless of which of the above definitions was used, these scholars divide either FGC

students or non-FGC students into two sub-categories for an in-depth discussion. Given that

students with parents who received some postsecondary education may have a different

socialization experience with other students, the current study further investigates students

without a parent who holds a bachelor's degree (FGC students) by including both: (1) students

without a parent who received any postsecondary education, and (2) students with at least one

parent who had some postsecondary education but without a parent who holds a bachelor's

degree.

2.1.1.2 Characteristics of FGC versus non-FGC Students

Recent studies in education have been investigating the motivation, integration,

adjustment, persistence, and academic performance of the FGC students (Acker-Ball, 2007;

UW-Madison, 2008; Stuber, 2011). Many studies showed the challenges encountered by FGC

students attempting to excel in college and emphasized students' demographic characteristics,

their adjustment to college, academic performance, and retention rates (e.g., Nava, 2010; Stuber,

2011). Scholars noted that compared to non-FGC peers, FGC students tend to be female, older in

age, come from a lower-income working-class family, work longer hours to support themselves,

and have a higher drop-out rate (Acker-Ball, 2007; Chonwerawong, 2006; Nava, 2010;

Ohl-Gigliotti, 2008; Olive, 2008; Stuber, 2011). Research in LIS also indicated that FGC

students face more difficulties in university-level research than their non-FGC counterparts

because they have not had opportunities to acquire research skills, including search skills, prior

to college (Logan & Pickard, 2012). However, in discussing students' library experience, another

study pointed out that FGC students tend to be closer to the extremes of the library-use

spectrum than their non-FGC peers. Some FGC students have been frequently exposed to

libraries because they have very few books at home; other FGC students have little or no library

experience prior to college (Tyckoson, 2000). Thus, learning FGC and non-FGC students' home

and high school information environment is important because it can help them adjust and

transition into college.

Human sources can be important to college students' in seeking academic information.

Torres and her colleagues (2006) used a grounded theory approach to examine how Latino FGC

students seek academic information. They proposed a model explaining the academic

information-seeking process of Latino students. According to their study, Latino FGC students

start seeking academic information from peers and pamphlets first, and then consult their

advisors or mentors. Torres and her colleagues also claimed that the unclear role of the advisor

as well as the untrusting relationship with advisors make students hesitant to seek help from

advisor and other university services. Logan and Pickard (2012) investigated first-year FGC

students' research experiences in college and found that students rely more on peers on seeking

academic information. Rather than consulting librarians, some of them turn to instructors/TAs

for library resources because they consult people who they are more familiar with. These studies

outlined the process of FGC students' academic information-seeking patterns in general and

implied the importance of human sources, especially the familiar ones. However, they did not

address how students' information-seeking behavior may change across specific academic

situations.

Human sources and social support may also be important to FGC students' academic

success. Saunders and Serna (2004) examined Latino FGC students' adjustment to college life

and Stanton-Salazar and Dornbusch (1995) examined Mexican FGC students' transition into

college experience. They concluded that intervention programs provided academic information

access and social support for these students and helped them obtain a college-going identity and

succeed in college. Other studies pointed out that parents' (Acker-Ball, 2007; Donatelli, 2010;

NCES, 1999) or relatives (Martinez, Sher, Krull, & Wood, 2009) involvement and

encouragement can play important roles in students' academic performance. Thus, examining

how students use their parents and other family members to get information and get help in

their academic situations can enhance our understanding of parents' and relatives' roles as

information sources.

Regarding research methods used in FGC student research, there is growing literature

investigating FGC students through qualitative approaches, especially using ethnographic

methods, and future research on the same topic can use quantitative methods to add insights to

the body of previous literature (Davis, 2010; Duke & Asher, 2012). Thus, the current study

employs a mixed-method research design to investigate FGC students and non-FGC students'

academic information behavior.

2.2 Socialization Experiences of College Students

The second section of the literature review focuses on undergraduate socialization and its

models. The first subsection of the review emphasizes the aspect of student-faculty and peer

interactions in undergraduate socialization; the second subsection addresses Astin's (1991, 1993)

I-E-O model and Weidman's (1989, 2006) *model of undergraduate socialization*, which stress

this interaction aspect. Literature in this section is mainly from the fields of higher education,

social psychology, and sociology.

2.2.1.1 Undergraduate Socialization

Socialization is a term that has been used in many different contexts throughout an individual's life course in social science research, and it is usually defined as the process individuals acquire their values, norms, and behaviors in order to participate in the society (Delamater, 2006), or "the process by which persons acquire the knowledge, skills, and dispositions that make them more or less effective members of their society" (Brim, 1966, p. 3; Weidman, 1989). Weidman (1989) viewed socialization in a university context as a form of organizational socialization and defined *undergraduate socialization* as:

> A series of processes whereby the student: (1) enters college as a freshman with certain values, aspirations, and other personal goals; (2) is exposed to various socializing influences while attending college, including normative pressures exerted via (a) social relationships with college faculty and peers, (b) parental pressures, and (c) involvement with non-college reference groups; (3) assesses the salience of the various normative pressures encountered for attaining personal goals; and (4) changes or maintains those values, aspirations, and personal goals that were held at college entrance. (p.301)

Undergraduate socialization has been discussed in relation to adolescent transitions to young adulthood (Hurrelmann & Engel, 1989) and with an emphasis on interactions with socializing agents, as suggested by the aforementioned second aspect of Weidman's (1989) definition (e.g., Padgett, Goodman, Johnson, Saichaie, & Umbach, 2008; Weidman, 1989).

Scholars clarified the differences between childhood socialization and adult socialization and emphasized the importance of interactions in adult socialization (Brim, 1966; Padgett et al., 2008; Weidman, 1989, 2006). Brim (1966) contended that the purposes of socialization is to give a person knowledge, ability, and motivation; however, socialization after childhood focuses more on the knowledge and ability to carry out the overt behavior than to hold appropriate values, and the objective of adult socialization is to help individuals to practice a new combination of skills acquired. When emphasizing interactions in adult socialization, Brim (1966) proposed that the relationships of an individual to the socializing agents can be analyzed in three aspects: formality of the relationship, power and support in the relationship, and group context of the person being socialized (Brim, 1966). Wheeler (1966) further indicated the important roles of the socializing agents and settings in the socialization process from an organizational perspective. He proposed different socialization types based on social context and composition of members, and argued that universities as an interpersonal setting can be

categorized as a "collective serial setting," which provides individuals with support, because

within a large-scale organization students can interact with their peers who entered the

institution at the same time or with seniors who have been a member of the institution for a

longer period of time. In this case, students are socialized as a member of a group and represent

one of the students passing through the socialization process in succession. Just as many

scholars emphasized the interaction in a socialization setting such as a university (Feldman,

1972; Wallace, 1964; Weidman, 2006), Wheeler's (1966) typological discussion reinforced the

importance of interactions with socializing agents in the college socialization experiences.

In order to study the interactions in socialization, important socializing agents to college

students have been identified in various studies. Some studies investigated parental and peer

influences on college students' financial behaviors (Cho, Gutter, Kim, & Mauldin, 2012; Shim,

Barber, Card, Xiao, & Serido, 2010); other studies examined students' interactions with faculty

members and peers (Padgett et al., 2008; Padgett et al., 2010; Weidman, 1989). While

interactions between students and parents and among peers have influence on college students'

financial behavior (Gutter, Copur, & Garrison, 2010), interactions between students and faculty

and among peers have been proven to have a positive impact on college students' academic

performance, educational attainment, and career development (Astin, 1993; Pascarella &

Terenzini, 1991; Tinto, 1993). Faculty members also have a great influence on undergraduate

students' library use (Logan and Pickard, 2012). However, Padgett et al.'s (2010) study

concluded that, FGC students get much less benefit from faculty, as socializing agents, than their

non-FGC counterparts. Therefore, faculty would be an agent worthy of further investigation

when studying FGC versus non-FGC students' college socialization.

In addition to socializing agents, indicators typically studied in college socialization

research include majors, peer groups, and co-curriculum as indicators (Feldman, 1972; Wallace,

1964; Weidman, 2006). Among these variables, many scholars included students' majors as one

of the critical factors in college socialization (Brimeyer, Miller, & Perrucci, 2006; Weidman,

2006). Other commonly examined demographic variables in college socialization studies

include gender, ethnicity, class cohort, and socioeconomic status (SES) (Gutter et al., 2010;

Padgett et al., 2008, 2010). For instance, Logan and Pickard (2012) suggested that researchers

should examine the differences between first-year and senior-year FGC students to understand

their research experiences and how they learn in college.

In general, studies of undergraduate socialization tended to focus on the transition from

high school and community college to four-year universities (Duke & Asher 2012; e.g., Nava,

2010; Shim et al., 2010) and emphasized the importance of students' precollege characteristics

(e.g., race, SES, and high school grades) and their interactions with faculty and peers in college

(Chonwerawong, 2006; Padgett et al., 2008, 2010; Pascarella & Terenzini, 1991; Wabash, 2011;

Weidman, 1989, 2006). This stream of research revealed that students who adjust well to the

college environment are usually those who develop their academic literacy (Zappa, 2008), who

are able to reduce uncertainty, and who find information that meet their needs (Tomlinson,

2002) through the socialization processes. Duke and Asher (2012) suggested that future

research may include students at different stages in their programs. Instead of focusing only on

first-year students, the current study investigates students at different stages in their

undergraduate programs, and focuses, using the socialization models described in the next

section (2.2.1.2), on students' precollege characteristics and their interactions with faculty and

peers.

2.2.1.2 Models of Socialization in Higher Education

Models of socialization in higher education stress the importance of studying the impact

of college on students and resultant student changes and development. According to Weidman

(2006), two main streams of theories can be identified: (1) developmental models of student

change that emphasize students' intrapersonal change, and (2) college impact models that

emphasize students' interpersonal experiences. The current study focuses on students'

interpersonal experiences and is based on socialization models that emphasize college impact.

Astin's (1991, 1993) *input-environment-outcome (I-E-O) model* and Weidman's *model of*

undergraduate socialization (1989) and *model of organizational socialization of students in*

higher education (2006) have been widely used to study college impact and students'

socialization (e.g., Padgett et al., 2008, 2010; Saks, Gruman, & Cooper-Thomas, 2011; Smith &

Zhang, 2009; Whitmire, 1998). This section describes Astin's and Weidman's models and points

out specific aspects of these models that are of interest to the current study.

Astin (1991, 1993) proposed an *I-E-O model* to understand college student change and to

assess programs and policies in higher education. This model investigates how the college

environment and students' background characteristics influence their cognitive skills or their

non-cognitive attitudes and behaviors. According to Astin (1993, p.7), *inputs* refer to "the

characteristics of the student at the time of initial entry to the institution," *environment* refers to

"the various programs, policies, faculty, peers, and educational experiences to which the student

is exposed," and *outcomes* refer to "the student's characteristics after exposure to the

environment." Outcomes can be broadly defined, including students' cognitive and

non-cognitive outcomes such as attitudes, values, aspirations, and other behaviors. These

outcomes can be measured by students' self-reported values and satisfaction.

Astin (1991, 1993) measured students' inputs by the courses they took in high school,

preliminary choice of career, reasons for attending college, religious preference, parental

occupation, parental income, parental education, and other demographic measures such as

ethnicity, age, gender, marital status, and citizenship. He measured environment using

institution characteristics, student's peer group characteristics, faculty characteristics,

curriculum, financial aid, major field choice, place of residence, and student involvement.

Among all the above categories of measures, Astin (1991, 1993) pointed out some specific

measures that are related to college students' information use. When measuring the college

environment, Astin identified variables that measure students' involvement with faculty and

peers, including non-classroom interactions with faculty and diverse peers, collaborative

learning, and the formation of student communities; he also identified variables that measure

students' use of campus services and facilities, including the library. When measuring outcomes,

he identified students' experiences and satisfaction in using library and computer facilities, as

well as students' experiences contacting faculty and relating to their peers.

Weidman (1989, 2006) proposed a *conceptual model of undergraduate socialization* (Figure 2.1) and incorporated other models (Astin, 1977, 1984; Pascarella, 1985; Tinto, 1975) for studying the organizational socialization of students in higher education (Figure 2.2). He emphasized the interpersonal dynamics of an academic environment, including interactions, integration, and learning. He contended that undergraduate socialization involves a set of processes resulting in specific outcomes, and that socialization processes include intrapersonal interactions (e.g., studying and attending lectures), interpersonal interactions (e.g., faculty and peer interactions), and integration (e.g., incorporation into campus academic and social life).

Parental Socialization
1. Socio-economic Status
2. Life Style
3. Parent/Child Relationships

Student Background Characteristics
1. Socio-economic Status
2. Aptitude
3. Career Preferences
4. Aspirations
5. Values

Pre-college Normative Pressure

Collegiate Experience

Normative Contexts + Socialization Processes

Academic
1. Formal
   a. Institutional Quality
   b. Institutional Mission
   c. Major Department
2. Informal
   a. Hidden Curriculum

Social
1. Formal
   a. Institutional Size
   b. Residences
   c. Organizations
2. Informal
   a. Peer Groups

+ 1. Interpersonal Interaction

+ 2. Intrapersonal Processes

+ 3. Integration
   a. Social
   b. Academic

In-college Normative Pressure

Socialization Outcomes
1. Career Choices
2. Life Style Preferences
3. Aspirations
4. Values

Non-College Reference Groups
1. Peers
2. Employers
3. Community Organizations

Figure 2.1. Weidman's (1989, p.299) conceptual model of undergraduate socialization.

Using Astin's (1991) *I-E-O model*, Weidman (2006) discussed undergraduate

socialization in three stages: anticipatory socialization, interactive socialization, and personal

socialization. These stages are not necessarily in a linear sequence; often, they are interactive

with one another (Weidman, 2006). In the anticipatory stage, Weidman (2006) examines

students' inputs, or the background characteristics that they held when entering college, such as

their socioeconomic status (SES) and aspirations. In the interactive stage, he examines the

college environment, focusing on students' formal and informal interactions with college

reference groups (e.g., faculty and peers) and non-college reference groups (e.g., friends from

off-campus communities and parents). This is the main stage in which students experience

socialization, regardless of the context. Finally, in the personal stage, Weidman (2006) focuses

on the outcomes of personal socialization, such as students' knowledge, skills, and career

choices (see Figure 2.2).

Professional
Communities
Practitioners
Associations

Higher Ed Institutions

Prospective	Normative	Socialization	Novice
Students	Contexts	Processes	Professional
Background	Majors	Interaction	Practitioners
Predispositions	Peer Groups	Integration	Skills
Preparation	Co-curriculum	Learning	Dispositions

Prospective
Students
Background
Predispositions
Preparation

Normative
Contexts
Majors
Peer Groups
Co-curriculum

Socialization
Processes
Interaction
Integration
Learning

Novice
Professional
Practitioners
Skills
Dispositions
[Commitment]
[Identity]

[Knowledge Acquisition]
[Involvement, Engagement]
[Investment]

Personal
Communities
Family
Friends
Employers

Inputs	Environment	Outcomes
Anticipatory	Interactive Stages of	Personal
	Socialization:	
	Formal, Informal	

Figure 2.2. Weidman's (2006, p.257) conceptual model of organizational socialization of students in higher education.

Like Astin, Weidman (1989, 2006) considered inputs, environment, and outcomes as three main elements in undergraduate socialization and emphasized student-faculty and peer interactions in socialization processes. He further added parental socialization to his framework as a one of its *environment* elements. When discussing normative pressures, Weidman (1989) divided socializing agents into two categories: pre-college normative pressures (e.g., influences from parents and pre-college peers) and in-college normative

pressures (e.g., influences from faculty and peers in college). Using these emphases, he further

discussed college students' interactions and integration in the academic and social normative

contexts. Weidman suggested that the outcomes of socialization can be applied to various

issues, and the ultimate goal of this framework is to shed light on higher education policies and

to help students learn in college.

Based on Astin's (1991, 1993) and Weidman's (1989, 2006) models, the current study

examines a context-specific organizational socialization by focusing on an individual's role as a

college student in the university context. The main focus is on the environment element in these

models, especially students' interpersonal interactions with college (e.g., professor and peer)

and non-college (e.g., parental) reference groups. The conceptual framework as described in

section 2.5 and the research instruments (see appendices) are developed based on these

emphases.

2.3 Information Horizons (IH)

The third section of the literature review focuses on the theoretical framework of IH and

the mixed-methods approach that can be applied to IH research because Sonnenwald (2005, p.

191) considers IH as a methodology to approach individuals' information behavior. Even if she

proposed research methods to collect and analyze data, variations can be found in IH literature. Therefore, the second subsection of this IH literature review also includes a discussion of methods used in IH research.

2.3.1.1 IH Theoretical Framework

Sonnenwald (1999, 2005) proposed the theoretical framework of *information horizons (IH)* to describe individuals' information behavior. She asserted that information behavior may be viewed as "collaboration among an individual and information resources" (Sonnenwald, 1999, p. 186), and used the information horizon map to graphically represent information sources and individuals' source preferences (Sonnenwald, Wildemuth, & Harmon, 2001). An individual's IH vary across contexts, situations, and social networks; therefore, IH studies help researchers understand individuals' information seeking, filtering, use, and dissemination. Sonnenwald (1999, 2005) also suggested that the studies of IH should examine when and why people do and do not access humans and other information sources, as well as the relationships among information sources in an information-seeking process. Savolainen and Kari (2004) further described "horizon" as an imaginary field and claimed that everyone has his or her own imaginary field upon which he or she positions various information sources according to personal preferences. They concluded that this mental map is the "information source horizon,"

and that perceived accessibility and quality are two main factors that influence people's IH.

Savolainen (2007) further identified user characteristics (such as media use habits) and

situational factors (such as lack of time) in addition to perceived accessibility and quality in IH

studies.

The three main IH concepts – contexts, situations, and social networks – can be discussed

as follows:

Contexts

A constructivist typically views *context* as the person's context, while a realist views it as the

context of activities (Fidel, 2012, p. 151). Fisher et al.'s (2004) information grounds and

Chatman's (2000) small world are examples of using conceptual constructs to define a context

(as cited in Fidel, 2012), and Case (2012) discussed contexts based on occupation, social roles,

and demographics. As Fidel (2012) contended, conceptual constructs and empirical research in

information behavior are not categories that are mutually exclusive. She viewed a *context* of

activities as constraints that are shaped by the level and type of resources available to the actor,

and believes that context and environment are sometimes used interchangeably by researchers.

Therefore, "*Context* is reserved for the constraints that actually shape human information

interaction activities taking place in a system (Fidel, 2012, p. 152)." Sonnenwald's definition of

context incorporates both perspectives and is closer to a realist's perspective. According to

Sonnenwald (1999), *contexts* are "multi-dimensional and can be described by attributes include

place, time, goals, tasks, systems, situations, processes, organizations, and types of participants."

(p. 179)

Situations

Situation is another term commonly used in information behavior research but lack of a

consistent definition. Allen (1997) defined *situation* as a collective situation in which different

individuals face the same problems using the person-in-situation. Wang (2011) contended that

situation can be an internal or external construct, and it is more dynamic and personal than

context. Sonnenwald (1999, p. 180) argued that since a flow of situations constitute a context, a

situation may be characterized as "a set of related activities, or a set of related stories that occur

over time." Based on Sonnenwald's definition, the current study situates the research in the

contexts of students' academic information seeking in family/university settings and examines

coursework-related *situations* (i.e., course-related, program-related, and moral support issues)

within this academic context.

Social networks

Social networks have been widely used in sociology, social psychology, and communication; this concept have also been applied and discussed in information behavior research in the last two decades (Haythornthwaite, 1996; Schultz-Jones, 2009; e.g., Pettigrew, 2000; Steffes & Burgee, 2009).

Two important concepts in social networks are *nodes* (or *actors*) and *links* (or *relations/ ties/ linkages*). *Nodes* may be individuals or groups of people; a *link* is generally defined as a specific kind of contact or connection between a pair of actors. In information science contexts, *links* can be viewed as "channels for transfer or 'flow' of resources" between actors (Wasserman & Faust, 1994, p. 4) and can be used to discuss the diffusion of information (Schmidt, 2006).

Depending upon the number of nodes and links, relational links can be categorized into different levels, such as *ego*, *dyad*, or *triad* (Wasserman & Faust, 1994). An egocentric network consists of one node (an *ego*) and all other nodes with direct links to the node. This type of network is appropriate for research that is conducted with participants unlikely to have had any contact with one another (Knoke & Yang, 2008). Since information behavior studies usually collect data from participants who do not know one another, these studies typically examine individuals' egocentric networks.

Sonnenwald (1999, p. 180) contended that *social networks* refer to communication among

individuals, in particular, patterns of connection and resonance interaction. Social networks

help construct situations and contexts and are constructed by situations and contexts (as shown

in *Figure 2.3*). In this IH framework, social networks serve as both independent and dependent

variables. As an independent variable, social networks influence individuals' information source

use behavior; as a dependent variable, individuals' social networks are influenced by factors

such as contexts and situations. Therefore, the current study introduces the concept of

socialization and emphasizes its interaction aspect to reinforce the concept of social networks in

IH studies. Specifically, the study uses interactions in socialization to discuss social networks as

an independent variable, and uses the referral relationships among sources to discuss social

networks as a dependent variable.
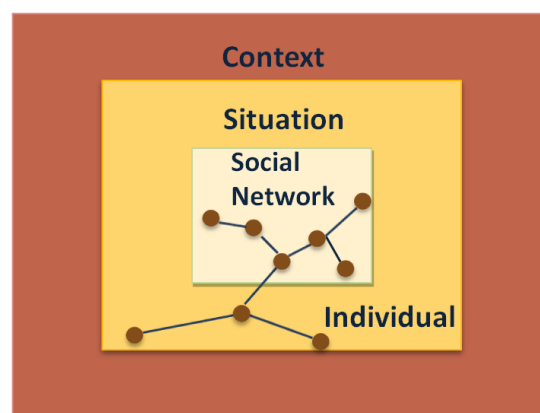
Figure 2.3. Sonnenwald's (1999) IH framework.

What IH framework emphasizes parallels the critical principles of the social network

perspective. Felmlee (2003, p. 391) proposes three principles for the social network perspective:

(1) the social network perspective emphasizes links among nodes; (2) individual behavior is

dependent on others' behavior within a social network; and (3) individual behavior is influenced

by a network environment. These principles are consistent with the IH propositions introduced

in the following discussion and imply the adequacy of adding a socialization element to the IH

framework.

The IH theoretical framework contains five propositions that describe the relationships of

the three concepts stated above (Sonnenwald, 1999):

1. Human information behavior is shaped by and shapes individuals, social networks,

   situations, and contexts.

2. Individuals or systems within a particular situation and context may perceive, reflect,

   and/or evaluate change in others, self, and/or their environment.

3. Within a context and situation is an "information horizon" in which we can act.

4. Human information seeking behavior may, ideally, be viewed as collaboration among

   an individual and information resources.

5. Because information horizons consist of various information resources, many of which

   have some knowledge of each other, information horizons may be conceptualized as

   densely populated spaces. (pp.181-188)

IH propositions imply the importance of environmental factors in addition to individual

factors: in proposition two, Sonnenwald (2005, p. 192) indicated that "individuals within a

particular situation and context may perceive, reflect, and/or evaluate change in others, self,

and/or their environment"; when explaining proposition three, Sonnenwald (2005, p. 193)

claimed that "information horizons, and subsequently information resources, are determined

socially and individually and may be different for different contexts even for the same

individual." The individually/socially-determined nature and the reflective nature of the

information-seeking process mentioned in these propositions connote ideas that learning and

collaborative learning are important elements in information-seeking behavior. While IH

emphasizes individual's perception, all the aforementioned reasons provide a foundation for us

to include socialization experiences in IH as the theoretical framework to examine FGC and

non-FGC students' information behavior.

As mentioned in chapter one, the current study assumes all the above propositions and

relates the research questions to these propositions. RQ1 is developed based on propositions one

and three, and incorporates the concepts of contexts and situations in the research inquiries;

RQ2 is based on proposition five, and explores the sequential and referral relationships among

information and human sources used by individuals; RQ3 is based on propositions two and four,

and adds the concept of socialization to the that of social networks in IH research.

2.3.1.2 IH Methodology

IH has been used as a methodology approaching information-seeking behavior with an

emphasis on source use behavior, and there are various ways to examine individuals' IH.

Sonnenwald suggested that using critical incident to conduct in-depth interviews and to

facilitate information horizon map drawings can help effectively discern users' IH (Sonnenwald

et al., 2001; Sonnenwald, 2005). This may help researchers not only to understand individuals'

information source use behavior, but also to explain the role of these information sources in

users' information-seeking processes. Furthermore, Sonnenwald and her colleagues (2001)

suggested that surveys can be used as a triangulation in information horizon research. They

emphasized the importance of triangulation but also indicated the difficulties in designing

survey questions that capture the variety and richness of information sources used by students.

Although Sonnenwald and her colleagues did not suggest specific ways to collect social

network data for IH research, they considered social networks as one of its main concepts,

proposed possibilities for incorporating social network analysis methods into IH research, and

emphasized the importance of mixed-methods approaches to IH. Schultz-Jones (2009)

suggested that various methods, such as surveys, interviews, and social network maps, can be

employed to collect data regarding social networks for information behavior research in general.

To collect data that can provide more complete picture of IH, the current study uses a web

survey, interviews, and informants' map-drawings.

When analyzing IH, Sonnenwald and her colleagues (2001) employed a matrix to

illustrate students' preferred order of information resources. The resources were presented in

the matrix and were sorted by the number of students who mentioned a resource and the total

number of times a resource was mentioned by the students. Savolainen and Kari (2004) used

three concentric circles to illustrate how users prioritize information sources according to their

preferences. The authors summarized the sources that appeared in informants' map-drawings in

tables and calculated weighted scores for each source by weighting the most and the

second-most preferred zones. Huvila (2009) argued that drawing an analytical information

horizon map (AIHM) based on interview data gathered by the researcher, instead of drawn by

the informants, may be more effective because the AIHM avoids the problem of informal and

inconsistent notations among informants. Tsai (2012) used a variation of Savolainen and Kari's

(2004) concentric circles and Huvila's (2009) AIHM to present participants' source preferences

with concentric circles. In order to better understand students' perception of sources, to solicit

notations used in students' information horizon maps, and to allow for future questionnaire and

interview design, this study adopts the informant's map drawings with a variation of Savolainen

and Kari's (2004) data analysis method by calculating weighted scores and compiling all

students' maps into one map with concentric circles, as described in chapter three.

Overall, IH is an evolving theoretical framework. Sonnenwald (1999, 2005) suggested

that in order to enrich this framework, more empirical research in various contexts with various

users is required. Therefore, this study utilizes a mixed-methods research design to study the IH

of FGC and non-FGC students in an academic context.

2.4 Source Use Behavior of College Students

The fourth section of this literature review focuses on empirical studies in information

source selection of college students, including IH empirical studies. By outlining the discussion

of sources student use as well as their perceptions of sources, this section helps the researcher

identify variables to be included in the conceptual framework and positions this study among

information behavior research.

Information behavior research examines individuals' source use behavior, whereas

library use studies often examine individuals' source use behavior in addition to library services

users used (e.g., Logan & Pickard, 2012; Sin, 2009; Whitmire, 2003). Studies of information

source use behavior have typically investigated the frequencies of source use and individuals'

perception of sources in order to learn their information source preferences and selection

criteria (Head & Eisenberg, 2010a; Kim & Sin, 2011; O'Brien & Symons, 2007; Tenopir, 2003).

Researchers have been especially interested in how undergraduate students evaluate and select

resources. Some commonly discussed criteria include accessibility, accuracy, credibility,

currency, and familiarity (Head & Eisenberg, 2010a; Kim & Sin, 2007, 2011; Metzger, Flanagin,

& Zwarun, 2003; O'Brien & Symons, 2007; Tenopir, 2003; Twait, 2005). Other studies examine

the relationships among sources. For instance, information pathway studies examine the

sources used in each step by users in their information-seeking behavior (Bronstein, 2010).

Recent studies on source use behavior summarized the roles of accessibility and quality

in individuals' information-seeking processes and discussed the moderating role of information

needs in individuals' information source selection. Lu and Yuan (2011), for example, measured

individuals' information needs by computing the differences between respondents' self-reported

current knowledge and their sufficiency threshold scores – each on a zero (knowing nothing) to

ten (knowing everything) scale. They scrutinized how information needs influence information

source selection, and discovered that: individuals favored source quality over accessibility when

they had medium information needs; individuals preferred human sources over information

sources as their information needs increased. Cole (2012) proposed an information need theory

and discussed how information use is related to information needs. He proposed three types of

information use—pre-focus, focusing, and post-focus—based on individuals' experiences and

knowledge, which determine their information need. He then argued that when studying

individuals' information use, researchers need to contextualize individuals' information need in

their problem situation, social and work environment, or task. Both Cole's (2012) and Lu &

Yuan's (2011) discussion about the moderating role of information needs on information source

selection is actually similar to what the theoretical framework of IH emphasizes. From an

information horizon perspective, it is important to investigate how contexts and situations shape

an individual's information behavior and needs. Therefore, in the current study, various

coursework-related situations are examined.

IH incorporates information needs and information seeking into source use behavior

research by emphasizing the concepts of contexts and situations. Nevertheless, only a few

empirical studies have used IH to examine users' information behavior, most of which have

focused on everyday life or career-related contexts (Kari & Savolainen, 2003; Savolainen & Kari, 2004; Savolainen, 2007). Some recent studies, however, have focused on graduate students' information-seeking activities in research process (Tsai, 2010; Chen & Tang, 2011) as well as on undergraduate students (Sonnenwald et al., 2001; Tsai, 2012).

While IH studies focus on the information sources used by individuals, some large surveys reveal recent trends of college students' source use behavior. For instance, Head (2007, 2008) and Head and Eisenberg (2009a, 2009b, 2010a, 2010b) conducted a series of studies with over 11,000 students from 57 colleges and universities regarding their source use behavior in course-related and everyday-life research contexts. For course-related research, the survey that was conducted with over 8,000 students from 25 campuses demonstrates that a large majority of the students consult course materials, search engines, library databases, and instructors (Head & Eisenberg, 2010a). The course-related research in Head and Eisenberg's series of work is defined as research "from the moment students receive a research assignment in a college course, through collecting materials, until turning in the final assignment to an instructor" (Head, 2013, p.474).

Library Journal conducted another large survey that discussed recent trends of how college students use various sources for academic research. Library Journal's academic library

patron profiles (Bowker Market Research, 2012) surveyed 2,516 undergraduate and graduate

students and 751 faculty members from community colleges, colleges, and research universities.

Among a wide range of sources (e.g., Google, Wikipedia, physical campus libraries, library

online resources, academic bookstores on campus, local bookstores, public libraries, faculty, and

librarians), results show that the top information resources students use for academic research

are: search engines, the course management system, faculty members, and both online and

physical bookstores. Academic research that is defined in the Library Journal survey is broader

than the one used in Head and Eisenberg's work. The academic research scenarios in the Library

Journal survey include: writing a dissertation/thesis or scholarly publication, fact-checking,

writing a novel or non-fiction, and researching a historical news article or local history.

OCLC's (2011) research focuses on the trends of how individuals (over 14 years old) use

the library. The surveys recruited 3,348 and 2,229 individuals in 2005 and in 2010 respectively.

Among all participants, 396 (in the 2005 survey) and 256 (in the 2010 survey) were college

students. The report shows that college students have increase their use of library websites (53%

to 58%), but have decreased their use of e-journals (41% to 39%) since 2005. The use of online

databases remains the same (30%). In terms of the top three steps for research, 83% of the

college students start their information search from a search engine, 7% from Wikipedia, and

none from a library website. When asking college students how trustworthy the information

from library sources and from search engines are, about half of the students believe that library

sources are more trustworthy, and another half believe that both are equally trustworthy.

However, students comment that they would cross-reference with other websites or sources if

they question the information they get.

In addition to the aforementioned surveys, other source use behavior research

categorized information and human sources used by individuals and provided a guideline for the

current study to design its research instruments. When studying the information use of LIS

students, Bronstein (2010) categorized four types of information sources, namely, networked

sources, human resources, printed resources, and expert resources. When studying FGC

students, Logan and Pickard (2012) categorized five types of human sources: instructor/TA,

friend(s)/classmate(s), librarians, family member(s), and writing center. Based on Bronstein's

(2010) and Logan and Pickard's (2012) typology of sources, the current study also include

categories proposed by other IH studies (e.g., Chen & Tang, 2011; Sonnenwald et al., 2001; Tsai,

2012) and totaled twenty information and human sources (see appendix A).

When studying students' socialization experiences and their transition into college

experience in relation to their information source use behavior, it is important to examine their

experiences in high school. In order to understand FGC and non-FGC students' college

experience and information behavior, it is important to include some environmental factors that

influence students' information use. The current study adopts constructs to measure students'

previous experiences in high school. For example, the study adopts questions that measure high

school information environment from *Education Longitudinal Survey (by NCES)* (Sin, 2009)

and general high school experiences from *Wabash National Study of Liberal Arts Education*

(Padgett et al., 2008; Wabash, 2011).

    Other source use behavior studies have shown that class cohort (e.g., freshmen,

sophomores, etc.) plays a role in an individual's information source selection and use (Callinan,

2005; O'Brien & Symons, 2007; Tenopir, 2003; Twait, 2005). Undergraduate and graduate

students' IH may be different because they have different levels of coursework-related tasks and

goals. Underclassmen and upperclassmen may have different IH for the same reasons.

Researchers should investigate undergraduate and graduate students' information source use

behavior separately, and further examine the different information source preferences and use

of underclassmen and upperclassmen.

    In sum, this section of literature review helps the current study outline the typology of

sources and the potential relationships among sources (e.g., information pathways) which can

be used to measure students' source use behavior. Other factors of interest regarding students'

socialization experiences and source use behavior include, but not limited to, high school

experiences and year in the study.

2.5 Conceptual Framework

This concluding section of the literature review proposes a conceptual framework based

on previous sections. As the topic of the current study suggests, the main concepts in the

framework are socialization and IH. The following framework incorporates and modifies Astin's

(1991, 1993) *I-E-O model*, Weidman's (1989, 2006; Figure 2.1 and Figure 2.2) *conceptual model*

of undergraduate socialization, and Sonnenwald's (1999; Figure 2.3) *IH framework*. Since the

current study is adding a college socialization dimension to the framework of IH, this concluding

section focuses on discussing how the researcher has incorporated this socialization layer into

the conceptual framework.

When studying the concept of socialization, functionalists such as Talcott Parsons (1955)

approach it at a macro-analytical level, using sub-cultural analysis to examine groups of people

rather than individuals and explain socialization in predetermined stages; symbolic

interactionists such as George H. Mead (2007) approach it at a micro-analytical level by

examining individuals in a specific context and focusing on their interactions. Other scholars,

such as William A. Corsaro (1992, 1995), approach socialization at a middle-range level using

the notion of interpretive reproduction, addressing how individuals not only passively conform

to roles and norms but also create their own social identities and subcultures. Generally,

socialization in family emphasizes factors such as parenting styles, socioeconomic status,

ethnicity, and family structure; socialization in peer relations emphasizes factors such as social

class, ethnicity, and gender (Delamater, 2006). The current study utilizes a middle-range

approach to examine how students interact with and are influenced by their environment.

As discussed in the previous sections, this study focuses on socialization in the university

context and emphasizes students' interactions with faculty and peers in relation to their

academic information-seeking processes. The IH layer of this framework is derived from

Sonnenwald (1999), and stresses the importance of contexts, situations, and social networks (as

described in section 2.3.1.1). The conceptual framework is illustrated in Figure 2.4:
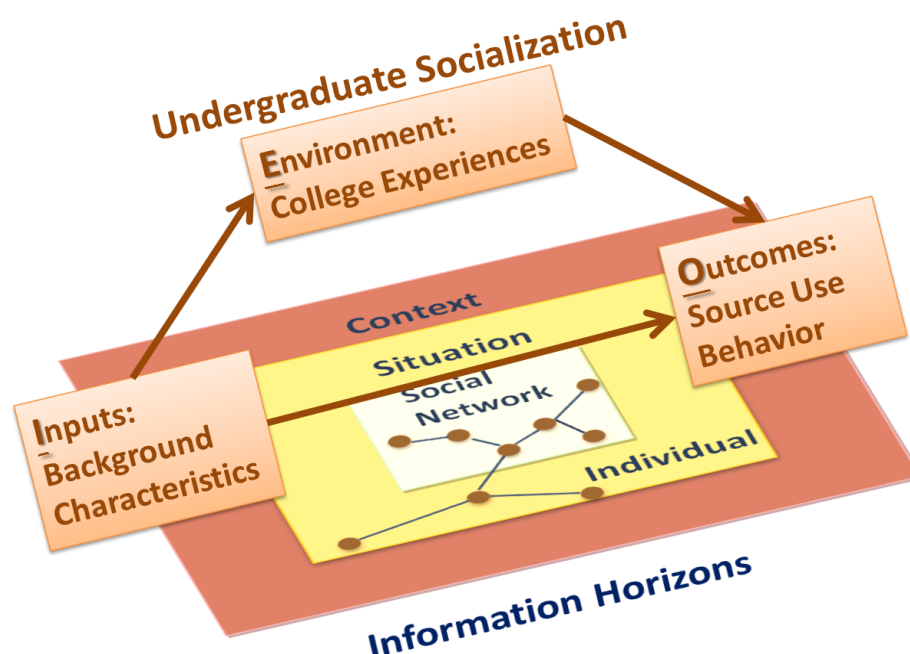
Figure 2.4. Conceptual framework for studying IH and the socialization of college students.
Note. The figure incorporates and modifies Astin's (1991, p.18) I-E-O model, Weidman's (1989, p.299; 2006, p.257) model of undergraduate socialization, and Sonnenwald's (1999, p.181) IH framework. Items measuring these variables can be found in Table 2.1, Table 2.2, and Appendix A.

Table 2.1 and Table 2.2 show the constructs and variables of the current study that were

used to measure elements in Figure 2.4. Items listed in Table 2.1 were used to measure

independent variables, including students' socialization experiences in their college

environment, students' background characteristics, such as home and school information

environments. Items listed in Table 2.2 were used to measure dependent variables, including

students' academic source use behavior in course-related, program-related, and moral-support

situations. These different types of the academic situations were identified based on empirical

studies on undergraduate socialization and college students' information source use behavior.

For instance, Head (2007, 2008) and Head and Eisenberg (2009a, 2009b, 2010a, 2011)

conducted a series of studies on college students' source use behavior and discussed students'

behavior in course-related situations in order to provide implications for information literacy

education; other researchers investigated college students' academic source use behavior by

examining scenarios regarding either course-related   (e.g., Chen & Tang, 2011) or

program-related issues (e.g., Steffes & Burgees, 2009), or both (e.g., Tsai, 2012); still others

examined undergraduate socialization and found that social support is essential to

undergraduate students' learning and retention in college (e.g., Jensen, 2011; Kuh, 2003).

As illustrated in Figure 2.4, these measurements can be categorized in three groups,

namely, *inputs*, *environment*, and *outcomes*. Items under the *input* category include home

information environment, high school information environment, and demographics which

measure the background characteristics students had when they entered college. Items under

the *environment* category were mainly used to measure student' socialization experiences while

they are exposed to their college environment; demographics that measure students'

characteristics in the normative context of a college environment were also included under this

category (see Table 2.1). Items under the *outcome* category were used to measure students'

academic source use behavior after they are exposed to their college environment (see Table 2.2).

As Astin (1993) argued, patterns of behavior can be measured as either environment variables,

outcome variables, or both. In the current study, the patterns of students' academic source use

behavior are viewed as outcome variables because the purpose of this study is to understand

how students' socialization experiences influence their information behavior.

Table 2.1.

Items Measuring Independent Variables and Their Sources

Items Measuring Independent Variables		Sources
Environment:		
Socialization experiences		
1. Role modeling		Cho et al. (2010); Gutter et al.
(1) Professors; (2) Peers; (3) Parents		(2012); Shim (2010) [1-2]
2. Parental direct teaching		Padgett et al. (2010); Wabash
3. Non-classroom interactions with		College (2011) [3-5]
faculty		Ekimyan (2008) [6]
4. Cooperative learning		Education Longitudinal
5. Meaningful discussions with diverse		Survey (by NCES); Padgett et
peers		al. (2008); Tomlinson (2002)
6. Forming a new community of support		[7-8]
7. General college experiences		
8. General high school experiences		
Input:	1. Have a computer at home	Education Longitudinal
Home information environment	2. Have Internet access at home	Survey (by NCES); Sin (2009)
	3. Have more than 50 books at home	[1-3]
Input:	1. Have computer access in high school	Public Library Survey (by
High school information environment	2. Have general articles or news database	NCES); Sin (2009) [1-3]
	access in high school	
	3. School library has automatic book	
	circulation system	

Items Measuring Independent Variables		Sources
	4. A public library near high school or home	
Input [I] and Environment [E]: *Demographics*	1. Age [I]	Logan and Pickard (2012);
	2. Citizenship [I]	U.S. Census (2011), etc.
	3. Class cohort [E]	
	4. Ethnicity [I]	
	5. Full-time student status [E]	
	6. Gender [I]	
	7. GPA [E]	
	8. Household income [I]	
	9. Live on/off-campus or with family [E]	
	10. Major [E]	
	11. Number of hours working per week [E]	
	12. Parents' education level [I]	
	13. Parents' occupation [I]	

Note. Some items under the category of "college socialization experiences" have been modified to fit the context of academic information seeking (see Appendix A for a complete questionnaire).

Table 2.2.

Items Measuring Dependent Variables

Items Measuring Outcomes	Dependent Variables
Source use behavior	a. Frequency of use
1. Course-related situation	b. Typical steps taken
2. Program-related situation	c. Typical sources suggesting other sources
3. Moral-support situation	

Note 1. Measures are developed based on Sonnenwald et al. (2001) and Tsai (2012).

Note 2. Each situation incorporates a similar set of questions measuring the frequency of use, typical steps taken, and typical sources suggesting other sources (see Appendix A for a complete questionnaire).

In sum, the current study examines FGC and non-FGC students' socialization experiences and IH. Variables in the research instruments are summarized in Table 2.1 and Table 2.2, and are developed based on the two-layer framework described in Figure 2.4. An overview of the research design is discussed in the following chapter, and additional details about the research instruments are discussed in section 3.4.2.

3. METHODS

This chapter first identifies research questions, and then describes the philosophical and methodological perspectives of this study, as well as the research setting and researcher as instrument, followed by a section that illustrates the research design, including selection of sample, procedures and instruments to be used to collect data, and potential techniques to analyze that data. The strategies used to maintain the trustworthiness of this study are also discussed.

3.1 Research Questions (RQs)

In order to understand the source use behavior (both information sources and human sources) of FGC versus non-FGC students and its relationship to their socialization experiences,

research questions guiding this study were derived from the IH propositions (Sonnenwald, 1999)

and the concept of socialization (Weidman, 1989, 2006). The research questions include:

1. IH and source usage in academic situations: (1a) How do FGC and non-FGC students

   position information and human sources on their IH in different academic situations? (1b)

   how frequently do they use these sources?

2. Process of using sources: (2a) What steps do students' information-seeking processes

   typically involve? (2b) What sources are typically consulted in each step? (2c) Do certain

   sources direct students to other sources? (2d) Which sources possess this quality of directing

   students to other sources?

3. Socialization and source use: (3a) What college socialization processes, particularly

   student-faculty and peer interactions (e.g., quality of non-classroom interactions with faculty,

   collaborative learning, and meaningful discussions with diverse peers), do FGC and

   non-FGC students experience? (3b) How do these college socialization experiences influence

   their academic source use behavior?

3.2 Research Setting

The sample of this study was drawn from the undergraduate population at the University

of Wisconsin—Madison. The University of Wisconsin—Madison is a selective research university

which serves over 42,000 students, including over 28,000 undergraduate students and over

9,000 graduate students. In Fall 2010, it offered 157 undergraduate majors and 4,000 courses

across the following Schools and Colleges: Agricultural and Life Sciences, Business, Education,

Engineering, Environmental Studies, Human Ecology, Journalism and Mass Communication,

Law, Letters and Science, Medicine and Public Health, Nursing, Pharmacy, Social Work, and

Veterinary Medicine. The average class size is 29 students (UW-Madison, 2012d). The university

has the 11th largest research collection in North America. There are 40 libraries on campus with

over 800,000 volumes and 17 computer labs on campus equipped with more than 1,000

computers (UW-Madison, 2012d, 2012e).

According to 2011-2012 Data Digest (2012c), the university admitted 50.5% of the

applicants with an average of 89.3 high school rank percentile and an average of 3.72 high

school grade point average (GPA) on a 4.0 scale. The 4th-year and 6th-year graduation rates are

55.5% and 82.8% respectively. While there is a 93.1% first-year retention rate for the 1,141 FGC

students in the 2010 cohort, the 6th year graduation rate is only 75.8% for the 1,233 FGC

students in the 2005 cohort.

3.3 Researcher as Instrument

The researcher positions herself in this study as a critical realist who adopts a

philosophical perspective between positivism and interpretivism because this critical realism

(CR) perspective assumes ontological realism and epistemological dualism (Bhaskar, 1979,

1998), and allows a mixed-methods research design that incorporates both deductive theory

verification and inductive theory generation (Danermark, 2002; Zachariadis, Scott, & Barrett,

2010). The researcher is aware of the perspectives from which she views the world and the

context in which she interacts with the study participants. She is also sensitive to her own biases

as a non-FGC international student and as a librarian. These experiences have shaped the

researcher's views about college experiences and about available resources on campus, and have

influenced the development of the research questions and instruments.

In planning this study, the researcher was aware of socio-cultural issues as factors in

addition to the factor of students' first-generation status. Despite the researcher's main concern

in students' first-generation status, she was cognizant of college students' socio-cultural

backgrounds as factors contributing to their socialization experiences and information behavior.

Therefore, individual characteristics (such as gender and ethnicity) and environmental factors

(such as home and high school information environment) were included in the questionnaire and interview guide.

As an interviewer in this study, the researcher comes in with her background as a non-FGC International student and as a librarian working with college students and faculty. As a student studying at the same university, the researcher views herself as an insider; as an International students who obtained her bachelor's degree from another country, she views herself as an outsider. In her previous interactions with college students on this campus as a researcher and as a librarian, she perceived a gap in their understanding of the role of the university library. She reminded herself of suspending her own thoughts to learn about students' perceptions.

As a non-FGC student, the researcher always admires the motivations and persistence of FGC students in attaining their postsecondary education. As a first-generation-international student, she relates herself to FGC students and sees the needs of seeking help from various sources to meet their academic information needs.

In order to minimize the effects of personal biases on this study, the researcher designed the current study based on literature mainly from the fields of education and LIS, and pilot

tested the instruments with several FGC and non-FGC students. When collecting and analyzing

the data, the researcher triangulated the findings and performed member checks to maintain the

validity of this study. The researcher also ensured the reliability of this study by discussing and

revising the coding scheme with colleagues during the data analysis process as peer validation

(see section 3.5).

Overall, the researcher's position being both a partial insider and outsider allows her to

learn college students' personal accounts from various perspectives. Following the CR

perspective, the researcher approaches the topic with a mixed-methods research design and

examines both individual and environmental factors in individuals' information seeking in

context.[4]

3.4 Research Design

The research design composes two parts. First, a questionnaire was employed to collect

generalizable data and to detect information source use patterns of FGC and non-FGC students

and to answer RQs 1b, 2a, 2b, 2c, 2d, and 3b. Second, interviews were conducted to gather

contextual information (RQs 1a and 3a) and to supplement the results from the questionnaire

---

[4] As CR allows researchers to study different levels of reality, it can be used to study information seeking in context (Carlsson, 2003; Wikgren, 2005) and to conduct ethnographic research (Porter, 1993, 2002).

(specifically, for RQs 2a, 2b, 2c, and 2d). Participant-drawn IH maps were also collected during

each interview session. This mixed-methods research design can be shown in Figure 3.1:
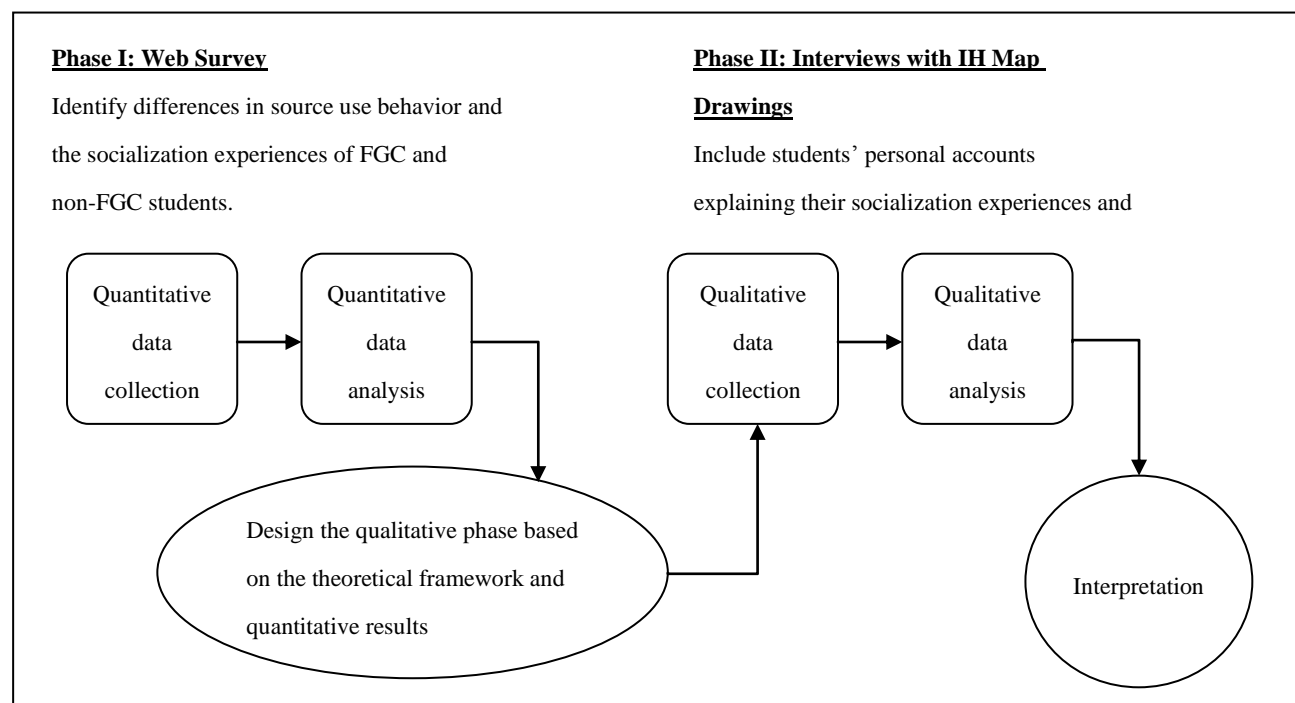
Figure 3.1. The research design of this study.

Note. Diagram based on Creswell (2011, p. 129).

3.4.1 Mixed-Methods Approach

As illustrated in Figure 3.1, a mixed-methods approach was employed to examine FGC

and non-FGC students' information source use behavior. Mixed-methods approach is a research

orientation that "combines elements of qualitative and quantitative research approaches (e.g.,

use of qualitative and quantitative viewpoints, data collection, analysis, and inference

techniques) for the purpose of breadth of understanding or corroboration" (Johnson,

Onwuebguzie, & Turner, 2007, p. 123). Additionally, mixed-methods research can

simultaneously address a range of confirmatory and exploratory questions and provide stronger

inferences (Creswell, 2009, 2011; Teddlie, & Tashakkori, 2009, pp. 31-32). This approach is

considered an orientation that incorporates the philosophy, research methods, and design used

in a study (e.g., Creswell & Clark, 2007; Greene, Caracelli, & Graham, 1989; Johnson,

Onwuegbuzie, & Turner, 2007). The advantages of using this approach include (Creswell, 2011):

> (1) offsetting the weaknesses of both quantitative and qualitative research; (2)
>
> providing more evidence for studying a research problem than either quantitative or
>
> qualitative research alone; (3) helping answer questions that cannot be answered by
>
> quantitative or qualitative approaches alone; (4) providing a bridge across the
>
> sometimes adversarial divide between quantitative and qualitative researchers; and
>
> (5) encouraging the use of multiple worldviews, or paradigms, rather than the typical
>
> association of certain paradigms with quantitative research and others with
>
> qualitative research. (pp. 12-13)

The current study takes advantage of mixed-methods approaches mainly by minimizing

the weaknesses of both quantitative and qualitative methods and by answering both general and

specific research questions.

This study includes a questionnaire to obtain generalizable information about college students' socialization experiences in relation to the frequency of using individual sources, the typical patterns of steps taken in the information-seeking process, and the sources that typically suggest other sources. Additionally, the questionnaire allows the researcher to compare the information use of the two groups of students—FGC and non-FGC students—in a systematic way.

On the other hand, the study includes interviews to learn contextual information about students' socialization experiences and information source preferences. The interviews allow the researcher to learn nuances and complexities of participants' perceptions and experiences.

Overall, the triangulation deepens the understanding of the phenomena about FGC and non-FGC students' source use behavior. As Sonnenwald (1999, 2001, 2005) emphasizes the importance of triangulation in IH research, this study employs a mixed-methods approach.

3.4.2 Data Collection

With a mixed-methods approach, using quantitative questionnaires with qualitative interviews is probably the most common strategy to complement the strengths of one method with the other (Teddlie, & Tashakkori, 2009). The current study follows this convention and

uses a sequential explanatory design, as Creswell (2009, 2011) describes, to collect data from a

web survey with follow-up semi-structured interviews. Each interview participant was also

asked to draw an information horizon map to reflect the information sources they used. The

procedures of the two-phase study, including (1) the selection of the sample, (2) the

demographics of the participants, and (3) the development of the research instruments, are

described in the following subsections.

3.4.2.1 First Phase: Quantitative Survey

A sequential explanatory mixed-methods design, consisting of a quantitative survey and

follow-up qualitative interviews and map-drawings, was employed in this study. A sequential

mixed-methods sampling was used to select the sample for this study, as suggested by Teddlie

and Tashakkori (2009). That is, the sample for the qualitative second phase of the study was

drawn from the sample of the quantitative first phase. This subsection focuses on the data

collection for the first phase of this study, and addresses where the sample of the quantitative

survey was drawn from and how the survey was developed.

3.4.2.1.1 Selection of Survey Participants

In the quantitative first phase, the study sampled the undergraduate population by recruiting voluntary participants at UW-Madison via emails and flyers. The researcher obtained a list of all undergraduate students' email addresses from the Office of Registrar, and recruited participants by sending an email to all undergraduate students and by administering an online questionnaire to those who voluntarily participate in the study. In Fall 2012, an email invitation to participating in this web survey was sent to 28,021 undergraduate students. A reminder was sent to the students two weeks after the first invitation email. All undergraduate students who used the university email service (WiscMail) should have received an invitation to participating in this web survey. As of Fall 2012, there were about 20% of FGC students at UW-Madison. However, FGC students are a hidden population who are difficult to identify (Tyckoson, 2000). FGC students versus non-FGC students were identified by a certain question in the survey. Since students' FGC status is one of the main focuses of the current study, the researcher also sent the recruitment email through the mail lists of several organizations and programs that aim to provide resources for non-traditional and FGC students: the Working Class Student Union, the Center for Educational Opportunity, and the First Wave Program at UW-Madison. In order to increase the response rate for the web survey, flyers were used to recruit participants in addition

to the recruitment email. With the approval from each location, flyers were posted in campus residence halls, libraries, cafeterias, the student activity center, department buildings that hold large undergraduate courses, and sororities/fraternities near campus.

3.4.2.1.2   Demographics of Survey Participants

Nine hundred and eighty four students out of 28,021 undergraduate students completed the web survey.[5] Among the 984 undergraduate students who completed the web survey, about 70% were female and 30% were male; 30.6% were FGC students, and 69.4% were non-FGC students. The distribution of class cohort is as follows: freshmen 23.9%, sophomores 21.1%, juniors 25.6%, and seniors or above 29%. Students majored in various disciplines, including health and medical sciences (22.3%), social sciences (14.5%), engineering (13%), natural and environmental sciences (12.7%), arts and humanities (10.3%), business (9.3%), education (6.5%), journalism (3.3%), social work (2%), and law (.6%); 5.4% of the students were undecided or double majored in multiple fields. As for ethnicity, 81.5% of the students were white, 10.3% were

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[5] According to UW-Madison (2012g), 1.2% of the undergraduate students were under 18 years old. Due to the Institutional Review Board (IRB) restriction, the current study only recruited students who were at least 18 years old. Therefore, 984 students out of 27,863 students completed the survey. Web surveys typically have substantial lower response rates than other modes of survey (e.g., face-to-face, telephone, or mail surveys) (Groves et al., 2009; Leguille et al., 2011). However, low response rates do not necessarily increase non-response errors (Fan & Yan, 2010).

Asian, 3.2% were Hispanic or Latino/a, 3.1% were multiracial, .9% were African American,

and .3% were American Indian.

A summary of demographic characteristics by students' FGC status is shown in Table 3.1.

Most of the students' background characteristics of the sample in the current study are similar

to those of the university population. However, in order to compare the source use behavior of

students with different FGC status, the researcher approached several organizations (as

mentioned in 3.5.2.1.1) with the intention of recruiting enough numbers of FGC students.

Moreover, females are more likely to response to survey than males (Axinn, Link, & Groves,

2011). Thus, there are more female students and more FGC students in the current sample than

in the university population.

As discussed in the conceptual framework of the current study (see section 2.5 and Table

2.1), students' demographic characteristics can be grouped into input and environment variables.

In terms of students' characteristics in their college environment, more FGC students (61%)

than non-FGC students (52.2%) lived off-campus or at home with their family. While 38.8% of

non-FGC students did not work besides school, 30.4% of FGC students (only 16.1% non-FGC

students) worked more than 15 hours per week (χ^2 =32.399, df = 7, p < .001). And much more

non-FGC students (40.1%) than FGC students (28.3%) had a cumulative GPA over 3.5 (χ^2 =

20.112, *df* = 4, *p* < *.001*). Compared to the university population, the current study seemed to

oversample students in health and medical sciences, and students in the current sample had a

higher GPA. According to UW-Madison (2012f), health and medical students had a higher GPA

than students majoring in most of the other fields. This phenomenon could possibly explain why

students in the current sample had a higher GPA than the overall university population.

In terms of students' characteristics regarding input variables (i.e., age, gender, ethnicity,

parents' education level, and household income), more FGC students than non-FGC students

were ethnic minorities (22.8% versus 16.5%) with an annual family household income below

$50,000 (41.1% versus 9.6%) (χ^2 =197.217, *df* = 12, *p* < .001). While there were 7% of FGC

students who were over 26 years old, only 1.1% of non-FGC students were over 26 years old (χ^2 =

34.968, *df* = 4, *p* < *.001*).

Overall, the demographic distribution between the two groups of students in the

current study is similar to related studies, emphasizing that compared to their non-FGC

counterparts, FGC students tend to be older, work longer hours besides school, and come from

lower-income families (Acker-Ball, 2007; Bowen et al., 2009; Chonwerawong, 2006; Housel &

Harvey, 2009; Ohl-Gigliotti, 2008; Olive, 2008; Stuber, 2011).

Table 3.1.

Demographics of Web Survey Participants

Demographics		FGC Students (*n*=305) Frequency (%)	Non-FGC Students (*n*=679) Frequency (%)	Overall (*N*=984) Frequency (%)	University Population[6]
Age***	18-20	157 (51.5)	436 (64.5)	593 (60.4)	62.5%
	21-25	127 (41.6)	232 (34.3)	359 (36.6)	34.2%
	Over 26	21 (7.0)	8 (1.1)	29 (2.9)	2.3%
Gender	Female	208 (68.2)	488 (71.9)	696 (70.7)	53.4%
	Male	96 (31.5)	189 (27.8)	285 (29.0)	46.6%
	Other	1 (.3)	2 (.3)	3 (.3)	
Ethnicity*	White	236 (77.4)	563 (83.5)	799 (81.6)	77.5%
	Asian or Pacific Islander	42 (13.8)	58 (8.6)	100 (10.2)	6.9%
	Hispanic or Latino/a	14 (4.6)	17 (2.5)	31 (3.2)	4.4%
	African American	5 (1.6)	4 (.6)	9 (.9)	2.7%
	Multiracial	5 (1.6)	25 (3.7)	30 (3.1)	6.9%
	Other	3 (1.0)	7 (1.0)	10 (1.0)	1.6%
Parents' Highest Education Level	Less than high school	20 (6.5)	N/A	20 (.2)	
	High school diploma or equivalent	103 (33.8)	N/A	103 (10.5)	
	Some college	69 (22.6)	N/A	70 (7.1)	
	2-year college degree	113 (37.1)	N/A	113 (11.5)	(FGC) 20.7%
	4-year college degree	N/A	323 (47.6)	323 (32.8)	(Non-FGC) 79.3%
	Master's degree	N/A	231 (34.0)	231 (23.4)	

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[6] The demographic distribution of the undergraduate population at UW-Madison comes from UW-Madison (2011a, 2012a, 2012d, 2012f, 2012g).

Demographics		FGC Students (n=305) Frequency (%)	Non-FGC Students (n=679) Frequency (%)	Overall (N=984) Frequency (%)	University Population[6]
	Doctoral degree	N/A	125 (18.4)	125 (12.7)	
Household Income[7]***	Less than $20,000	36 (11.8)	13 (1.9)	49 (4.9)	N/A[8]
	$21,000-$49,999	89 (29.2)	62 (9.1)	151 (15.3)	
	$50,000-$99,999	111 (36.4)	220 (32.4)	331 (33.6)	
	$100,000-$149,999	23 (7.5)	136 (20.0)	159 (16.2)	
	Over $150,000	6 (2.0)	131 (19.3)	137 (13.9)	
Class Cohort	Freshman	65 (21.3)	170 (25.1)	235 (23.9)	18.5%
	Sophomore	43 (14.1)	162 (23.9)	205 (20.9)	21.5%
	Junior	87 (28.5)	164 (24.2)	251 (25.6)	26.4%
	Senior or above	108 (34.4)	179 (26.4)	287 (29.2)	33.5%
Major	Art and humanities	35 (11.5)	66 (9.7)	101 (10.3)	12.1%
	Business	22 (7.2)	69 (10.2)	91 (9.3)	6.3%
	Education	16 (5.2)	49 (7.2)	65 (6.6)	7.1%
	Engineering	37 (12.1)	90 (13.3)	127 (12.9)	13.5%
	Journalism	8 (2.6)	24 (3.5)	32 (3.3)	1.7%
	Health and medical sciences	65 (21.3)	154 (22.7)	219 (22.3)	6.9%
	Natural or environmental sciences	40 (13.1)	84 (12.4)	124 (12.6)	24.4%
	Social sciences	48 (15.7)	95 (14.0)	143 (14.6)	20.6%
	Social work	9 (3.0)	11 (1.6)	20 (2.0)	.2%
	Other	25 (8.2)	35 (5.2)	60 (6.1)	7.2%
GPA***	2.5 or below	20 (6.7)	24 (3.5)	44 (4.5)	
	2.6-3.0	69 (23.0)	108 (15.9)	177 (18.1)	Average
	3.1-3.5	126 (42.0)	274 (40.4)	400 (40.9)	3.242

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[7] 16% of the students (13.1% of FGC students and 17.2% of non-FGC students) "don't know" their annual household income.

[8] The median annual household income of all UW-Madison freshmen applicants is $98,381 (Witte & Wolfe, 2009).

Demographics		FGC Students (*n*=305) Frequency (%)	Non-FGC Students (*n*=679) Frequency (%)	Overall (*N*=984) Frequency (%)	University Population[6]
	Over 3.5	85 (28.3)	272 (40.1)	357 (36.5)	
Housing during the semester	On-campus residence	114 (37.4)	300 (44.2)	414 (42.1)	N/A
	Sorority/fraternity	2 (.7)	20 (2.9)	22 (2.2)	
	Off-campus housing	175 (57.4)	337 (49.6)	512 (52.0)	
	At home with family	11 (3.6)	17 (2.5)	28 (2.8)	
Work (hours per week)***	Don't work besides school	101 (33.1)	263 (38.8)	364 (37.0)	N/A
	1-5 hours	15 (4.9)	58 (8.6)	73 (7.4)	
	6-10 hours	48 (15.7)	123 (18.1)	171 (17.4)	
	11-15 hours	48 (15.7)	124 (18.3)	172 (17.5)	
	16-20 hours	56 (18.4)	58 (8.6)	114 (11.6)	
	21-25 hours	23 (7.5)	23 (2.3)	46 (4.7)	
	Over 26 hours	14 (4.6)	29 (5.6)	43 (4.3)	

Note. $^*p < .05.$ $^{***}p < .001.$

3.4.2.1.3   Survey Instrument

Regarding the web survey instrument (see appendix A), this study adopted and modified

socialization scales based on the National Survey of Student Engagement (NSSE, 2008), the

Wabash National Study of Liberal Arts Education (Kuh, 2003; Wabash College, 2011),[9] and

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[9] Although the Wabash College is not a similar type of higher education institution to UW-Madison, the instrument used by the Wabash National Study of Liberal Arts Education was based on the National Survey of Student Engagement. Therefore, the current study adopted some of the scales used by the Wabash College on student-faculty and peer interactions.

Padgett and his colleagues' (2008, 2010) instruments; the scale testing information source use

behavior in academic situations was adopted and modified based on the instrument used in

Sonnenwald et al.'s (2001) and Tsai's (2012) studies. The questionnaire measuring college

socialization includes 38 items (see appendix A): eight on parental direct teaching and role

modeling, five on quality of non-classroom interactions with faculty, four on cooperative

learning, three on meaningful discussions with diverse peers, four on forming a new community

of support, and fourteen on general high school and college experiences. Based on Weidman's

(1989, 2006) socialization model, this study emphasizes the socialization processes regarding

impact of student-faculty and peer interactions. Among the above socialization measurements,

the main focuses are on quality of non-classroom interactions with faculty, cooperative learning,

and meaningful discussions with diverse peers.

The questionnaire measuring information source use included a similar set of questions

for three different academic situations (i.e., course-related, program-related, and moral-support

issues): (1) frequency of use, (2) typical steps taken, and (3) typical sources suggesting other

sources. Demographic and background questions, such as a student's ethnicity, major, GPA, and

parents' SES, were included. At the end of the questionnaire, participants interested in follow-up

interviews were asked to leave their email address. The Qualtrics Survey Hosting Service

(http://survey.wisc.edu/) was used to build the questionnaire.

3.4.2.2 Second Phase: Qualitative Interviews and Map-Drawings

As mentioned earlier in this section, the current study adopts an explanatory

mixed-methods design which consists of two phases: first, a quantitative survey; second,

qualitative interviews and map-drawings. This subsection focuses on the data collection for the

qualitative second phase of the study by addressing how the follow-up interview participants

were selected and how the interview protocol was developed.

3.4.2.2.1   Selection of Interview Participants

In a mixed-methods design, while some researchers follow up with all participants from

the quantitative phase of the study, others do not. Creswell (2011, 2012) recommends that, in an

explanatory mixed-methods design, the follow-up qualitative data collection comes from a much

smaller sample than the quantitative phase. This helps the researcher obtain an in-depth and

rigorous qualitative examination so that "meaningful themes can be developed" (Creswell, 2011,

p. 186). For an explanatory mixed-methods design, Creswell (2011) also suggests a systematic

approach to purposefully sample qualitative cases by using the quantitative statistical results to

select the follow-up participants.[10]

In the second phase of the current study, students' FGC status, class cohort, and

ethnicity were used to purposively sample interview participants from the first phase of the

study. Since FGC status is one of the main focuses in the current study, ten FGC students and

ten non-FGC students were purposefully recruited in the qualitative second phase. Students'

class cohort and ethnic background have been found as important factors affecting

undergraduate socialization (Astin, 1993; Weidman, 2006). Additionally, based on the survey

results, students in different class cohorts and with different ethnic backgrounds have

significantly different information source use behaviors (see sections 4.1.1.4 and 4.3.2.1). Thus,

the researcher selected students who represented different class cohorts and ethnic backgrounds,

in addition to their FGC status, for the follow-up interviews. Only those who expressed an

interest in being interviewed in the web survey were contacted. Each interview participant

received a fifteen-dollar gift certificate as an incentive for their participation.

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[10] Creswell (2011) provides examples of explanatory-sequential-design studies to illustrate the sample size in each phase of the study. Ivankova and Stick's (2006) study on students' persistence in a doctoral program recruited 278 students for a web survey and 4 participants for the follow-up interview; Thogersen-Ntoumani and Fox's (2005) study on mental well-being in corporate employees recruited 312 employees for the quantitative questionnaire and 10 employees in the follow-up interview. Both studies select follow-up participants based on their statistical results.

3.4.2.2.2 Demographics of Interview Participants

The twenty face-to-face interviews were conducted between January and February of 2013. The length of each interview session ranged from 55 minutes to 90 minutes. The demographic distribution of the interview participants is shown in Table 3.2:

Table 3.2.

Demographics of Interview Participants

Participant	Gender	Class Cohort	Ethnicity	Parents' Education Level	First-Generation Status
I1	Male	Sophomore	White	Bachelor's/Associate's	non-FGC
I2	Male	Sophomore	African American	Bachelor's/Bachelor's	non-FGC
I3	Female	Freshman	White	MD/ Bachelor's	non-FGC
I4	Female	Junior	White	Bachelor's/Some college	non-FGC
I5	Male	Freshman	Hispanic	MD/Master's	non-FGC
I6	Female	Senior	White	Bachelor's/Master's	non-FGC
I7	Male	Sophomore	White	Master's/Master's	non-FGC
I8	Female	Senior	Asian	PhD/Master's	non-FGC
I9	Female	Freshman	Asian	Middle School/HS	FGC
I10	Female	Sophomore	White	HS/Some college	FGC
I11	Female	Freshman	White	GED/Some HS	FGC
I12	Female	Junior	White	HS/HS	FGC
I13	Female	Junior	Asian	Some college/HS	FGC
I14	Female	Senior	Hispanic	HS/HS	FGC
I15	Female	Junior	Hispanic	HS/Trade school	FGC
I16	Female	Sophomore	White	Bachelor's/Bachelor's	non-FGC
I17	Male	Sophomore	White	HS/HS	FGC
I18	Female	Senior	White	HS/HS	FGC
I19	Male	Junior	White	HS/Associate's	FGC
I20	Male	Senior	White	PhD/Master's	non-FGC

Note. GED = General Education Degree; HS = High School; MD = Doctor of Medicine.

Although most participants were female, there were equal numbers of FGC and non-FGC students, and equal numbers of underclassmen and upperclassmen. Most participants were white, but three were Asian and three were Hispanic. There was only one African American student. Among the ten FGC students, there were four underclassmen and six upperclassmen; two of the ten were Asian and two Hispanic. Among the ten non-FGC students, there were six underclassmen and four upperclassmen; one of the ten was Asian and one Hispanic.

3.4.2.2.3   Interview Protocol

Using the critical incident technique, the interview protocol included questions to further investigate source selection and use in different situations. The interview guide included questions asking students about their college socialization experiences and academic information-seeking behaviors (see appendix B). It was developed based on Sonnenwald's (1999, 2001, 2005) work and the aforementioned socialization instruments, as well as important findings from the first phase of the study. During each interview session, the participant was first asked to describe their interactions with family, peers, and professors, and was then asked to draw an information horizon map of coursework-related contexts, followed by questions regarding their information map and source use behavior (see appendix C).

3.4.3 Data Analysis

This section describes how quantitative and qualitative analysis techniques were used to analyze the data. First, the researcher introduces the statistics that was used to analyze quantitative survey data. Second, the researcher describes methods used to analyze the qualitative interview data. Finally, the researcher delineates techniques of visualization for the participant-drawn IH maps.

3.4.3.1 First Phase: Quantitative Survey

Data collected from the questionnaire was coded and processed in SPSS 20 (IBM, Armonk, NY). A descriptive statistical analysis was first conducted to obtain an overview of the results regarding students' demographics, socialization experiences, and information use. Inferential statistics, such as t-tests, were used to conduct basic comparisons of frequency of sources use and source diversity between FGC and non-FGC students and between underclassmen and upperclassmen. After conducting basic descriptive and inferential statistics, a cluster analysis and multivariate statistics (e.g., MANOVA and multiple regression analyses) were used to analyze the data. Specifically, cluster analysis was used to identify different profiles of students' socialization experiences based on different socializing agents (i.e., professors, peers, and parents). After student profiles of socialization experiences had been identified, one-way

multivariate analyses of variance (MANOVA) were used to investigate the differences in the

frequency of source use and source diversity among students with different socialization profiles.

Meanwhile, multiple regression analyses were used to test the relationship between socialization

and information use and how well these socialization variables could predict students' source

use behavior.

3.4.3.2 Second Phase: Qualitative Interviews and Map-Drawings

The twenty interviews were recorded and then transcribed, yielding 924 pages of

transcripts with an average of 45.21 pages per interview transcript. Each interview participant

was given an identifier (i.e., I1 to I20). All transcripts were then imported to NVivo 10 (QSR

International, Melbourne, Australia) and coded at a descriptive, topical, and analytical level

according to Richards (2009) and Saldaña (2013). At the descriptive level, "attribute coding"

(Saldaña, 2013, p. 70) was used to sort the data according to each participant's attributes. At the

topical level, the researcher first coded the transcripts according to the categories based on the

interview protocol and then re-organized the categories and subcategories by "critiquing a

starter list of categories" (Richards, 2009, p.92). At the analytic level, the researcher considers

"the meanings in context and create categories that express new ideas about the data" (Richards,

2009, p. 94). In the analytic coding process, the researcher developed the coding scheme

(Appendix D) using "focus coding" which emphasizes comparative methods to perform

incident-by-incident coding (Charmaz, 2006; Saldaña, 2013, p.213). This method is usually

applied to individuals' concrete actions and helps researchers to "make sense of observations in

new and analytic ways" (Charmaz, 2006, p. 53). Since the main focus of this study is on students'

source use behavior and the actions students take are concrete, it is appropriate to adopt

focusing coding in the analytical coding process. Specifically, statements and incidents in each

interview transcript were compared within the same interview and with other interviews

(Charmaz, 2006). The researcher then summarized tentative findings and asked participants for

feedback to perform member checks. Agreements and disagreements between the data collected

from quantitative and qualitative methods were also examined and discussed.

IH maps were first organized and recorded into participant-sources matrices, as

suggested by Sonnenwald (2001). The weighted scores for each source were calculated according

to Savolainen and Kari (2004). The score for each source was based upon the number of times

the source appeared on students' maps and was further weighted by students' preferences: zone

1 sources were weighted by 3, zone 2 sources by 2, and zone 3 sources by 1. For instance, a zone 1

source that appeared 2 times on students' information horizon maps receives a weighted score

of 6. Finally, a combination and variation of Savolainen and Kari's (2004) and Huvila's (2009)

techniques were used to present the IH map. The information and human sources on

participants' IH maps were organized and displayed on an analytic IH map that represents the

number of times participants included a certain source on their maps. Since the concepts of

contexts and situations are what IH emphasizes, the study took a step further to analyze source

stability across academic situations. The change ratios for each source across the situations were

calculated based on its weighted scores on course-related, program-related, and moral-support

IH maps.

3.5 Trustworthiness of the Study

The researcher used several techniques to establish the trustworthiness of this study. In

order to maintain the validity of this research, the constructs in the questionnaire are developed

based on previous literature, including IH empirical studies (e.g., Sonnenwald, 2001; Savolainen

& Kari, 2004), and scales that have been tested by other studies, such as the National Survey of

Student Engagement (NSSE, 2008) and the Wabash National Study of Liberal Arts Education

(Kuh, 2003; Wabash College, 2011). A pilot test of the research instruments, both the

questionnaire and the interview protocol, were conducted with several FGC and non-FGC

students. The feedback derived from this pilot survey helped the researcher revise the

instruments. Other ways to increase the trustworthiness of the quantitative and qualitative parts

of the current study are described in the following subsections.

3.5.1 Sample Size and Statistical Power

In this first phase of the study, 984 undergraduate students participated in the web

survey. This sample is large enough to be representative and reach a 95% confidence interval in

all statistical analysis conducted in this study.[11] To control the statistical power so that the

researcher does not fail to detect an effect that actually exists (Marascuilo & Serlin, 1988), the

researcher calculated the power of statistical tests before performing each statistical test to

ensure the sample size maintains a .80 power for each statistical test.

3.5.2 Reliability of Multi-item Measurements

As to the web survey in the current study, Cronbach's alpha was used to measure the

reliability of multi-item indices such as the socialization subscales used in the questionnaire. It

is a common approach to learn how well a set of multiple items measures a single dimension of a

construct. An acceptable level of Cronbach's alpha is at least .70, or .60 for exploratory

measurements (Hair et al., 2010). The alpha's of the socialization subscales used in the current

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[11] According to the table for determining sample size from a given population that is over 10,000, the sample size
should be at least 384 to maintain a 95% confidence interval (5% precision) (Teddlie & Tashakkori, 2009, p. 183).

study are all above .75 (see Table 4.13). Specifically, parents as role model (3 items; α =.80),

parental direct teaching (5 items; α =.85), non-classroom interactions with faculty (5 items; α

=.85), and meaningful discussion with diverse peers (3 items; α =.83) were found to be highly

reliable. And the internal consistency of the socialization subscales adopted from the National

Survey of Student Engagement (NSSE, 2011) is higher than what the NSSE (2011) reported.[12]

Moreover, when grouping the above items in order to measure influences from parents,

peers, and professors—the three socializing agents of interest in the current study, the

researcher found that the Cronbach's alpha of the 8-item "parents as socializing agents"

reaches .88, the 10-item "peers as socializing agents" reaches .85, and the 9-item "professor as

socializing agents" influences reaches .86.

3.5.3 Missing Data

As to the web survey of the current study, the average missing value for each variable is

only .265%. Only one variable has more than 1% missing values. Traditionally, complete-case

analysis (listwise deletion), available-case analysis (pairwise deletion), and single imputation are

used to handle missing values of less than 5%. As suggested by statisticians, simple imputation

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[12] The NSSE (2011) reported the internal consistency of the socialization subscales with the following Cronbach's alpha coefficients: non-classroom interactions with faculty (α =.60), collaborative learning (α =.67) and meaningful discussion with diverse peers (α =.68).

is more likely to create biases when there is less than 5% missing data (Lynch & Brown, 2013).

Additionally, if the missing data is less than 1%, using different methods for handling the

situation is likely to return essentially the same results (SSCC, 2013). In order to preserve

statistical power, the current research used the pairwise deletion method to handle missing data

when conducting almost all statistical analyses. Therefore, valid N for each variable differs.

However, when calculating covariance in the data with pairwise deletion, some programs

use the number of cases on the variable with the most missing data, while others use the number

of cases on the variable with the least missing data; this creates problems especially when

presenting results of regression analysis (Allison, 2002; Little & Rubin, 2002). Therefore, only

when conducting regression analysis did the researcher handle the missing data by using

listwise deletion.

3.5.4 Trustworthiness of the Mixed-Methods Design and Qualitative Data Analysis

As suggested by many qualitative researchers, triangulation, member checks, and peer

validation were performed to increase the validity of this study (e.g., Kvale & Brinkmann, 2009;

Miles & Huberman, 1994; Patton, 2002; Lincoln & Guba, 1985). The mixed-methods research

design helps triangulate the findings. The researcher collected data from the questionnaire,

interviews, and IH maps to see how data from different sources answer the same questions. The interview transcripts were also presented to the interview participants to reconfirm the findings and interpretations made by the researcher. After the researcher developed the coding scheme, peer examination was conducted to refine the categories. The researcher invited two colleagues (one with a Ph.D., the other with a Master of Library and Information Science (MLIS) degree; both have substantial expertise in information behavior research) to examine and comment on the coding scheme to help refine the categories. Finally, inter-coder agreement was assessed in order to ensure the reliability and credibility of the qualitative interpretation of the current study. Based on the revised coding scheme, a second coder with a MLIS degree and substantial expertise in information behavior research was hired to recode one hundred segments from four selected transcripts: 25 segments from each of the four transcripts (i.e., transcripts of an FGC underclassman, an FGC upperclassman, a non-FGC underclassman, and a non-FGC upperclassman). The coding results by the second coder were compared with those by the primary researcher, yielding an inter-coder agreement of 87.5%. The primary researcher then refined her interpretation of the findings by discussing category differences with the second coder until consensus was reached.

4. RESULTS

This chapter reports the results regarding the three sets of research questions (RQs) in three sections. The research questions are as follows:

1. IH and source usage in academic situations: (1a) How do FGC and non-FGC students position information and human sources on their IH in different academic situations? (1b) How frequently do they use these sources?

2. Process of using sources: (2a) What steps do students' information-seeking processes typically involve? (2b) What sources are consulted in each step? (2c) Do certain sources direct students to other sources? (2d) Which sources possess this quality of directing students to other sources?

3. Socialization and source use: (3a) What college socialization processes, particularly student-faculty and peer interactions (e.g., quality of non-classroom interactions with faculty, collaborative learning, and meaningful discussions with diverse peers), do FGC and non-FGC students experience? (3b) How do these college socialization experiences influence their academic source use behavior?

As described in chapters one and three, the web survey was conducted to gather

information answering RQs 1b, 2a, 2b, 2c, 2d, and 3b; interviews were conducted to gather

contextual information (RQs 1a and 3a) and to supplement the results from the web survey (RQs

2a, 2b, 2c, 2d, and 3b). Section one presents results regarding RQ1 on students' source use

behavior and IH maps across academic situations. Section two presents results regarding RQ2

on the relationships among sources used by the students; section three presents results

regarding RQ3 on students' socialization and source use behavior. Each section first describes

the results from the web survey and then the findings from the interviews.

4.1 Source Use Behavior across Academic Situations

In this section, the researcher first reports results from the web survey regarding

frequency of source use and source diversity across different academic situations in section 4.1.1.

The researcher then reports participant-drawn information horizon maps (IH maps) in different

academic situations in section 4.1.2.

4.1.1 Source Use across Situations

In this section, the frequency and diversity of information and human source use across

different academic situations are discussed. Students were asked how frequently they used a

specific source in course-related, program-related, and moral-support situations. The list of

sources can be divided into (1) information sources (or published sources) and (2) human

sources (or personal/interpersonal sources). Tables 4.1 and 4.2 provide complete lists of

information and human sources. A course-related situation can be a situation where students

seek information for a weekly assignment or a final paper; a program-related situation can be a

situation where students select courses for a new semester; a moral-support situation can be a

situation where students feel stressful about coursework or having problematic relationships

with a TA or a professor.

In the following subsections, the researcher first provides an overview of frequently-used

sources and source diversity in each situation based on descriptive statistics. Second, the

researcher discusses how information and human sources were used differently in different

situations based on the results of paired-samples t-tests. Finally, based on the results of

independent-samples t-tests, the researcher discusses frequency of use and source diversity by

examining how similarly or differently students with different FGC status and in different class

cohorts used these sources in each situation.

4.1.1.1 Source Use Overview

Among information sources, personal collections (including course materials), search

engines, and the university or course websites were the top three frequently-used sources for

course-related issues. Both library online and print resources were not as frequently used as

these sources. The university website was the most frequently-used information source, while

online forums were the second-most frequently-used source for program-related issues (Table

4.1 and Figure 4.1).

Table 4.1.

Frequency of Information Source Use across Academic Situations   *N*=984

Information Source	Course Mean (SD)	Program/Major Mean (SD)
Personal collections***	**4.37** (.85)	2.82 (.16)
Search engines***	**4.12** (1.02)	2.58 (1.29)
Course or university website/ course catalog***	**3.63** (1.04)	**4.00** (1.06)
Library online resources	**3.05** (1.20)	N/A
Online forum or Q&A sites***	3.18 (1.21)	**2.90** (1.34)
Social networking or micro-blogging sites***	2.64 (1.28)	2.31 (1.19)
Library print resources	2.47 (1.09)	N/A
Traditional mass media	1.99 (1.05)	N/A

Note. Mean scores based on scale: 1= Never; 5= Very Frequently. ***p* < .001.
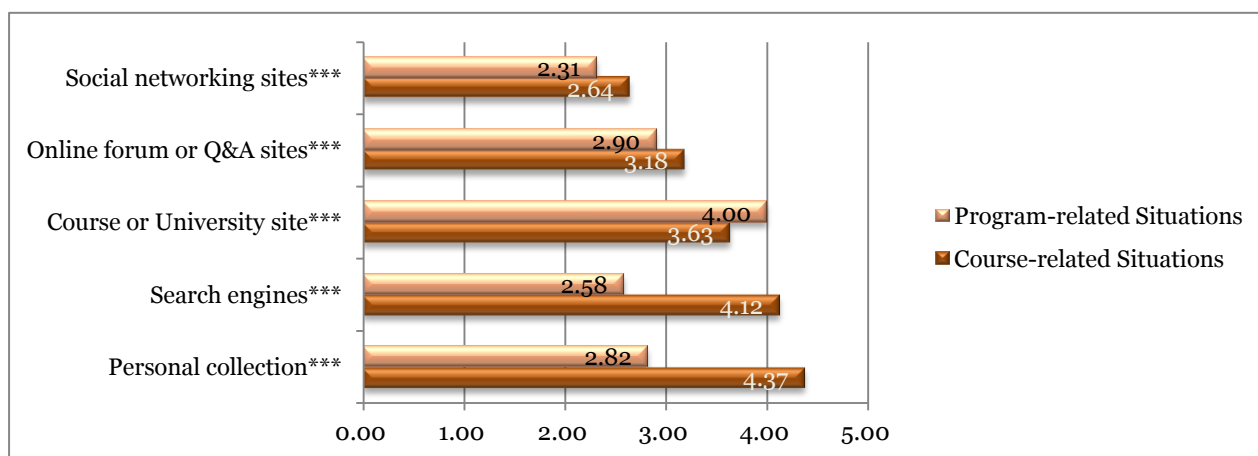
Figure 4.1. Information sources consulted across academic situations.

Among human sources, peers were the most popular source because they were the only source that was consistently frequently consulted in all academic situations. Roommates were also a popular source because they were frequently consulted in both course-related and moral-support situations. Other frequently-used human sources (i.e., TAs, advisors, and parents) were only consulted in a certain situation. The top frequently-consulted human sources in each situation include: peers in the same course, TAs, professors, and roommates for course-related issues; peers and advisors for program-related issues; peers, roommates, and parents for coursework-related moral support (Table 4.2 and Figure 4.2).

Table 4.2.

Frequency of Human Source Use across Academic Situations   *N*=984

Human Source	Course Mean (SD)	Program/Major Mean (SD)	Moral Support Mean (SD)
Peers in the same course ***	**4.25** (.81)	**3.94** (.94)	**3.55** (1.18)
Other college friends	2.78 (1.24)	2.71 (1.30)	2.53 (1.32)
Pre-college friends***	2.35 (1.13)	1.94 (1.09)	2.74 (1.26)
Roommates***	**3.15** (1.25)	2.82 (1.26)	**3.42** (1.31)
Professors***	**3.15** (1.10)	2.70 (1.13)	2.03 (1.07)
Advisors***	2.70 (1.10)	**3.51** (1.10)	1.98 (1.03)
TAs***	**3.42** (1.05)	2.53 (1.16)	2.23 (1.14)
School teachers	1.57 (.88)	1.42 (.82)	1.38 (.81)
Librarians***	1.52 (.79)	1.32 (.74)	N/A
Writing center instructors***	1.51 (.82)	1.30 (.71)	N/A
Parents***	2.47 (1.26)	2.36 (1.26)	**3.25** (1.35)
Siblings***	2.12 (1.26)	1.59 (1.22)	2.56 (1.39)

Note. Mean scores based on scale: 1= Never; 5= Very Frequently. ***$p < .001$.
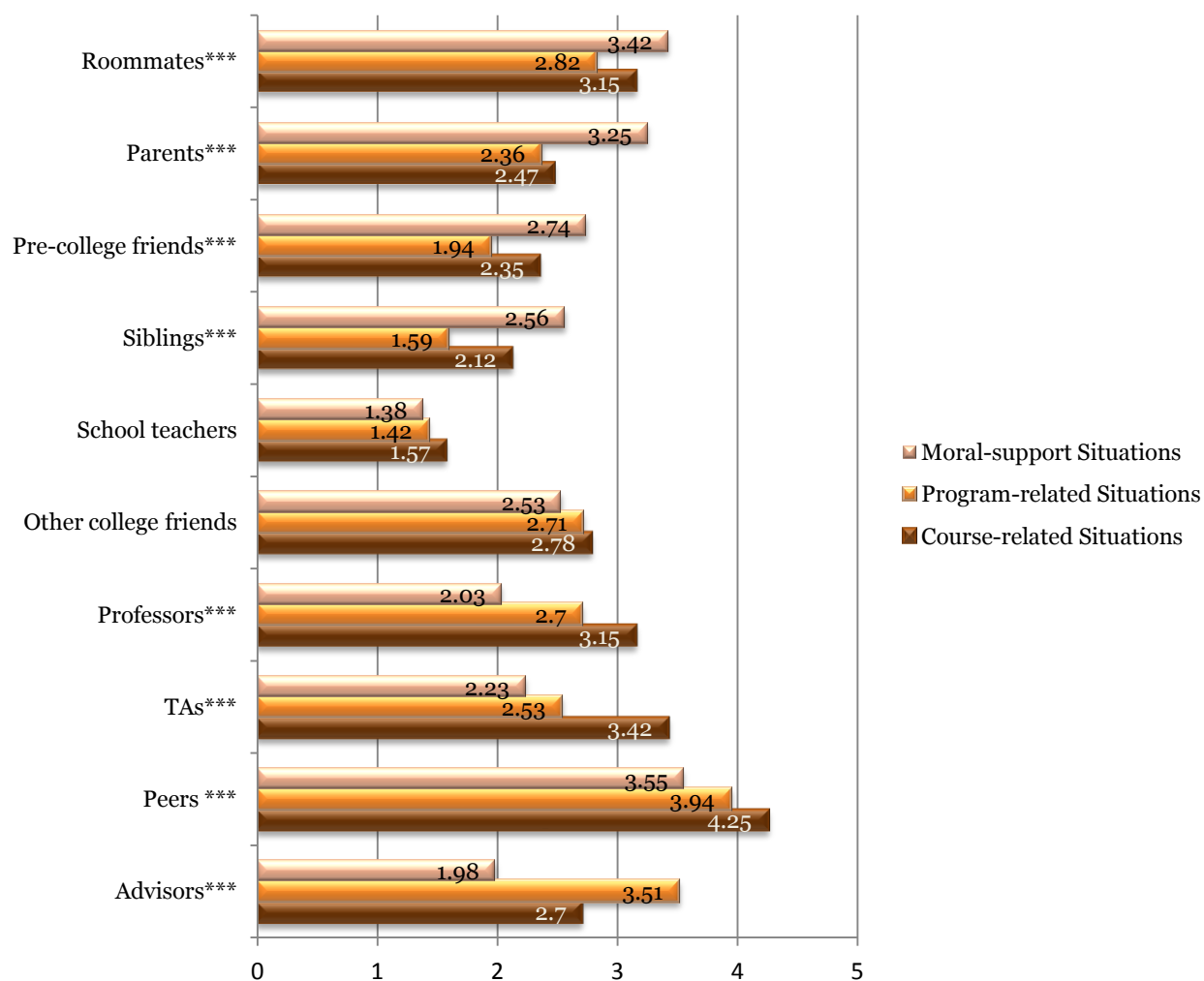
Figure 4.2. Human sources consulted across academic situations.

In terms of source diversity, the average numbers of different information sources used

by students in course-related and program-related situations are 5.28 (out of eight sources;

SD=1.59) and 3.01 (out of five sources; *SD*=1.30) respectively; the average numbers of different

human sources used by students in course-related, program-related, and moral-support

situations are 5.95 (out of twelve sources; *SD*=2.36), 5.31 (out of twelve sources; *SD*=2.48), 5.00 (out of ten sources; *SD*=2.33) respectively.

The average of information sources used in both course-related and program-related situations is 8.30 (out of 13 sources; *SD*=2.47), and the average of human sources used in all three situations is 16.27 (out of 34 sources; *SD*=6.15). The overall average of number of all sources in all situations is 24.56 (out of 47 sources; *SD*=7.79).

4.1.1.2 Frequency of Use across Academic Situations

Paired-samples t-tests were conducted to examine the differences in frequency of source use across different academic situations. In terms of frequency of use, all information sources and most human sources were used significantly differently across different situations, except for some less-used human sources (i.e., other college friends and school teachers they had before college).

Almost all information sources were much more frequently-used in course-related situations than in program-related situations. Only the university or course websites were used more frequently in program-related situations (Table 4.1 and Figure 4.1).

As shown in Table 4.2 and Figure 4.2, almost all human sources were consulted differently, in terms of frequency of use, across academic situations. Except for the unique role of advisors, other human sources can be grouped into two categories based on students' frequency of use across academic situations. The first group of human sources includes peers, professors, TAs, and school teachers. This group of human sources were consulted most frequently for course-related issues, then for program-related issues, and finally for coursework-related moral support. This first group mostly consists of experts. Although peers may not be experts, they learn in the same course with the students and thus have some expertise about the course materials.

In contrast, the second group of human sources forms a support group with non-experts. These human sources include pre-college friends, roommates, parents, and siblings. This group of sources were consulted most frequently for coursework-related moral support, then for course-related issues, and finally for program-related issues.

Advisors are designated for students for program-related issues; they were consulted most frequently for program-related issues, then for course-related issues, and finally for moral support.

4.1.1.3 Source Use between FGC and non-FGC Students

Students' FGC status is one of the main focuses in the current study. Independent t-tests

were conducted to test whether or not there were significant differences in frequency of use and

in source diversity between FGC and non-FGC students. Results showed a tendency of non-FGC

students more frequently using both information sources for course-related issues (t (984)=

-2.045, $p<.05$) and human sources across all situations (t (984)= -2.542, $p<.05$). Compared to

FGC students, non-FGC students consulted peers (t (981)= -3.151, $p<.01$), advisors (t (981)=

-2.065, $p=.05$), and parents (t (981)= -7.635, $p<.001$) more frequently for course-related issues,

and also consulted peers (t (981)= -1.965, $p=.05$) and parents (t (981)= -6.231, $p<.001$) more

frequently for program-related issues. For coursework-related moral support, non-FGC students

consulted peers (t (981)= -2.282, $p<.05$), other college friends (t (981)= -1.665, $p<.01$),

pre-college friends (t (981)= -2.933, $p<.01$), and parents (t (981)= -4.738, $p<.001$) more

frequently than FGC students.

In general, FGC students consulted human sources less frequently (t (984)= -2.580,

$p=.01$), especially for course-related issues (t (984)= -2.542, $p<.05$) and for moral support (t

(980)= -2.516, $p<.05$). FGC students also consulted non-experts less frequently for all academic

situations: course-related (*t* (984)= -4.055, *p<*.001), program-related (*t* (982)= -3.465, *p=*.001), and moral-support situations (*t* (984)= -3.965, *p<*.001).

In terms of source diversity, FGC students consulted a narrower range of human sources than non-FGC students, especially in course-related situations (*t* (984)=-2.397, *p<*.05) and across all academic situations (*t* (984)=-2.220, *p<*.05). This finding supports the assumption that FGC students use fewer sources of information, especially human sources, than non-FGC students (Davis, 2010). It could also support the assumption that FGC students are less familiar with the college culture than their non-FGC counterparts (Davis, 2010; Housel & Harvey, 2009; Stephens et al., 2012), so they do not take advantage of a wide range of sources.

4.1.1.4 Source Use between Underclassmen and Upperclassmen

Socialization is one of the main focuses in the current study, and upperclassmen have been in their college environment longer than underclassmen. Students' class cohort is a variable of interest which helps us learn how college environment affects students' source use behavior. Independent t-tests were conducted to test similarity and differences in the frequency of use and source diversity between underclassmen and upperclassmen.

While upperclassmen used official sources more frequently across academic situations (t (980)=-4.136, p<.001), underclassmen more frequently used unofficial sources (t (980)=4.773, p<.001) and human sources (t (980)=4.692, p<.001). Specifically, underclassmen used search engines (*t* (974)= 3.389, *p*=.001), online forum (*t* (979)= 5.431, *p*<.001), and social networking sites (*t* (980)= 3.899, *p*<.001) more frequently, and consulted pre-college friends (*t* (978)=4.015, *p*<.001), roommates (*t* (974)=2.299, *p*<.05), school teachers (*t* (976)=5.949, *p*<.001), parents (*t* (978)=4.737, *p*<.001), and siblings (*t* (977)=2.926, *p*<.001) more frequently than upperclassmen. Upperclassmen used personal collections (*t* (981)= -3.331, *p*=.001), online library resources (*t* (977)= -4.079, *p*<.001), and physical library resources (*t* (976)= -3.586, *p*<.001) more frequently than underclassmen; they also consulted professors (*t* (978)= -3.440, *p*=.001) more frequently than underclassmen. This finding supports the assumption that upperclassmen use the library more frequently than underclassmen.

Surprisingly, compared to upperclassmen, underclassmen used a wider range of sources, especially human sources (t (980)=4.730, p<.001). This finding does not support the assumption that upperclassmen utilize a wider range of information sources than underclassmen (Head & Eisenberg, 2010a; Tenopir, 2003). More discussion on source diversity between underclassmen and upperclassmen can be found in section 4.3.2.2.2.

4.1.2 Information Horizon Maps (IH Maps)

During each interview session, participants were asked to recall a recent incident when they need information for course-related issues, and place all information and human sources they used in three zones according to their preferences. Participants were then asked to recall other recent incidents when they needed information for program-related issues and for coursework-related moral support, and to re-position sources on their IH maps. Based on the participant-drawn IH maps, this section presents the researcher-organized IH maps for course-related, program-related and moral-support situations with discussions regarding students' source preferences. Source stability across the three academic situations is discussed at the end of this section.

All of the incidents mentioned by the participants can either be identified as one of the predetermined categories—course-related, program-related, and moral-support situations—or as either typical or special situations. For instance, a typical course-related situation would be seeking information for a weekly assignment or a final paper; a special course-related situation could be seeking information for an extremely difficult or challenging assignment. A typical program-related situation would be course selection; a special program-related situation could

be switching majors. All the findings presented in this section were derived from typical

situations mentioned by the students, unless otherwise noted.

Savolainen and Kari's (2004) method were adopted to calculate weighted scores for each

source that appeared on participants' maps. The weighted score for each source was based upon

the number of times a source appeared on students' map-drawing; zone 1 sources were weighted

by 3, zone 2 sources by 2, and zone 3 sources by 1. That is, a zone 1 source that appeared 5 times

on students' information horizon maps would receive a weighted score of 15; a zone 2 source

that appeared 5 times would receive a weighted score of 10; a zone 3 source that appeared 5

times would receive a weighted score of 5. The researcher further illustrated the concentric circle

using different font sizes to represent the number of times a source appeared on students'

information horizon maps. The more times an information source appeared on students' maps,

the larger the font size would be; font size was determined based on the ordinal rank of number

of times sources appeared in a specific zone.

While the average numbers of unique sources included in a course-related, program-

related, and moral-support IH map were only 8.25, 5.15, and 3.60 respectively, the total numbers

of sources on students' IH maps are 16, 13, and 12 respectively. Students used a wider range of

human sources than information sources across different academic situations (see Table 4.3).

Specific source preferences in each scenario are discussed in the following subsections.

Table 4.3.

Number of Unique Sources on Students' IH Maps   *N=20*

	Information Source	Human Source	Total
Course-related situation	6	12	18
Program-related situation	4	11	15
Coursework-related moral support	1	12	13

4.1.2.1 Course-related Information Horizons

Table 4.4 and Figure 4.3 summarize sources that appeared on the 20 participant-drawn

IH maps. Among the 18 unique sources on students' maps, 11 unique sources were included in

each zone.

Most students included information sources in the most preferred zone (zone 1), human

sources in the second-most preferred zone (zone 2), and library print resources in the least

preferred zone (zone 3). The information sources included in zone 1 were primarily search

engines and personal collections (i.e., course materials such as textbooks, handouts, and class

notes); human sources included in zone 1 were primarily peers and TAs. Some students also

included library online resources and course websites in zone 1. About half of the students

included human sources, such as TAs, professors, and peers, in zone 2, and some also included

information sources, such as search engines and library resources. Sources that were included in

zone 3 were primarily library print resources and parents (Figure 4.3).

Figure 4.3. Course-related information horizon map.

Note 1. Sources in the central circle (zone 1) are the most preferred ones; sources in the middle circle (zone 2) are

the second-most preferred ones; sources in the outer circle (zone 3) are the least preferred ones.

Note 2. Only sources that were mentioned at least five times were presented in this map (see Table 4.4).

Note 3. **Human sources** are in bold and italics.

Note 4. Font size was determined based on the ordinal rank of number of times sources appeared in a specific zone.

While some sources were placed consistently in one zone, others were not. Course

websites and advisors were the sources that appeared only in zone 1; mentors, such as residence

advisors and lab graduate students, and siblings only appeared in zone 2; other friends,

librarians, and experts only appeared in zone 3. Search engines, personal collections, library

online resources appeared in the first two zones; parents and roommates appeared in either

zone 1 or 3; writing center and other online resources, such as ted.com and YouTube, appeared

in the last two zones. Peers, TAs, Professors, and library print resources appeared in all three

different zones (Table 4.4).

Table 4.4.

Sources on Students' Course-related IH Maps *N=20*

Source	Zone	Number of Times on the Maps	Weighted Score (zone 1*3, zone 2*2, zone 3*1)
Search engines	1	14	54
	2	6	
Personal collections (primarily course materials)	1	14	46
	2	2	
Library (online resources)	1	11	43
	2	5	
Peers	1	7	43
	2	9	
	3	4	
TAs	1	5	39
	2	11	
	3	2	
Professors	1	4	35
	2	10	
	3	3	
Library (print resources)	1	3	26
	2	5	
	3	7	
Course/ university websites	1	8	24
Parents	1	1	10
	3	7	

Source	Zone	Number of Times on the Maps	Weighted Score (zone 1*3, zone 2*2, zone 3*1)
Advisors	1	2	6
Roommates	1	1	4
	3	1	
Mentors (e.g., residence peer advisor, lab graduate student)	2	2	4
Siblings	2	2	4
Writing Center Instructors	2	1	3
	3	1	
Other online resources (i.e., ted.com and YouTube)	2	1	3
	3	1	
Librarians	3	2	2
Other friends	3	2	2
Firsthand accounts from experts	3	1	1

The following examples demonstrate the reasons why some sources (i.e., peers, TAs, professors, parents, and the library) were placed across different zones. Some students who placed a source in zone 2 provided good explanations not only for themselves but also for those who placed the source in zone 1 or zone 3.

Students who placed peers in zone 2 considered various factors. They typically thought that peers were the most convenient and familiar human source and shared similar experiences with them. However, they also realized that sometimes peers may not have the expertise to answer all their questions, so sometimes they did not trust their peers' answers. The former was

usually the reason for students who placed peers in zone 1; the latter was usually the reason for students who placed peers in zone 3.

I would say that I would go to my peers first to see if they knew, and then go to professors. I mean obvious things that can be easily answered by my peers. I won't ask them things they wouldn't know because I don't trust that. (I3)

Students who placed TAs and professors in zone 1 typically cared about their grades, paid attention to instructors' expectations, and highly valued TAs' and professors' authority, expertise, and reliability (e.g., I3, I8, I16); students who placed TAs and professors in zone 3 may value convenience more or have other concerns (e.g., I14, I15).

Obviously [professors and TAs] they're going to be grading my things and they're teaching me how to do such projects so I trust them the most. (I16)

I mean I do get lazy and just don't want to leave the apartment. I feel I want to know for sure everything to the extent that I can do. I want to put in everything that I can do, and only if I absolutely need them [professors] will I go to them probably because I'm just not as comfortable asking a professor about something. (I14)

While underclassmen tended to place TAs in zone 2 and professors in zone 3 because they mostly had larger classes with both TAs and professors, upperclassmen tended to place both TAs and professors in the same zone because they were more likely to have smaller classes with only professors as well as larger classes with both TAs and professors. Students who placed TAs and professors in zone 2 also provided various reasons that were mentioned by students who placed these sources in both zones 1 and 3 (e.g., I1, I2, and I18). For instance, I18 provided explanations for those who placed TAs in zone 2 and professors in zone 3:

> *For classes that do have a teaching assistant, I'll go to the TA first because obviously they're there for a reason. And the professor has other obligations and doesn't want to meet with the students all the time. So I usually take a hint with the teaching assistant. And that's usually worked out for me because they're usually the one who are grading it anyway. And my whole concern whenever I go there is how do I get an A, how do I do this to your liking, and so if there is a teaching assistant, teaching assistant. (I18)*

I15 placed both professors and parents in zone 3, and provided a typical example of students who had other concerns towards consulting human sources.

I don't really want to bother them [professors]. Same with my family and relatives,

sometimes I don't want them to think that I'm kind of aimless I guess. I want to let them

think that I know what I'm doing. (I15)

Although many students indicated that they studied in the library, they did not often use the resources in the library. Most students placed online library resources in the first two zones and physical library in the last two zones. Typical reasons for not using the library included that the books were outdated, they were unfamiliar with the database search functions, and that they did not think they needed to use the library resources because they had other sources.

I rarely, rarely use physical books or archives in the library. I just feel that it's not as

efficient as a Google search. It's just obsolete. (I4)

I feel like most of my courses, you just need the textbook. It's all textbooks and lectures, so

you don't really need to use the library... The library database for articles comes up with

random stuff. It's not very good in terms of the search function. (I8)

I think only one professor talked about that [using library databases], but I never used it.

I'm not familiar with it, and I didn't think it's really necessary. (I17)

I would say I would put [the physical] libraries down here [in zone 3] because I feel that I

can find a lot of that information on the Internet. (I15)

In fact, students who claimed that they preferred and placed library resources in one of

the first two zones of their IH maps not necessarily used it frequently. The reasons for using

resources from the library were typically about convenience (for library online resources),

quality, or instructors' expectations. For instance, I5 positioned the physical library in zone 1 but

clearly pointed out that he only used the textbooks in the library; I18 placed library online

resources in zone 1 because it could be accessed remotely, but she also pointed out she did not

use it very frequently. Students who used the library physical resources only when it was

required by some of her professors usually placed it in zone 3 (e.g., I4) and indicated that even it

was not convenient, they would still use it.

With things like JSTOR, I would group it with the Internet. I don't use them very much,

but it's about the convenience. I mean I'm comfortable using them. I just don't tend to

because I usually get enough information using other sources, and you can find scholarly

papers just online. You don't even need to go to the databases. They're a little more

difficult to search, so I guess they'd be in zone one and half maybe. (I18)

For research papers, some [professors] prefer a book or two. They want you to use the

bibliography. (I4)

4.1.2.2 Program-related Information Horizons

Table 4.5 and Figure 4.4 summarize participants' program-related IH maps. Among the

15 unique sources on students' maps, 11 unique sources appeared in zone1, 13 in zone 2, and 8 in

zone 3. Most students included the university website in zone 1, advisors and peers in one of the

first two zones, and other online resources (i.e., ratemyprofessors.com) in zone 3 (Figure 4.4).
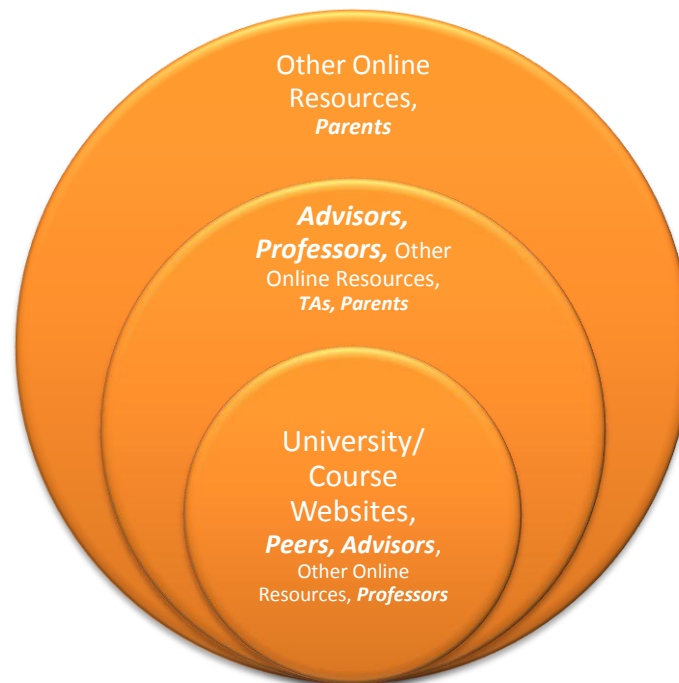
Figure 4.4. Program-related information horizon map.

Note 1. Sources in the central circle (zone 1) are the most preferred ones; sources in the middle circle (zone 2) are the second-most preferred ones; sources in the outer circle (zone 3) are the least preferred ones.

Note 2. Only sources that were mentioned at least three times were presented in this map (see Table 4.5).

Note 3. **Human sources** are in bold and italics.

Note 4. Font size was determined based on the ordinal rank of number of times sources appeared in a specific zone.

However, sources were placed less consistently on students' program-related IH maps than on their course-related ones. Only one student included the significant other in zone 1, and this was the only source that appeared solely in zone 1; mentors, other relatives, roommates, and the library were each included in zone 2 once. Advisors and TAs appeared in the first two zones; search engines appeared in either zone 1 or 3; other friends appeared in the last two zones. The university website, other online resources (i.e., Internet ratings/ ratemyprofessors.com), peers, professors, parents, and siblings appeared in all three different zones (Table 4.5).

Table 4.5.

Sources on Students' Program-related IH Maps N=20

Source	Zone	Number of Times on the Maps	Weighted Score (zone 1*3, zone 2*2, zone 3*1)
Course/ university websites	1	16	54
	2	2	
	3	2	
Advisors	1	9	45
	2	9	
Peers	1	10	43
	2	5	

Source	Zone	Number of Times on the Maps	Weighted Score (zone 1*3, zone 2*2, zone 3*1)
	3	2	
Professors	1	4	43
	2	6	
	3	1	
Other online resources (i.e., Internet ratings)	1	4	23
	2	3	
	3	5	
TAs	1	2	12
	2	3	
Parents	1	1	12
	2	3	
	3	3	
Siblings	1	1	6
	2	1	
	3	1	
Search engines	1	1	4
	3	1	
Significant others	1	1	3
Other friends	2	1	3
	3	1	
Library	2	1	2
Mentors (e.g., residence peer advisor, lab graduate student)	2	1	2
Other relatives	2	1	2
Roommates	2	1	2

Reasons for different students placing a source in different zones on their

program-related IH maps were similar to what was mentioned when discussing their

course-related IH maps. However, other online sources (i.e., Internet ratings/ Rate

MyProfessors.com), advisors and parents appeared to be interesting sources that students

discussed much more in program-related situations than in course-related situations.

When talking about the Internet ratings (i.e., RateMyProfessors.com), most students

were aware that students might rate their professors based on their grades, and that positive or

negative opinions could vary on an individual basis. However, the participants held very

different opinions about the reliability and credibility towards this type of online resource.

More FGC students than non-FGC students placed Internet ratings in zone 1 because

they trusted other students' opinions even if some of them admitted that they might trust them

too much and cared too much about their own grades.

I look at all the professors on RateMyProfessors. And then I weed them [the professors]

out if they sound horrible, or if I wouldn't learn anything from them, and then I try to fit

them altogether... The one thing I think about is the inefficient about my process is that I

do weed out professors based on what other students say. I trust these opinions a little too

much because I'm too concern about my grades. And if they grade really harshly, even if I

know I'll learn a lot from it, and it sounds great, but I can't do it. I'm afraid because I

want my GPA to be really good. (I18)

Students who placed the Internet ratings in zone 2 did not trust other students' opinions as much as students who placed it in zone 1. These students usually did not weigh other students' opinions too much, but still took those opinions into consideration.

I take it [Internet ratings] with a grain of salt. I know that some people, usually people

rate the professors after they've gotten their grade. (I16)

Students placed the Internet ratings in zone 3 because they questioned other students' opinions, and did not make decisions based on those opinions. However, they still took a look either before or after they made their own decisions, simply for their own references.

It's usually after I register for courses. I go and see what the description is and what other

people think of the course. Especially for rating a professor, each person has their own

opinion. I like to register and then see. I don't like to base my choices on other peoples'

opinions. (I5)

I feel that professors are on an individual basis. I just talked to a girl in my class

yesterday, and she had a professor that I had in freshman year, we talked about it, and I

just feel that it's such on an individual basis. And even my chemistry professor, I know the

majority of the class absolutely hated her, but I really liked her, and I connected really

well with her, so I just don't trust their opinions [on RateMyProfessors]. I'd rather make

my own decisions. (I12)

Advisors were placed by more students on their program-related IH maps than in other

situations. Most students, especially underclassmen, found advisors very helpful. However, a

few upperclassmen or non-FGC did not consider their advisor as an important source. A

non-FGC student described how her parents helped her with program-related issues, so she did

not need to get much advice from her advisor in this way:

I feel that I knew what I wanted to do when I talked to my advisor, so I don't have to get

that much advice... My parents try to give me the info... That could be part of it, yeah. [My

parents] They're my most trusted. (I3)

Although students who consulted their parents for program-related issues usually

acknowledged that their parents did not know much about their courses, non-FGC students and

the very few FGC students who included their parents in zone 3 of their maps had different

responses. While non-FGC students typically had a more in-depth discussion or got more

specific advice from their parents, FGC students typically only "let their parents know what

courses they will be taking," (e.g., I14) and got reassurance from their parents. One FGC student

illustrated:

I'll let my parents know because otherwise everyone's like "what classes are you taking?"

I'll talk to them a little about it, and they'll be like, "that sounds like something you would

like." (I14)

A non-FGC student described how his father helped him with course selection:

My parents don't really know much about the courses, but they still try to give me the info.

My dad was all about looking at RateMyProfessors. He would like to make sure that I get

a good professor. (I3)

Another non-FGC student described a special situation when he decided to switch to

another major with the help from both his advisor and parents:

From the resources that my advisor gave to me, my parents looked it up for me. I kind of

put it all together and find a new major. (I2)

Overall, based on students' program-related IH maps, the researcher found that FGC

students relied on the Internet ratings and advisors more than their non-FGC counterparts.

While non-FGC students also consulted other sources, they may rely on their parents more than

FGC students.

4.1.2.3 Moral-support Information Horizons

Table 4.6 and Figure 4.5 summarize participants' coursework-related moral-support IH

maps. Among the 13 unique sources on students' maps, 8 unique sources appeared in both zones

1 and 2, and 6 in zone 3.

Students tended to included parents and peers in one of the three zones (Figure 4.5), but

sources were less consistently placed on their moral-support IH maps than on the

course-related ones. Significant others, roommates, and mentors were the only source that

appeared solely in zone 1; search engines and other relatives were the sources that only

appeared in zone 2. Advisors and siblings only appeared in the first two zones; peers appeared in

either zone 1 or 3; professors and TAs only appeared in the last two zones. Parents and other

friends appeared in all three different zones (Table 4.6). This shows that in a moral-support

situation, zone 1 of the IH maps predominately consisted of non-experts. Experts, such as

advisors, professors, and TAs, mainly appeared in the last two zones.
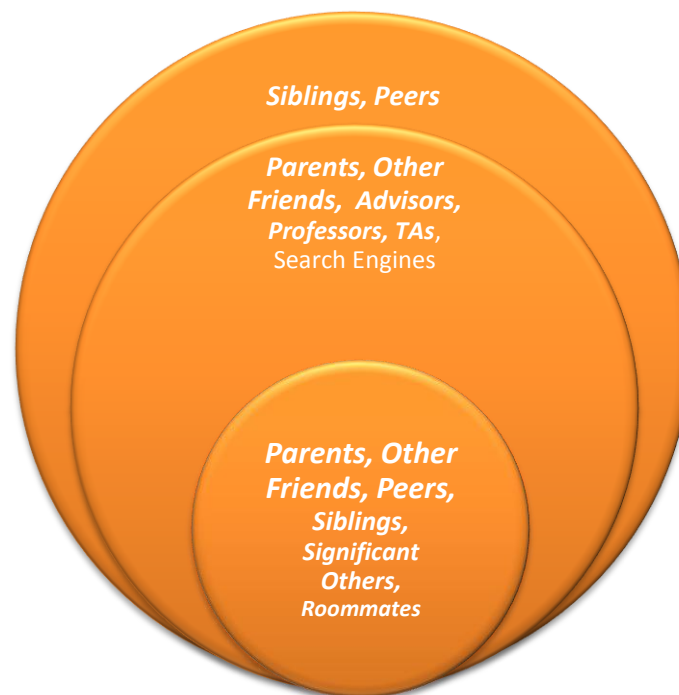
Figure 4.5. Coursework-related moral-support information horizon map.

Note 1. Sources in the central circle (zone 1) are the most preferred ones; sources in the middle circle (zone 2) are

the second-most preferred ones; sources in the outer circle (zone 3) are the least preferred ones.

Note 2. Only sources that were mentioned more than once were presented in this map (see Table 4.6).

Note 3. **Human sources** are in bold and italics.

Note 4. Font size was determined based on the ordinal rank of number of times sources appeared in a specific zone.

Table 4.6.

Sources on Students' Coursework-related Moral-support IH Maps   *N*=20

Source	Zone	Number of Times on the Maps	Weighted Score (zone 1*3, zone 2*2, zone 3*1)
Parents	1	10	43
	2	6	
	3	1	
Other friends	1	8	35
	2	5	
	3	1	
Peers	1	7	23
	3	2	
Siblings	1	5	19
	2	2	
Significant others	1	4	12
Advisors	1	1	11
	2	4	
Roommates	1	3	9
Professors	2	3	7
	3	1	
TAs	2	2	5
	3	1	
Search engines	2	2	4
Mentors	1	1	3
Other relatives	2	1	2
Therapist	3	1	1

Parents were placed by more students on their moral-support IH maps than on other

maps. Most students placed parents, peers, and other life-long friends in one of the first two

zones in zone 1 because their parents and friends were the ones who they trusted and were the

most familiar with (e.g., I1, I6). Some students also pointed out that even if their family had

different experiences or goals, they shared the same values (e.g., I9). Therefore, students turned

to their family for coursework-related moral support.

If I'm having a problem I would go to my parents and my friends because they know me

better than anybody else. That's who I would go to if it was a personal problem. (I6)

I consult my family just because we have a lot of the same values. We prioritize similarly

even though we have different goals. (I9)

[My parents] They've experienced enough, even if they're not academic, they've

experienced enough things to know how to go about overcoming a challenge. (I19)

Fewer students also included advisors, TAs, or professors on their moral-support IH

maps. The reasons for included these sources were also out of familiarity and trust. These

students usually had non-classroom interactions with these human sources, and thus built a

personal relationship with them. The students also felt that advisors, TAs, or professors knew

them, so they might be able to help.

If it has to do with academics, then I would also go to my advisors. I would go to my

advisors just because they know my academic history and it's not only just academics, but

they do understand outside of academics, my personal life. So my involvement and things

like how much I have to work. They just know my personal issues, too. (I13)

In describing the reasons for placing a variety of human sources on the

coursework-related moral-support IH maps, I16 provided a summary of utilizing different

sources:

If I was stressed about the class, I might go to the professor or TA. But if I wasn't

comfortable with that, then I'd talk to the students who are also in the same class, see if

they're experiencing the same thing… Just because my family can't really change

anything, so it'd pretty much just be me complaining about it, but my class peers and my

roommates have the same resources as me and they've gone through the same

experiences. (I16)

In addition to human sources, very few students (i.e., I5 and I14) also used search

engines to look for information for coursework-related moral support and to learn how other

people dealt with similar problems.

Probably zone two would be the Internet. I'll Google "ways to get more motivation or

have more energy throughout the days to get you through classes." Just Googling

scenarios. (I14)

When I am stressed, I like to go to friends first. After that, I'll go online and see how other

people reacted or how other people felt. (I5)

Overall, the criteria students used to place information and human sources on their IH

maps mainly included: convenience, familiarity, quality or expertise, reliability, currentness,

and instructors' expectations (e.g., at least certain number or types of sources are required to be

used in an assignment). As to course-related and program-related issues, most students

considered both perceived accessibility and perceived quality and emphasized that convenience,

familiarity, and quality of the source were the three main factors affecting their source use

behavior. However, some students pointed out instructors' expectations would be a dominant

factor over other factors. As to coursework-related moral support, students emphasized

familiarity and trust because students only turned to people who they trusted and also knew

them well.

4.1.2.4 Source Stability across Academic Situations

In order to systematically examine source stability of each source across the three

academic situations, the change ratio for each source was calculated based on its weighted

scores in course-related, program-related, and moral-support situations. The smaller number

the change ratio is, the more stable the source is. Only sources that appeared on the IH maps for

at least two different situations were given a change ratio.

Sources can be categorized into three types: (1) stable sources which were preferred

sources for all situations; (2) situation-specific sources which were preferred sources in certain

situations; and (3) highly situation-specific sources which appeared on students' IH map for

only one situation. Peers and mentors were the most stable sources because they were

consistently placed on the IH maps across all situations. Personal collections and library print

resources were highly situation-specific sources which were only placed in course-related

situations. In addition to sources on the two ends of the spectrum, almost all the other

situation-specific sources can be categorized into two groups. While library online resources,

search engines, other online resources, and experts tended to be preferred sources for

course-related and program-related situations, non-experts were situation specific for moral

support.

Table 4.7.

Source Stability on Information Horizon Maps across Situations

Source	Course vs. Program	Course vs. Support	Program vs. Support	Average Change Ratio
Library (online resources)	**21.50**	N/A	N/A	21.50
Other friends	(1.50)	**(17.50)**	**(11.67)**	10.22
Search engines	**13.50**	**13.50**	1.00	9.33
Other online resources (e.g., RateMyProfessors, YouTube)	(7.67)	N/A	N/A	7.67
TAs	**3.25**	**7.80**	**2.40**	4.48
Advisors	**(7.50)**	(1.83)	**4.09**	4.47
Professors	(1.23)	**5.00**	**6.14**	4.12
Significant others	N/A	N/A	(4.00)	4.00
Siblings	(1.50)	**(4.75)**	**(3.17)**	3.14
Parents	(1.20)	**(4.30)**	**(3.58)**	3.03
Roommates	(2.00)	**(2.25)**	**(4.50)**	2.92
Course/ university websites	(2.25)	N/A	N/A	2.25
Mentors (e.g., residence peer advisor, lab graduate student)	2.00	1.33	(1.50)	**1.61**
Peers	1.00	1.87	1.87	**1.58**

Note. Only sources that appeared at least a total of five times in two situations were included in this table. Change ratios were calculated based on the weighted scores of each source in different situations (see Table 4.4, Table 4.5, and Table 4.6).

Ratios in parentheses indicate that the weighted score in the latter situation is greater than the former situation. For instance, in "course vs. program" column, a ratio in parenthesis indicates that the weighted score for that source is greater in program-related situations than in course-related situations. Ratios larger than two were considered situation specific.

4.2 Relationships Among Sources

Since examining the relationships among sources used by individuals is one of the elements IH emphasizes, this section reports sequential and referral relationships among sources. First, the researcher presents the patterns of typical steps students took in different academic information-seeking processes. Then, the researcher reports the information and human sources that typically directed students to other sources.

4.2.1 Sequential Relationships Among Sources

When reporting web survey results, the researcher identified sources that were included as one of the first three steps in students' academic information-seeking processes, and then described the typical steps taken in each academic situation. The researcher described the steps taken among all information and human sources prior to the steps taken among human sources in each situation.

When reporting interview findings, the researcher identified the different strategies students used to seek academic information and discussed the steps students took in their information-seeking processes.

4.2.1.1 Survey Results

In the web survey, students were asked to identify their first three steps when seeking

information for course-related, program-related, and moral-support issues. In each situation,

students were first asked to identify their steps considering all information and human sources,

and then asked to identify steps considering only human sources.

As with frequency of use and IH maps, peers appeared to be the only source that was

consulted as one of the first three steps in all academic situations. Other information and human

sources were typically used as one of the first three steps only in one or two of the situations

(Table 4.8).

For course-related issues, many students consulted personal collections, peers, search

engines, and TAs as one of the first three steps in their information-seeking processes,

considering all information and human sources. In considering only human sources, most

students consulted peers and TAs as one of their first three steps; more than half of the students

consulted professors as one of their first three steps.

For program-related issues, most students consulted the University of Wisconsin—

Madison website and peers as one of their first three steps, considering all information and

human sources. In considering only human sources, most students consulted peers and advisors; one-third of the students consulted professors as one of the first three steps in their program-related information-seeking processes.

As to coursework-related moral support, most students consulted peers as one of their first three sources; about half of the students consulted roommates and parents, and slightly more than one-third of the students consulted TAs.

Table 4.8.

Source as One of the First Three Steps in Academic Information-Seeking Process   *N*=984

Source	Course (%)		Program/Major (%)		Moral Support (%)
Personal collections	**78.2**	N/A	24.3	N/A	N/A
Peers in the same course	**42.9**	**87.3**	**53.3**	**82.5**	**70.7**
Search engines	**41.1**	N/A	15.0	N/A	N/A
TAs	**38.5**	**76.6**	11.4	24.9	**35.2**
Course or university website/course catalog	26.4	N/A	**70.1**	N/A	N/A
Professors	20.4	**59.2**	15.3	**33.3**	24.2
Library online resources	13.3	N/A	N/A	N/A	N/A
Library print resources	8.3	N/A	N/A	N/A	N/A
Online forum or Q&A sites	6.4	N/A	22.5	N/A	N/A
Roommates	6.1	25.6	10.4	29.8	**49.0**
Advisors	5.7	16.0	**50.0**	**70.6**	14.6
Social networking or micro-blogging sites	3.7	N/A	5.0	N/A	N/A
Other college friends	2.6	12.3	8.8	20.2	18.2
Parents	1.7	8.9	5.5	19.4	**44.6**
Siblings	1.6	5.8	3.9	7.1	14.7
Pre-college friends	1.0	4.4	1.7	5.6	22.9

Source	Course (%)		Program/Major (%)		Moral Support (%)
Traditional mass media	.7	N/A	N/A	N/A	N/A
Librarians	.5	1.3	.5	.8	N/A
Writing center instructors	.1	.7	.2	.6	N/A
School teachers	0	.4	.3	.4	.6

Note 1. The percentages for course-related and program-related situations report the frequency with which a specific source was used as one of the first three steps (1) among both information and human sources and (2) among human sources.

Note 2. The percentages do not add up to 100%.

Figure 4.6 shows the most common pattern of steps taken by students in three different academic situations. In course-related situations, considering all information and human sources, students typically started their information-seeking processes with personal collections, and consulted peers, TAs, search engines, or professors as their second and third steps. In considering only human sources, students tended to consult peers, TAs, and professors (in varying orders) as their first three steps, although they typically started their steps by consulting peers.

In a program-related situation, considering all information and human sources, students typically started their information-seeking processes with course catalog on the university website, followed by consulting advisors, peers, or online forums. In considering only human sources, students tended to consult peers, advisors, and roommates (in varying orders) as their first three steps, although they typically started their steps by consulting peers or advisors.

As to coursework-related moral support, considering only human sources, students tended to consult peers, parents, roommates, and TAs as their first three steps (in varying orders) as their first three steps, though they typically started their steps by consulting peers or parents.
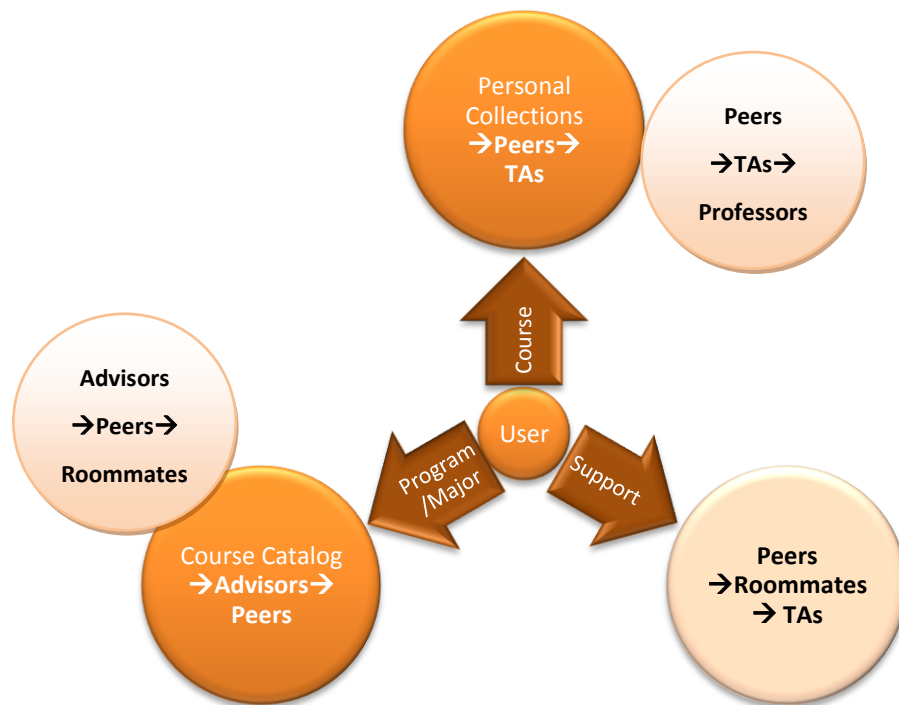
Figure 4.6. Typical information-seeking steps across academic situations.
Note. Orange (dark) circles indicate typical steps among all sources; pink (light) circles indicate typical steps among human sources; **human sources** were in bold.

4.2.1.2 Interview Results

During the interview sessions, the participants were asked to describe their information-seeking processes when they recently needed academic information. Students had different strategies and had different numbers of steps towards coursework issues.

Two main strategies were identified: information-first and human-first strategies. While

most students tended to consult information sources prior to human sources, some students

consulted human sources prior to information sources. Students who started with information

sources usually claimed that it was convenient or they would like to be prepared before

consulting other people. A typical response was, "I'd probably start from the internet because it's

on-hand right away, but I don't have problems asking people anything." (I3) Many students

mentioned that they would like to be prepared before consulting human sources, especially

consulting professors.

> *If there is all this information available, it's like I'm wasting their [other people's] time*
>
> *because I could find it on my own. (I11)*

> *Usually professors want you to do research, so try it before you ask them questions.*
>
> *Otherwise, you're asking them to do it for you. (I8)*

However, a few of the students also had concerns consulting human sources prior to

information sources. For example, I14 mentioned that "I just feel much more comfortable

figuring it out myself." And I18 explicitly identified himself as an introvert.

I guess just by nature I'm an introvert. And that just how it works... They [TAs and professors] don't want someone to come to office hours who hasn't looked through all the notes already, and exhausted all the resources because their time are valuable. (I18)

Students who started with human sources usually needed to learn general information or where to start looking for information. Therefore, some underclassmen tended to consult human sources before using information sources for course-related (e.g., I16) and program-related situations (e.g., I7 and I11).

I was stuck, and I just didn't know what to do, and that's what the TA is for... I go to my TAs and professors first just because Google isn't always trustworthy. And I guess I just I like to go to the professors just because I'm paying for to go to school. (I16)

However, a student addressed that whether he consulted information or human sources first depended on the situation. He argued that while information sources provide quick references to tangible facts, human sources allowed him to learn more abstract issues that were not easily answered by information sources.

If it comes to a syllabus, that is almost always my first information source that I go to. Other than what's on Learn@UW [the course website] or the syllabus, I will go to a

person first. It's kind of neck and neck, I like talking to the professors and the TAs because

it allows me to ask more abstract questions and get a more real answer, but as far as

administrative things I'll just look to the syllabus. (I19)

Specific sources used in each steps were similar to what students presented in their IH

maps. Zone 1 (the most preferred) and some zone 2 (the second-most preferred) sources were

typically included in their first three steps. Although zone 3 (the least preferred) sources were

not likely to be included in their typical information-seeking steps, these sources might be

included in their later steps when facing special or challenging situations because these were

stronger needs for information.

While most students typically had two or three steps when they needed information,

some students only pursued the third step when they "really needed it," (e.g., I19) other students

pointed out that they had a chain of steps moving back and forth among sources (e.g., I18).

These phenomena usually occurred in special situations when students were working on

challenging assignments. This information-seeking process is similar to what Sonnenwald et al.

(2001) described as the *cyclic pattern*. In describing this cyclic pattern, I18 also implied that she

is a perfectionist.

I mean I don't stop until I'm satisfied. I'll start from zone one and exhaust that, and then

I'll go to zone two, and if it's still not working, I'll go back to zone one, and if it's still not

working, back to zone two. And if that happens to be comfortable or extracted of me, then

I'll go to zone three. But I'll jump back and forth until it's perfect. (I18)

An emerging finding related to the cyclic pattern was a combination of a chain involving

both referrals and sequential steps (e.g., I1). This type of information-seeking processes usually

occurred in a special situation rather than a typical one, and it was usually when students faced

a challenging problem which was not easily solved. It was similar to what Sonnenwald et al.

(2001) described as the *sequential chain pattern*. Nevertheless, while Sonnenwald et al.

emphasized the complexity of these patterns, she did not further illustrate whether the nature of

the sequential chain was simple steps or a combination of steps and referrals. In the current

study, source use patterns were examined mainly through their sequential steps and referral

incidents. The current study found that while referral incidents usually involve two sources, the

number of sources involved in sequential steps may vary from two to five, or more. This is also

similar to Sonnenwald et al.'s finding that a sequential chain usually included two to five sources.

The next section focuses on results regarding referral incidents.

4.2.2 Referral Relationships among Sources

This section focuses on the source quality. First, the researcher reports survey results regarding sources that typically direct students to other sources in course-related, program-related, and coursework-related moral-support situations, and then reports interview findings regarding the paths of the referral processes. Different types of sources are discussed according to the number of times a source directs students to other sources and/or is directed to by other sources.

4.2.2.1 Survey Results

This subsection provides an overview of sources that possess a quality of directing students to other sources in different academic situations. In course-related situations, most students reported being directed to other sources by search engines, course or university websites, personal collections, peers, TAs, and professors. In program-related situations, most students reported being directed to other sources by course or university websites, peers, and advisors. In terms of coursework-related moral support, more than half of the students reported being directed to other sources by peers and parents (Table 4.9 and Table 4.10).

Table 4.9.

Information Source Referral Frequencies across Academic Situations   *N*=984

Information Source	Course Frequency (%)	Program/Major Frequency (%)
Search engines	**768 (78.3)**	526 (53.8)
Course or University website/Course Catalogs	**756 (77.1)**	**750 (76.4)**
Personal collection	**738 (75.1)**	522 (53.2)
Library online resources	571 (58.1)	N/A
Online forum or Q&A sites	471 (48.0)	447 (45.5)
Social networking or micro-blogging sites	471 (48.0)	402 (41.1)
Library print resources	433 (44.0)	N/A
Traditional mass media	288 (29.3)	N/A

Note. The frequency in the cells indicates sources that at least occasionally direct students to other sources.

Table 4.10.

Human Source Referral Frequencies across Academic Situations   *N*=984

Human Source	Course Frequency (%)	Program/Major Frequency (%)	Moral Support Frequency (%)
Peers in the same course	**845 (86.0)**	**739 (75.5)**	**566 (57.8)**
TAs	**770 (78.4)**	576 (58.8)	463 (47.3)
Professors	**710 (72.2)**	606 (61.7)	388 (39.6)
Advisors	620 (63.1)	**698 (71.2)**	453 (46.4)
Roommates	580 (59.1)	531 (54.4)	450 (46.0)
Other college friends	492 (50.3)	466 (47.5)	386 (38.5)
Parents	462 (47.1)	419 (42.7)	**504 (51.6)**
Siblings	346 (35.4)	314 (32.0)	308 (31.6)
Pre-college friends	313 (31.9)	246 (25.1)	271 (27.7)
Librarians	254 (25.9)	126 (12.8)	N/A
Writing center instructors	191 (19.6)	115 (11.7)	N/A
School teachers	162 (16.2)	128 (12.5)	120 (12.3)

Note. The frequency in the cells indicates sources that at least occasionally direct students to other sources.

Information sources that possessed a referral quality seemed to be consistent in both course-related and program-related situations. Compared to information sources, human sources that possessed a referral quality varied across situations. The only human source that possessed a referral quality across all situations was peers. TAs and professors possessed a referral quality in a course-related situation more than other situations; advisors in a program-related situation; parents in a moral-support situation. Sources that possessed a referral quality typically appeared in one of the first two zones on students' IH maps and were also frequently used.

4.2.2.2 Interview Results

During the interview sessions, a total of 119 academic information referral incidents were mentioned by the 20 participants, with an average of 5.95 information referral incidents per participant. While there were 60 unique referral paths, only 22 unique sources appeared in these paths, with 18 unique sources directing the students to 14 unique sources.

In order to learn which sources possess a quality of directing students to other sources or receiving referrals, the current study examines the findings based on Sonnenwald et al.'s (2001) argument. According to Sonnenwald et al., a resource can be one of the following types of nodes:

isolates without any link to other sources, *transmitters* with outgoing links but no incoming

links, *receivers* with incoming links but no outgoing links, or *carriers* with both incoming and

outgoing links. Sonnenwald further categorized the resources and suggested that a transmitter is

a starting resource, and a receiver is an *ending resource*. A carrier can either be (1) *a*

recommending resource with more outgoing than incoming links, (2) *a balancing resource* with

about the same outgoing and incoming links, or (3) *a focusing resource* with more incoming

than outgoing links. Since an isolate is not within the scope of the current discussion about

referral incidents, the following discussion focuses on transmitters, receivers, and carriers.

Table 4.11 summarizes sources directing students to other sources with numbers of

outgoing and incoming links, as well as their node types. Human sources tended to possess the

quality of directing students to other sources, and information sources tended to receive those

referrals. Among the 18 unique sources directing students to other sources, only 5 were

information sources; among the 14 unique sources that other sources directed students to, 8

were information sources. Therefore, starting and recommending sources which tended to direct

students to other sources were mostly human sources; balancing, focusing, and ending sources

which tended to received referrals were mostly information sources.

Table 4.11.

Sources Directing Students to Other Sources in Academic Situations   *N*=20

Source	Outgoing Links	Incoming Links	Node Type
Search engines	9	0	Starting
Parents	7	0	Starting
Friends	3	0	Starting
High school teachers	2	0	Starting
Roommates	2	0	Starting
Significant others	2	0	Starting
Mentors	1	0	Starting
Siblings	1	0	Starting
Professors	25	12	Recommending
TAs	20	6	Recommending
Peers	19	6	Recommending
Advisors	7	2	Recommending
Personal collections	2	3	Balancing
Course/ university websites	1	2	Balancing
Articles	11	19	Focusing
Online resources (e.g., Wikipedia, Government statistics, practice exams)	4	43	Focusing
Books	2	10	Focusing
Experts	1	3	Focusing
Library	0	5	Ending
Campus resources (e.g., Writing Center, campus tutorial services)	0	4	Ending
Databases	0	2	Ending
Graduate students	0	2	Ending

Note. Node types based on Sonnenwald et al. (2001). **Human sources** are in bold.

In addition to examining the total outgoing and incoming links, the current study further

investigated the numbers of unique outgoing and incoming links each source possessed. Figure

4.7 shows the 60 unique referral paths in a network based on Table 4.12, weighting the ties between sources by the number of times mentioned and weighting the size of the source by the number of unique outgoing and incoming links.

As shown in Figure 4.7, the top five sources with five or more unique outgoing links included professors, TAs, parents, peers, and articles; and the top five sources with five or more unique incoming links included online resources, professors, articles, TAs, and the library. Professors, TAs, and articles were the top three sources that possessed both the most unique outgoing and incoming links.

Table 4.12.

Information and Human Source Referral Incidents Matrix *N*=20

	advisor	article	book	campus resource	course/ university website	database	expert	grad student	lib.	online resource	peer	personal collection	prof.	TA	Unique Outgoing Links
Advisor							1			2	1		3		4
Article		6					1		1	2			1		**5**
Book		2													1
Course/ university website	1														1
Expert													1		1
Friend			1						1				1		3
HS teacher			1							1					2
Mentor		1													1
Online resource		1								3					2
Parents	1				1				1	1			2	1	**6**
Peer		1								11	5		1	1	**5**
Personal collection		1								1					2
Prof.		3	3	2	1	1	1	2	1	5		3	1	2	**12**

	advisor	article	book	campus resource	course/ university website	database	expert	grad student	lib.	online resource	peer	personal collection	prof.	TA	Unique Outgoing Links
Room-mate										1				1	2
Search engine		2	1							6					3
Sibling										1					1
Sig. other													1	1	2
TA		2	4	2		1			1	9			1		7
Unique Incoming Links	2	**9**	**5**	2	2	2	3	**1**	5	**12**	2	1	**9**	**5**	

Note 1. Number in each cell indicates the number of incidents mentioned by the 20 participants during the interview sessions.

Note 2. Sources in the left column starting with uppercases are the ones directed students to other sources; sources on the top row starting with lowercases are the ones being directed to.

Note 3. **Human sources** are in bold.
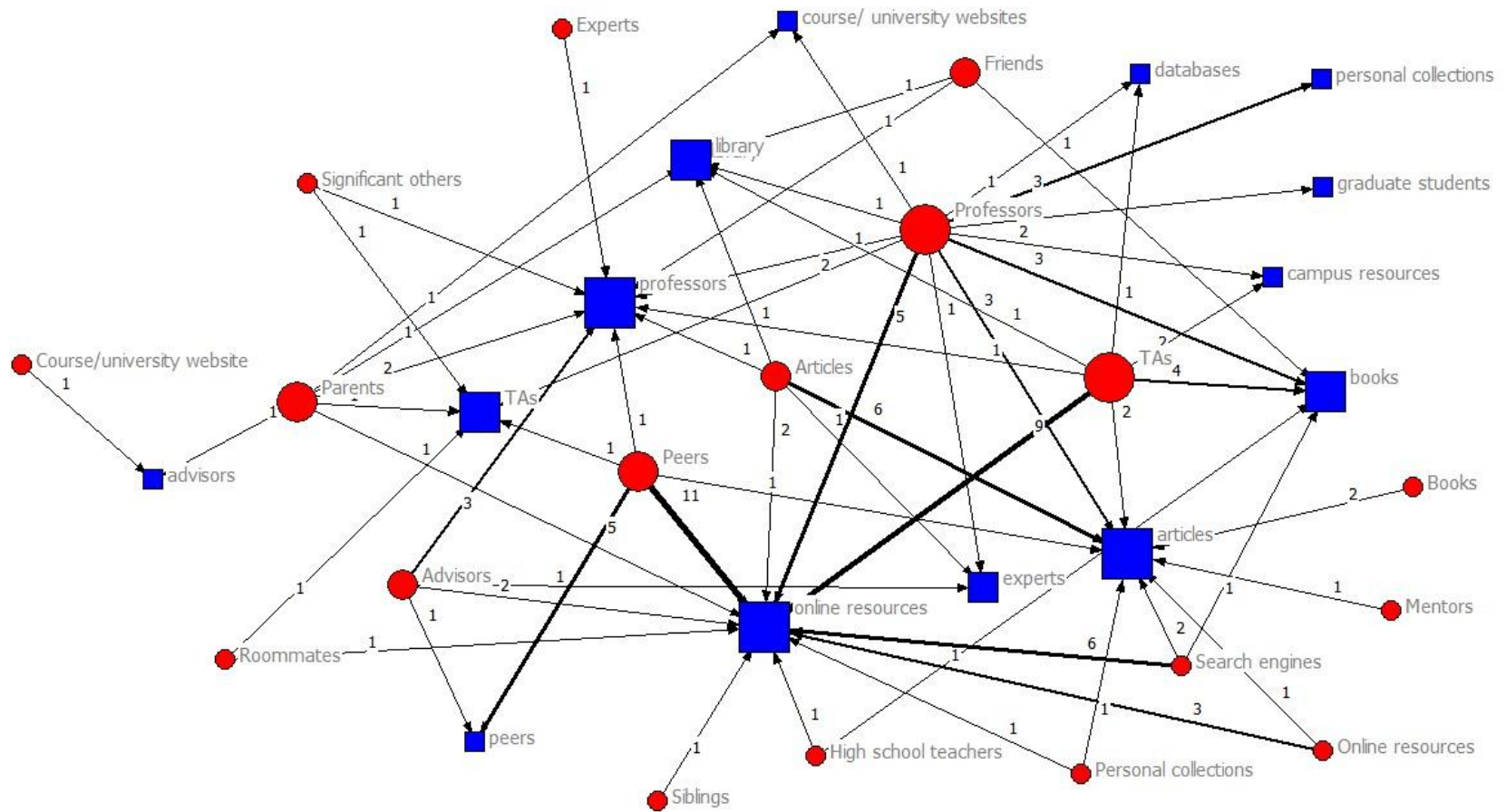
Figure 4.7. Academic information referral paths.

Note. Red circles are sources (with outgoing links) that direct students to other sources; blue squares are sources (with incoming links) that are directed to by other sources. Circles and squares are weighted by numbers of unique incoming and outgoing links.

Numbers indicate the number of incidents mentioned by the 20 participants during the interview sessions, and links are weighted by these numbers.

The study identified two emerging findings when students described their academic information referral incidents. Although most of the referral incident occurred when students asked for help, a referral incident could occur passively. Some students mentioned that professors or TAs usually recommended specific resources either in class or on the course website. Even if the students might not pay attention to the information or did not ask for help, they used the resources later when they needed it. The students also viewed this type of incident as a referral incident. Moreover, while this type of referrals usually occurred in course-related situations, I19 provided an example of a referral incident in a program-related situation which helped him make a course selection decision.

> *I'm taking an epistemology class and most of the reason why I'm taking it is because my*
>
> *TA from a previous semester highly recommended the professor that is teaching it, saying*
>
> *he was very thorough and very articulate of what he expected and very clear. I was kind*
>
> *of at a crossroads of what I wanted to take and he suggested it in class, so that's why I*
>
> *took it. (I19)*

Finally, although most referral incidents typically occurred between two sources with one directing to the other, it could involve a chain of sources (mentioned by two participants, I15

and I20). For instance, I20 mentioned that a friend directed him to a professor, and that

professor directed him to another professor.

> *I have a friend who is a life science communication major, and I'm in the science writing*
>
> *course right now and need to write a paper. I've asked a couple of sources that if he knows,*
>
> *and he has talked to a professor, so my friend referred me to him [the professor]. I looked*
>
> *him up, got his email, and got in touch with him. And actually that professor referred me*
>
> *to a different professor. (I20)*

4.3 Socialization and Source Use

In this section, the researcher first reports students' interactions with various socializing

agents, and then reports the impact of socialization on students' source use behavior.

4.3.1 Interactions with Socializing Agents

According to Weidman's (1989, 2006) model of undergraduate socialization, students'

interactions, integration, and learning are three main aspects for researchers to learn college

impact. The current study focuses on students' interactions with socializing agents, including

their learning from different agents. The researcher first reports results from the web survey

regarding students' interactions with peers, professors, and parents, and then presents interview

findings on students' interactions with the above socializing agents, along with other important

agents identified by the participants. Students' narratives about what they learned from

different socializing agents are also addressed.

4.3.1.1 Survey Results

In the web survey, students were asked to what degree they agreed with the statements

regarding their socialization experiences. Focusing on parents, peers, and professors as

socializing agents in academic contexts, the statements in the survey addressed the following

aspects: parents as role models, peers as role models, professors as role models, parental direct

teaching, collaborative learning, forming new community in college, meaningful discussion with

diverse peers, and non-classroom interactions with faculty (see Appendix A). This section first

reports students' interactions with specific socializing agents, and then identifies homogeneous

subgroups within this sample and presents the socialization profiles of these homogeneous

subgroups.

Table 4.13 summarizes parents, peers, and professors as socializing agents to students by

their FGC status. Results showed that more students viewed peers, rather than professors, as

their role models and fewer students viewed parents as their role models in academic

information-seeking contexts.

In terms of the interactions with socializing agents, students had more interactions with

professors and peers than with parents. Compared to FGC students, non-FGC students had

more interactions with all the socializing agents, especially with parents (t(980)=-11.254,

p<.001), receiving more parental direct teaching (t(980)=-7.518, p<.001), and having more

collaborative learning experiences with peers (t(983)=-2.579, p=.01).

Table 4.13.

Students' Interactions with Parents, Peers, and Professors   *Mean (SD)*

Multi-item Index (Number of items)	Socializing Agents of Interest	FGC (*n*=305)	Non-FGC (*n*=679)	Overall (*N*=984)	Cronbach's *alpha*
Parents as role models (3)***	Parents	2.80 (.96)	3.52 (.90)	3.30 (.98)	.80
Peers as role model (3)	Peers	3.78 (.69)	3.87 (.69)	3.85 (.69)	.75
Professors as role models (3)	Professors	3.64 (.80)	3.58 (.75)	3.60 (.76)	.76
Parental direct teaching (5)***	Parents	2.81 (.95)	3.29 (.91)	3.14 (.95)	.85
Non-classroom interactions with faculty (5)	Professors	3.41 (.77)	3.42 (.79)	3.41 (.79)	.85
Cooperative learning (4)**	Peers	3.24 (.85)	3.39 (.82)	3.34 (.83)	.76
Meaningful discussion with diverse peers (3)	Peers	3.33 (1.02)	3.33 (.94)	3.33 (.97)	.83

Note. Mean scores based on scale: 1 to 5; the higher the score is, the more students interact with that specific socializing agent.

*p < .05. **p < .01. ***p < .001.

As described in section 3.5, grouping items presented in Table 4.13. by the three socializing agents of interest to the current study produced even more reliable and meaningful results. When examining students interactions with the three socializing agents of interest, professors (*M*=3.50, *SD*=.60) and peers (*M*=3.44, *SD*=.56) as socializing agents had a greater impact on students than parents as socializing agents (*M*=3.24, *SD*=.73). However, non-FGC students were more likely than FGC students to view parents (*t*(983)=-8.396, *p*<.001) and peers (*t*(984)=-4.362, *p*<.001) as their socializing agents. This finding does not support the assumption that FGC students rely more on peers as socializing agents in college (Davis, 2010; Logan & Pickard, 2012; Weidman, 2006) than non-FGC students. However, when examining FGC students' own socialization scores, the researcher found that slightly more FGC students viewed peers rather than professors as their role models.

In order to identify homogeneous subgroups with similar socialization experiences within the sample of 948 students, a two-step cluster analysis was used. Five predictors, ranked by their importance in the cluster analysis, were used to identify four homogeneous subgroups: (1) class cohort, (2) FGC status, (3) viewing parents as socializing agents, (4) viewing peers as

socializing agents, and (5) viewing professors as socializing agents. The four homogeneous

clusters include: (1) FGC underclassmen (n=108, 11%), (2) FGC upperclassmen (n=196, 20%), (3)

non-FGC underclassmen (n=332, 33.8%), and (4) non-FGC upperclassmen (n=345, 35.2%).

The average Silhouette measuring cluster cohesion and separation was .6, indicating that

students within a cluster were closely related while students in one cluster were distinct and

well-separated from those in other clusters. Means of socialization scores were transformed into

their z-scores in order to normalize the distribution for meaningful comparison.

As shown in Figure 4.8, FGC students had lower scores on viewing parents and peers as

socializing agents than non-FGC students; within either the group of FGC or non-FGC students,

underclassmen had higher scores on viewing parents and peers as socializing agents than

upperclassmen. However, underclassmen had lower scores on viewing professors as socializing

agents than upperclassmen; within each class cohort, FGC students had lower scores on viewing

professors as socializing agents than their non-FGC counterparts.
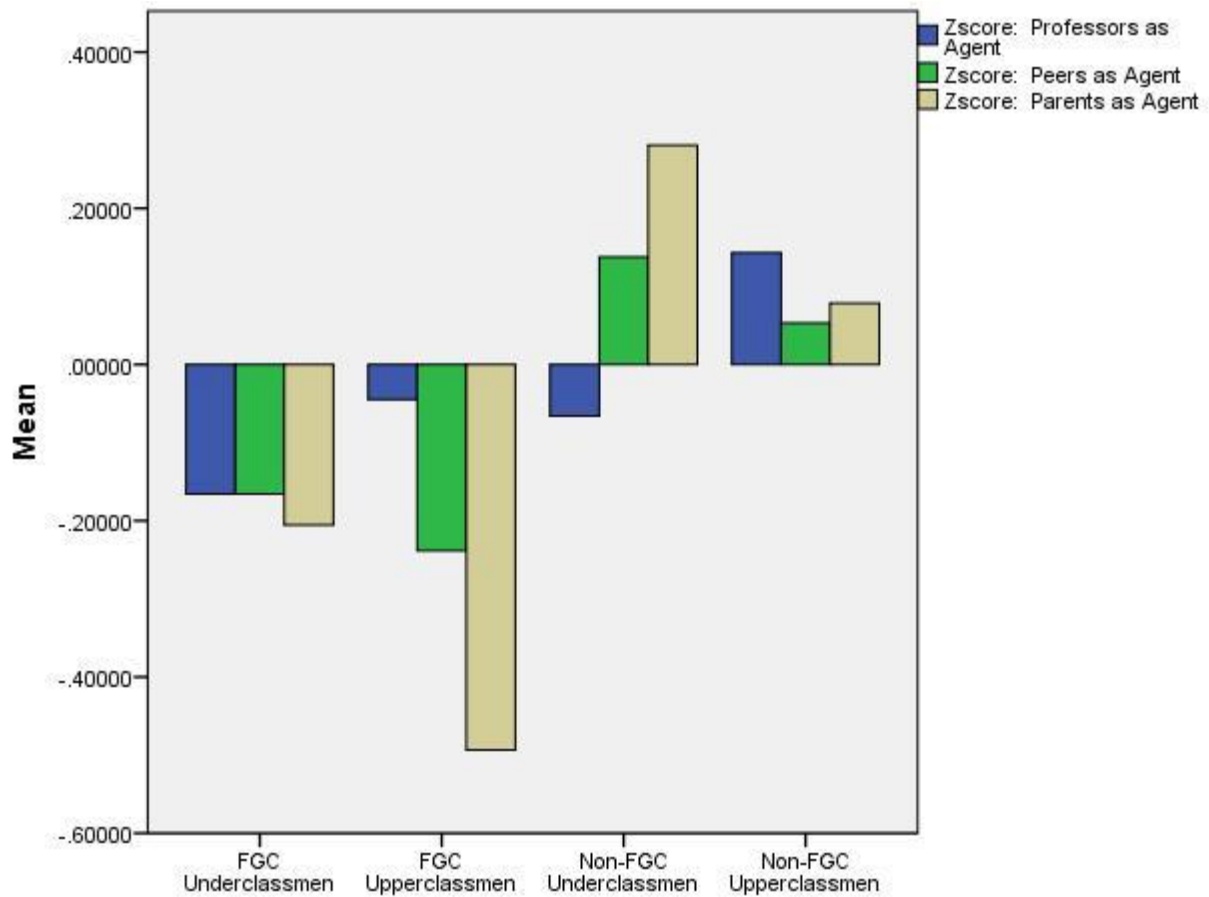
Figure 4.8. Student profile of their FGC status, class cohort, and socialization experiences.

4.3.1.2 Interview Results

During the interview sessions, the participants described their interactions with family members, peers, high school teachers, and college professors, as well as what they learned from these socializing agents.

4.3.1.2.1 Interactions with Family Members

In regard to students' interactions with family members, most students talked with their

parents more frequently than their siblings while they were in college, and thought they received

greater influences from their parents than their siblings. Only four students commented that

their siblings had greater influences on them; two of them were FGC students who also had

another sibling studying at UW-Madison.

Most FGC students who had siblings either entered college before them (i.e., I10, I11, I12,

I15, I17, I19) or after them (i.e., I12, I13, I14, I19); only two did not have other siblings who

shared any college experiences with them (i.e., I9, I18). However, both of the FGC students said

that they anticipated their younger siblings attending college in the future (i.e., I9, I18).

When describing the interactions with parents, most students said that they talked to

their parents at least weekly on the phone or via texts or emails; some talked to their family

everyday or even multiple times a day. Most FGC students only shared general issues in college

with their parents; some FGC students also consulted their parents very general issues. An FGC

student described what she shared with her parents regarding general college life in this way:

I usually just tell them like maybe an assignment that I'm doing for a certain class that's

tough or maybe a teacher that I don't like or something like that... I would say that before

coming into college, I was almost angry that they [my parents] didn't have the experience

because I felt really lost, but I trust their opinion. That's definitely the reason why I only

ask them general questions, I would never ask them a fact-based thing, because I don't see

them knowing the answer to any question that I ask them without having to make them

go and look it up themselves. That's probably why I don't really ask them that much. (I10)

Most non-FGC students not only shared some specific issues in college but also

consulted their parents at times. Even if some non-FGC students also claimed that they only

consulted their parents general issues, the examples they provided were usually more specific

than the ones FGC students provided. A few of the non-FGC students even had their parents

proofread their assignments. A non-FGC student described:

My poor mother, she always hears my problems... I also get advice from my parents,

anything they might know, but usually, they've been out of college for a while, so they're

like "I don't know what you're doing." ... Since my mom is a school psychologist and I'm a

psychology major, sometimes I'll ask her like, "What do you think about this topic" or

"what should I write about for this class?" Sometimes she'll help me brainstorm things.

But other than that, it's usually general questions. (I6)

When describing what students learned from their parents, FGC students and non-FGC had some different answers. While both FGC and non-FGC students said that they learned from their parents the importance of education and hard work, some FGC students also mentioned that they also learned some other good traits or learned to try new things, from their parents, and some non-FGC students also mentioned various things that they learned from their parents. For instance, some non-FGC students also mentioned major or career inspiration, work-life balance, and how to filter information. While I20 provided a good summary about what many FGC and non-FGC students learned from their parents, I3 and I7 provided examples of additional things non-FGC students learned from their parents:

[My dad] He sees [education] this as a very important thing. So no matter what I do in my life, I have to have a degree just because it will open doors that you don't really expect. And it's also important to follow the path that you want to go. It's not like some parents who would say, "you're going to become a doctor." They're just as long as you're going to college, getting a degree, study whatever you want, just work hard. (I20)

My parents both work in the medical field, so that kind of inspired me to go into nursing.

They've pushed me my whole life, or my dad specifically. (I3)

I've learned [from my parents] how to filter information properly. Like how much you

can trust a source and stuff like that. What sort of information you can expect to get from

certain sources and if it is valid and whatnot. (I7)

Although two FGC students (i.e., I11 and I12) did not think any of their family member

provided information about how to succeed in college, they had other important socializing

agents, such as other relatives and their high school teachers.

In addition to students' immediate family, about half of the FGC students had other

relatives who they sometimes consulted with, especially for career options. These relatives

typically included grandparents, uncles, aunts, and cousins.

4.3.1.2.2   Interactions with Peers

As to peers, almost all students said that they talked about academics with their friends

"all the time," and then clarified that "all the time" meant everyday or every other day. Very few

male students said that they did not often talk about academic part of college with their friends (i.e., I17, I20).

When talking about friends, most students referred to friends they met through courses or through student organizations in college. Some students had also been in touch with their high school friends or other friends who they met even earlier, other students did not keep in touch with old friends because those friends did not attend college and their lives have become very different.

For those who stayed in touch with their old friends, they mentioned that their old friends are also in college and thus share similar experiences with them. With friends who were in the same courses or in similar fields in college, students tended to talk more about academics and sometimes study together; with other friends, they talked more about career options or exchange experiences they had in different disciplines or at different universities. For example:

[My peers and I] We talked about school all the time because we are all students. It's what you do. We are going through the same thing at the same time...We just get advice from each other about what class to take or what's a good idea to study about, or study for, or

how we study. Like, we'll study together and learn from each other that way. I've edited

papers for friends before, and I've had them edit my papers, stuff like that. (I6)

Most of my friends are not in liberal arts majors; they're mostly in hard science or

business. We contrast a lot about what our respective field of study is required. (I19)

When describing what students learned from their peers, they mentioned three main

things: (1) peers in different fields broadened their perspectives; (2) peers helped them explore

various possibilities, co-curriculum, extracurricular, or career options and utilize resources; (3)

peers provided good examples of a good writer or leader, example of hard work, and help them

develop efficient study habit. For example:

I think I learned a lot [from peers] about diversity and culture because we come from a

variety of backgrounds and perspectives. (I11)

I think I've learned [from peers] how to utilize our resources and explore a lot of different

options, there's always something I can learn from them. That's what I've learned is that

by talking to a lot of people or asking questions and help, they can direct me to maybe

someone else who is a lot more knowledgeable about a subject or something. (I13)

I've learned from one friend in particular pretty good study habits to power through

things and get it done, and then you'll have free time. (I20)

Two students did not think they learn specific things from peers. For example, even if I18

studies with friends, but she did not think she learned specific things from peers.

4.3.1.2.3   Interactions with High School Teachers

As to high school teachers, most students talked to their high school teachers during

their first year in college. Several students indicated that in addition to having in-person

conversations, they used to chat with their teachers on Facebook at times, but now they were

"just Facebook friends." (e.g., I7, I18, I19) Students typical visited their high school when they

went home and talked to several most influential teachers once or twice per semester, very few

underclassmen visited their high school teachers about four or five times per semester.

There were a couple of English teachers that I kept in contact with my first year of college.

I guess we had a good relationship and I was deep into writing. We had that connection…

We're still friends on Facebook actually, but we don't really talk anymore, but we used to

talk about my classes. (I18)

When describing what students learned from their high school teachers, some of the similar things were raised as when students described what they learned from peers. Students learned about various career options and viewed some of their high school teachers as their good examples of hard work and work-life balance. Some students learned from their teachers how to be a good writer. For example:

I feel like wanting to go into teaching, I can look at him [my high school teacher] as somebody who I feel is a good teacher or I feel he has a good balance between his home life and his work. I feel that he's a good example. (I15)

With the English teacher, I learned how to be a concise writer and just how to be a structured writer and how to think. (I16)

4.3.1.2.4 Interactions with Professors

As to professors, most students said that they went to professors' office hours and talked to professors before or after class. Some students talked with professors almost weekly; others only one or two times per semester. Some students talked to different professors for all their courses; others only talked to one or two professors. They mainly talked with professors about

specific course-related issues. Slightly over half of the students also consulted professors about career options or learned about professors' research interests and experiences.

However, one FGC upperclassmen pointed out some concerns that a few underclassmen also indicated. These students indicated that they did not talk to professors outside the class because they were either intimidated by professors or thought professors were too busy to answer their questions, and they thought their questions could be answered by other people. As one FGC students explained:

It's not that I'm afraid of approaching them, it's just I don't really feel that I have anything useful to ask them. And I know my professors are fairly busy. And the questions I have are very general. They can be answered by a TA or an academic advisor. (I11)

Some students also indicated that their interactions with professors had been changed since they entered college because they did not realize how helpful it could be consulting a TA or professor. A few of the students did not think of consulting TAs or professors until they learned from peers. An FGC student described:

I would say earlier in my college career I did not go to office hours, I did not talk to my TAs; a little intimidated to. I think that a lot of, it's very easy to be afraid that you're

going to ask stupid questions or that you're going to embarrass yourself. I think that

once you get over that, you find out that it's nice to go and get real information as

opposed to just figuring out on your own. (I19)

When describing what students learned from professors in college, most students

mentioned a specific subject itself. Some students also mentioned the value of research or career

options; others also mentioned critical thinking and how to become a good writer. For example:

I guess [with professors] the value of research I have learned a lot. Yes, I love research.

Also, opportunities to go into academia. (I14)

In my journalism program, I learned how to be a much better writer, and be much more

critical of media, and how to be a reporter and a writer. (I20)

4.3.1.2.5 Interactions with Other Socializing Agents

In addition to family members, friends, high school teachers, and professors in college,

some FGC students identified other influential socializing agents, such as mentors and

significant others. Some students mentioned the influences they received from their significant

others, such as their spouses (e.g., I17), boyfriends/girlfriends (e.g., I18, I19), or even their

significant other's and friend's parents (e.g., I10). Other students mentioned influential mentors, such as graduate students they worked with in the lab (e.g., I12). Students mostly learned the value of education from these agents and sometimes consulted these agents about general coursework-related issues or career options, and networked through the connections these agents had.

> *And I had never really thought about academic excellence. I didn't think really think it was for me because my parents didn't do it. But [my boyfriend] he did really, really well in school, and he was very proud of himself for that. He came from a similar background. So I would say he is the whole reason. So he got me to value education which I never really have before. (I18)*

> *My boyfriend's parents and my best friend's parents, I didn't start asking them questions about college until my senior year of high school. They helped with some questions that I didn't understand and that my parents couldn't really help me out. (I10)*

4.3.2 Impact of Socialization on Source Use Behavior

After examining students' interactions with socializing agents, this section reports the

impact of socialization on students' academic source use behavior. The first subsection reports

differences in students' source use behavior among the four subgroups of students with different

socialization experiences and identifies specific socialization variables predicting students'

source use behavior. The second subsection presents findings regarding how interview

participants viewed the connections between their socialization experiences and their source use

behavior.

4.3.2.1 Survey Results

As mentioned in section 4.3.1.1, FGC underclassmen, FGC upperclassmen, non-FGC

underclassmen, and non-FGC upperclassmen had different socialization experiences with

parents, peers, and professors. In this section, one-way multivariate analyses of variance

(MANOVA) were first used to compare the frequency of source use and means of source

diversity among the four subgroups of the students. Meanwhile, multiple regression analyses

were used to test which socialization variables predict students' frequency of source use and

means of source diversity.

4.3.2.1.1   Source Use Behavior of Students with Different Socialization Experiences

Students with different FGC status and in different class cohorts had different

socialization experiences. Multivariate analysis of variance (MANOVA) is an analysis which

compares the means of multiple dependent variables among the groups (Pallant, 2010). In the

current study, MANOVA was used to investigate the differences among students with different

socialization experiences in their frequency of source use (Table 4.14) and in their source

diversity (Table 4.15). Results showed that there were significant differences in students' source

use behavior among the four subgroups of students who had different socialization experiences.

These differences occurred in frequency of official source use ($F(3,977) = 5.849$, $p = .001$),

unofficial source use ($F(3,977) = 8.041$, $p < .001$), overall human source use ($F(3,977) = 8.814$, p

$< .001$), and non expert use ($F(3,977) = 15.647$, $p < .001$). In general, upperclassmen consulted

official sources more frequently than underclassmen, and non-FGC students consulted

non-experts more frequently than FGC students.

Specifically, both groups of upperclassmen consulted official sources and human sources

significantly more frequently than both groups of underclassmen ($p < .001$), and non-FGC

underclassmen especially used unofficial sources more frequently than all the other subgroups

($p < .05$). Both groups of non-FGC students consulted non-experts more frequently than both

groups of FGC students ($p < .01$), and FGC underclassmen consulted non-experts significantly

more frequently than FGC upperclassmen ($p < .05$).

Table 4.14.

Students' Socialization Profiles and Frequency of Use $N=984$

Frequency of Use	FGC underclassmen	FGC upperclassmen	Non-FGC underclassmen	Non-FGC upperclassmen
Information sources	3.04	3.01	3.10	3.04
Official sources***	3.30	3.44	3.31	3.48
Unofficial sources***	2.84	2.67	2.95	2.69
Human sources***	2.53	2.40	2.62	2.47
Experts	2.20	2.11	2.15	2.07
Non-experts***	2.81	2.62	3.01	2.79

Note. Mean scores based on scale: 1= Never; 5= Very Frequently.

*** $p < .001$.

The differences in students' source use also occurred in their overall source diversity

($F(3,977) = 6.560$, $p < .001$) and human source diversity ($F(3,977) = 8.588$, $p < .001$), and

underclassmen seemed to use a wider range of sources. Specifically, non-FGC underclassmen

used significantly a wider range of sources, considering only human sources as well as

considering both information and human sources, than both groups of upperclassmen (p

$< .001$); FGC underclassmen also significantly used a wider range of human sources than FGC

upperclassmen ($p < .05$).

Table 4.15.

Students' Socialization Profiles and Source Diversity   *N*=984

Source Diversity	FGC underclassmen	FGC upperclassmen	Non-FGC underclassmen	Non-FGC upperclassmen
All sources***	24.81	23.26	25.99	23.89
Information sources	8.20	8.25	8.48	8.19
Human sources***	16.60	15.00	17.51	15.70

Note. Mean score in each cell indicates number of sources used across all academic situations.

 *** *p* < .001.

When further investigating specific source-use differences among the four groups of

students, the researcher found that most significant differences occurred between FGC and

non-FGC underclassmen rather than between FGC and non-FGC upperclassmen. That is,

compared to FGC underclassmen, non-FGC underclassmen tended to use the university website

(χ^2=4.223, *df*=1, *p*<.05), search engines (χ^2=4.355, *df*=1, *p*<.05), social networking sites

(χ^2=6.164, *df*=1, *p*<.01), and to consult friends from a student organization or religious group

(χ^2=4.704, *df*=1, *p*<.05). [13] There was no significant difference in the above frequency of source

use between FGC and non-FGC upperclassmen. The only significant difference between FGC

and non-FGC upperclassmen rather than underclassmen was in consulting parents (χ^2=7.420,

df=1, *p*<.01). This finding supports the assumption that differences in source use behavior

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[13] Chi-square tests were used to test the differences in frequency of source use between underclassmen and upperclassmen within FGC students and within non-FGC students. In order to interpret the results easily, frequency of source use were re-coded into two categories—"at least occasionally" versus "rarely or never" use a source.

between FGC versus non-FGC students are more obvious among freshmen than among seniors

(Logan & Pickard, 2012).

4.3.2.1.2   Socialization Variables Predicting Students' Source Use Behavior

In this section, two subsections are presented. First, the researcher presents how

socialization variables of main interest in the current study predict students' source use behavior.

Second, the researcher presents how other variables that have also been viewed as important

factors for undergraduate socialization predict students' source use behavior.

4.3.2.1.2.1. Main Socialization Variables Predicting Source Use Behavior

In order to learn how well socialization variables predict students' source use behavior,

multiple regression analyses were used to test which socialization variables could predict

students' use of information and human sources. Multiple regression analysis is a multivariate

statistical technique to examine the relationship between a single dependent variable and a set

of independent variables (Hair et al., 2010). In hierarchical multiple regression, "the

independent variables are entered into the equation by the researcher based on theoretical

grounds" (Pallant, 2010, p.149). In the current study, five main independent variables regarding

students' socialization experiences include: (1) whether or not students have attended a library

workshop,[14] (2) have taken a CommA course, and view (3) parents, (4) peers, and (5) professors

as socializing agents.

A CommA course is one of the two Undergraduate Communication Requirement courses

that all undergraduates at the UW-Madison are required to complete. CommA courses

emphasize written/oral communication and information literacy components, and CommB

courses emphasize discipline-specific writing and research skills. CommA courses across

different Schools and Colleges have been reported as an effective way of achieving

undergraduate general education objectives with respect to information-seeking skills

(UW-Madison, 2007b). Therefore, whether or not students have taken a CommA course is one

of the variables that can help us understand college impact on students' source use behavior.

All incoming freshmen are required to take a CommA course during their freshman year,

except for those who have been exempted from this requirement through one of the following

ways: (1) Advanced Placement (AP) Exams, (2) International Baccalaureate (IB) Exams, (3) UW

System English Placement Test (UWEPT), or (4) Transfer course credits (UW-Madison, 2011b).

In the current study, slightly over half of the students (55.1%) have been exempted from a

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[14] 21.7% of the students in the sample have attended a library workshop.

CommA course. Among which, more non-FGC students (59.1%) than FGC students (46.2%) have been exempted from a CommA course (χ^2=14.081, *df*=1, *p*<.001). This shows a pre-college information-literacy divide between the FGC and non-FGC students because the exemption of the CommA requirement implies that students received enough information literacy education prior to college. However, recent reports by the Undergraduate General Education Committee at UW-Madison (2008b, 2011b) noted the rising number of students who tested out the CommA requirement and pointed out the need of re-examining the effectiveness of CommA courses in relation to students' information literacy and developing better ways to assess their information literacy skills. The current study views "having taken CommA course" as one measurement of college impact on students' information literacy skills rather than a measurement of students' pre-college information literacy skills. More discussion is addressed in section 6.2.1 when the researcher provides implications for professionals.

In a regression analysis, it is assumed that no multicollinearity exists. Multicollinearity exists when the independent variables are highly correlated (*r* =.9 or above) (Pallant, 2010). Preliminary analyses were conducted to ensure no violation of this assumption. No correlation among the independent variables is greater than .428, and this indicates that no multicollinearity exists among the independent variables.

Multiple regression analyses were then conducted to test if the above socialization

variables can predict the following source use behavior: frequency of information source and

human source use, including use of official sources, unofficial sources, experts, and non-experts

(Table 4.16); information source diversity, human source diversity, and overall source diversity

(Table 4.17).

Table 4.16 summarizes the variables that predicted students' source use behavior from

the hierarchical multiple regression analyses. Results showed that the five socialization variables

explained a significant portion of variance in the overall frequency of information source use

and human source use, as well as the use of official, unofficial sources, experts, and non-experts.

"Parents and peers as socializing agents" significantly predicted the overall information source

use and human source use. The more students viewed parents and peers as socializing agents,

the more frequently they used a wide range of information and human sources.

Table 4.16.

Multiple Regression Analysis for Socialization Variables Predicting Source Use Frequency   *N*=977

	Information Source			Human Source		
	Official	**Unofficial**	**Overall**	**Experts**	**Non-experts**	**Overall**
	(β)	*(β)*	*(β)*	*(β)*	*(β)*	*(β)*
Attended Library workshops	.623	-.006	-.018	-.062	-.015	-.021
Took CommA courses	.020	.038	.041	.095**	.003	.047
Professors as socializing agents	.181***	-.095**	.010	.182***	-.083**	.043

	Information Source			Human Source		
	Official (β)	Unofficial (β)	Overall (β)	Experts (β)	Non-experts (β)	Overall (β)
Peers as socializing agents	.135***	.216***	.234***	.151***	.323***	.291***
Parents as socializing agents	.121***	.211***	.223***	.199***	.405***	.368***

Note. **p < .01. ***p < .001.

Frequency of use across all situations that were significantly predicted by the demographics and socialization variables include:

(1) Information sources (R^2 = .150, $F(5,971)$ = 34.399, $p < .001$);

(2) Official information sources(R^2 = .118, $F(5,971)$ = 26.021, $p < .001$);

(3) Unofficial information sources (R^2 = .102, $F(5,971)$ = 22.146, $p < .001$);

(4) Human sources (R^2 = .330, $F(5,971)$ = 95.563, $p < .001$);

(5) Experts (R^2 = .186, $F(5,971)$ = 44.441, $p < .001$);

(6) Non-experts (R^2 = .328, $F(5,971)$ = 94.619, $p < .001$).

"Viewing professors as socializing agents," along with the above variables, significantly predicted the frequency students consulted official sources, unofficial sources, experts, and non-experts. It is an interesting variable which positively and negatively predicted students' use of specific types of sources. Students who viewed professors as socializing agents consulted official sources and experts more frequently; on the contrary, students who did not view professors as socializing agents used unofficial sources and non-experts more frequently.

Finally, whether or not students have taken a CommA course, along with all the above variables, significant predicted the frequency students consulted experts. Students who have

taken a CommA course consulted experts more frequently than students who did not take a

CommA course.

When further examining students' frequency of library use, results from the regression

analysis showed that the five socialization variables significantly predicted students' use of

library print resources (R^2 = .046, $F(5,971)$ = 9.298, p < .001) and library online resources (R^2

= .068, $F(5,971)$ = 14.218, p < .001). Specifically, students who have taken CommA courses (β

= .081, p = .01, β = .073, p < .05) and viewed professors (β =.094, p < .05, β = .096, p < .01) as

socializing agents tended to use both library print and online resources more frequently. While

students who viewed parents (β = .092, p < .01) as socializing agents also used library print

resources more frequently, students who viewed peers (β = .182, p < .001) as socializing agents

used library online resources more frequently.

In terms of source diversity, Table 4.17 summarizes the hierarchical multiple regression

analyses results regarding how the five socialization variables predicted students' source

diversity. Results showed that the five socialization variables explained a significant portion of

variance not only in the overall source diversity but also in information source diversity and

human source diversity. Parents and peers as socializing agents significantly predicted the

source diversity. The more students viewed parents and peers as their socializing agents, the

wider the range of information and human sources they used.

Table 4.17.

Multiple Regression Analysis for Socialization Variables Predicting Source Diversity　　　　　*N=977*

	Source Diversity		
	Information Source (β)	**Human Source (β)**	**Overall (β)**
Attended Library workshops	-.010	-.034	-.030
Took CommA courses	.056	.038	.049
Professors as socializing agents	-.033	.012	-.001
Peers as socializing agents	.224***	.229***	.252***
Parents as socializing agents	.193***	.344***	.333***

Note. $*p = .05$. $***p < .001$.

Dependent variables that were significantly predicted by the socialization variables include:

(1) Information source diversity ($R^2 = .113$, $F(5,971) = 24.829$, $p < .001$);

(2) Human source diversity ($R^2 = .239$, $F(5,971) = 61.004$, $p < .001$);

(3) Overall source diversity ($R^2 = .241$, $F(5,971) = 61.540$, $p < .001$).

4.3.2.1.2.2. Other Input and Environment Variables Predicting Source Use Behavior

When further considering students' information environment that could be part of their

background characteristics related to their socialization experiences, the researcher found that

some of these information environment variables significantly predicted students' frequency of

source use and source diversity. Students who had a public library near their home or high

school used information sources more frequently ($\beta =.081$, $p < .05$). Students who had access to

library databases in high school consulted experts more frequently (β = .062, p < .05) and used

a wider range of information source (β =.067, p < .05). Students who had circulation systems in

their high school libraries used a wider range of information sources (β =.078, p < .05) and

human sources (β =.070, p < .05).

When considering other independent variables that have been found to be important

factors affecting undergraduate socialization (Astin, 1993; Weidman, 2006), such as gender,

ethnicity, major, and class cohort, results from the regression analyses showed that adding these

variables explained a larger portion of variance in students' source use behavior than the five

socialization variables alone. These variables together significantly predicted students'

frequency of overall information source use (R^2 = .163, $F(18,949)$ = 11.475, p < .001) and human

source use (R^2 = .363, $F(18,949)$ = 30.098, p < .001), including the use of official sources (R^2

= .148, $F(18,949)$ = 9.161, p < .001), unofficial sources (R^2 = .151, $F(18,949)$ = 9.376, p < .001),

experts (R^2 = .221, $F(18,949)$ = 14.959, p < .001), and non-experts (R^2 = .367, $F(18,949)$ =

30.537, p < .001).

Specifically, while gender, ethnicity, major, and class cohort significantly predicted the

frequency of information source use, gender, FGC status, major, and class cohort significantly

predicted the frequency of human source use. For instance, males consulted human sources less

frequently than females (β = -.071, p < .05). Asian students tended to use unofficial sources (β = .123, p < .05) more frequently than other students. Compared to students in other majors, business majors consulted unofficial sources (β = .141, p < .001) and non-experts (β = .073, p < .05) more frequently; education majors consulted human sources (β = .072, p < .05), especially non-experts (β = .083, p < .01), more frequently; engineering majors (β = -.075, p < .05) and medical sciences majors (β = -.080, p < .05) consulted experts less frequently. These phenomena could be discussed through an integrated view by considering various factors affecting students' source use behavior rather than attributing a single factor to a specific source use behavior. The following discussion suggests how some of the above findings confirm other findings also discussed above, and provide potential explanations for those findings.

Disciplinary differences in students' source use behavior may be explained by gender differences in students' source use behavior as well as the gender composition of disciplines. For instance, male and female students in the current survey sample tended to major in different disciplines (χ^2=100.946, df=14, p<.001)—more males than females majored in engineering; more females than males majored in education and social sciences. This phenomenon could possibly provide some rationales for disciplinary differences in students' source use behavior. For instance, more females majored in education, and females tended to consult human sources

more frequently than males; this may be a potential reason why education majors were more

likely to consult human sources.

Similar to how students' gender and disciplines affected their source use behavior,

disciplinary differences in students' source use behavior may be explained by students' FGC

status in relation to their ethnic backgrounds and by the ethnic composition of disciplines. For

instance, more FGC students than non-FGC students were ethnic minorities, including Asians

(see Table 3.1). Students with different ethnic backgrounds tended to major in different fields

(χ^2=24.636, *df*=14, *p*<.05)—more Asian students than Caucasian and other minority students

were business and engineering majors; more students in health and medical-related fields were

from minority groups other than Caucasians and Asians.[15] Therefore, students' FGC status and

their ethnic backgrounds provided potential explanations for disciplinary differences in students'

source use behavior. For instance, minority students other than Asians tended to major in

health and medical-related fields, and minority students tended to consult experts less

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[15] Among the survey participants, 19.2% Asian students were business majors, while only 8.6% Caucasian students
and 3.9% other minority students were business majors; 18.2% Asian students were engineering majors, while only
12.6% Caucasian students and 9.1% other minority students were engineering majors. 29.9% other minority students
were medical science majors, while only 22.1% Caucasian students and 19.2% Asian students were health and medical
sciences majors.

frequently; this may be a potential reason why health and medical students tended to consult

experts less frequently.

Another factor that could be noted when discussing students' fields of study is the

instructor's expectation. Students with different majors have different course requirements. As

pointed out in section 4.1.2, instructors' expectations played an important role in students'

source use preferences. Readers should be aware of various factors contributing to

undergraduate socialization in relation to their academic source use behavior. Nevertheless, the

current study focuses on students' interactions with socializing agents rather than attempting to

investigate how undergraduate socialize into a discipline or delineate the complicated

relationships among all the potential factors in undergraduate socialization and source use

behavior. Astin (1993) suggests that the college environment affects students' attitudes, values,

and satisfaction outcomes. For instance, engineering majors tend to report lower scores on their

satisfaction regarding relationships with faculty, quality of instruction, and overall college

experiences; students in health professions tend to report higher scores on their growth in

knowledge. Future research is needed to examine students' majoring fields as a factor in

undergraduate socialization and as a mediator of source use behavior (see section 6.4).

4.3.2.2 Interview Results

During the interview sessions, participants were asked to describe how they view the

connections between the influences from various socializing agents and their academic

information seeking. Participants were also asked to describe how they view the connections

between their learning of using the library and the Internet and their academic information

seeking.

4.3.2.2.1   Influences from Socializing Agents

When students were asked about the influences of socializing agents on their source use

behavior, all students commented that peers and professors had greater influences than parents.

However, nearly half of the students stated that professors had greater influences; others stated

that peers had greater influences; still others stated that different socializing agents influenced

them in different ways.

Professors exerted their influences mainly on students' use of information source,

especially the use of scholarly articles and books as well as the library databases, and on their

source diversity. For example, I14 and I4 described how professors influenced their using of

books and journal articles; I20 described how professors guided them to consult various

sources.

I guess they [professors] are more likely to influence me to look for books. That might just

be reflection of their own era but yes, look for certain books that talk about this or this

specific author. (I14)

Most professors would prefer you to use the scholarly articles from the database because

it's just the most recent information. (I4)

My professors will give me the information and then tell me to find my own information

or other sources, and the other sources will tell me to do more research. (I20)

Peers exerted their influence on students' use of both information and human sources,

especially on their use of the Internet and advisors, TAs, and professors. As with professors,

peers also helped increase students' source diversity. For example, an FGC upperclassman

described how peers influenced her into consulting an advisor; an FGC underclassman

explained how peer mentors influenced her into consulting TAs and professors, and why the

influences from peers were greater than professors and her parents:

My friends will say, "You should go talk to an advisor," and then I'll go. It'll be totally

worth it. I don't think I've ever had the thought in my head that I should go talk to an

advisor. (I15)

My peer mentors highly recommended reaching out to your professor and TA more, and I

think that's important for me to want to see them more… My parents don't really have

that much of understanding of college and professors. And I mean I don't have that close

relationship with my professors. And if I did [have a closer relationship with my

professors], I'm sure they [professors] would have been more influential. (I11)

Overall, while both professors and peers influenced students on their source diversity,

professors were more influential on students' use of official sources, and peers were more

influential on students' use of unofficial sources and experts.

4.3.2.2.2   Influences from Students' Learning

When students were asked how they viewed the influences of their learning of using the

library and the Internet in college on their source use behavior, students mentioned learning

through trial-and-error, courses, and workshops, as well as collaborative learning with peers.

All of the students pointed out that they learned these skills mainly through trial-and-error even if most of them have taken either a CommA or CommB course, or both.[16] Most students agreed that these courses helped them learn how to utilize various library resources but suggested that the self-learning and trial-and-error process was also very important. Very few students did not think these courses were helpful and suggested that they taught themselves mostly. However, some of these students also reflected that they did not like the course or did not pay attention in the class because they did not think it was interesting or important. For instance, an FGC student who did not think the CommA course he took helped described how he learned to use library databases through trial-and-error:

I pretty much toy with it and eventually get it to what I want. If they have a help section, sometimes I'll see frequently asked questions. If those aren't helpful, then just kind of keep playing with until eventually figure it out. (I19)

In addition to self-learning, students who agreed that CommA or CommB courses helped them learn how to utilize library resources indicated that either a librarian or the professor

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[16] Among the 20 interview participants, 8 students have taken CommA courses, and 12 students have taken CommB courses. Only four students have not taken any of the CommA/CommB courses.

showed them how to use specific library databases or other library resources related to their

field so that they learned available campus resources.

> *I guess my biggest learning experience was through a Comm A class. There's a speech*
>
> *when we came to the College Library and had a librarian to teach us how to use the*
>
> *databases, look up scholarly articles, so that was very helpful. I didn't even know that*
>
> *existed. (I4)*

Several students also mentioned acquiring skills of using the library and the Internet

through collaborative learning with peers (e.g., I2, I4, I13). Students who acquired skills through

collaborative learning with peers stressed the importance of these exchanges among peers. As an

FGC student commented:

> *I think I've learned how to utilize our resources and explore a lot of different options,*
>
> *there's always something I can learn from them [my peers]. That's what I've learned is*
>
> *that by talking to a lot of people or asking questions and help, they can direct me to*
>
> *maybe someone else who is a lot more knowledgeable about a subject or something. (I13)*

Although nearly half of the students mentioned that they attended workshops either

through the Division of Information Technology (DoIT), the library, or the writing center, they

did not emphasize the influences from these workshops. Students agreed that the workshops were usually helpful for learning a specific resource, but they did not think the workshops had great influences on their use of information sources. Students who have never attended any workshop claimed that they did not have time, the workshops were not required, or did not think they need it. A typical response is: "because they [the workshops] aren't required, and I just never thought I needed help." (I10)

Some FGC students mentioned utilizing multiple ways to learn these skills in college, and some underclassmen also mentioned their high school learning experiences (e.g., I12, I14). For instance, an FGC upperclassman, I14, mentioned that she learned the skills not only by teaching herself but also through CommA, CommB courses, and various workshops. An FGC underclassman, I10, mentioned that she has learned about utilizing library resources since her senior year in high school. This finding implies the importance of high school information environment and the value of information literacy education, especially to FGC students.

I would say the reason why I use Google first is because that was the easiest for me in high school because that's all I was taught at first. And then I would say that, especially in high school, my last couple years that's when they started pushing. The librarian started

pushing "learn how to use these databases, learn how to look up articles, and not just

trust some random source on the internet." (I10)

In terms of ease of use, all participants agreed that it is getting much easier to seek

academic information as moving along in their program because they have become more

familiar with various information and human sources. An FGC upperclassman explained in

detail:

It's much easier because I know more people, I feel more comfortable talking to professors,

and I know the library better. I know a lot of databases now and how to use them. I would

know more of what constitutes a good resource and just the online databases. I would

know how to use those more. I'm sure now I would be much more likely to talk, or ask a

professor or TA or go to a library if I absolutely need to. I'm sure back then, I just would

have Googled and Wikipedia-ed everything. And sometimes that asking a TA is faster

than me researching it. (I14)

In terms of source diversity, while more than half of the students stated that they used a

wider range of sources than before, five thought they used a narrower range of sources because

they are more focused on specific sources and used them more efficiently as they learned

through the information-seeking processes; one student suggested that she used about the same

variety of sources but more excelled at using these sources (i.e., I7).

Students who claimed that they used a wider range of sources indicated that they

identified and learned about more available options in college. Several underclassmen pointed

out that they used to only use the search engine in high school, but now they learned and utilized

various sources.

I think it's a lot more. In high school I just used the Internet because it was just so easy,

and I didn't have to go to the second or third zones [on the IH map] because I can just

access it right on the internet. But now I probably need to follow that succession [different

zones on the IH map]… Whereas when I was a freshman, I kind of just typed anything

into Google, and hoping for the best. Now I'm aware of what the library has to offer and

how to look for those things. (I11)

Students who used a narrower range of sources than the time when they were a freshman

or in high school indicated that they identified useful, reliable, and preferred sources through

their learning in college (e.g., I4, I10, I12, I15, and I16).

I think probably use less diverse sources right now just because I've kind of weeded out

the sources from my freshman year that won't be as helpful just from experience. (I16)

I think I use fewer [unique sources] because I feel that I've been a bit of grasping what's

reliable and what is not. (I12)

Students' explanations about using a narrower or about the same range of sources

explained why the findings in the current study did not support the assumption that

upperclassmen use a wider range of sources than underclassmen.

5. DISCUSSION

This chapter discusses findings derived from both the web survey and the follow-up

in-depth interviews. Since the current study is informed by Sonnenwald's (1999) *information*

horizons (IH), Astin's (1991) *input-environment-outcome (I-E-O) model*, and Weidman's (1989)

undergraduate socialization, this chapter discusses the findings based on these frameworks,

and compares and contrasts the findings with related literature. The discussion is comprised of

three sections. First, the researcher discusses students' IH maps and their source use behavior

across different academic situations (Outcome [O]). Second, the researcher discusses the

relationships among sources used by students (Outcome [O]). Finally, the researcher discusses

how input and environment variables affect source use outcomes by addressing how students'

background characteristics and socialization experiences affect their source use behavior

(Input-Environment-Outcome [I-E-O]).

5.1 IH and Source Usage in Academic Situations (Outcome)

The concepts of *contexts* and *situations* are two important concepts in IH. Based on the

IH framework, this section discusses students' source preferences and how situations associate

with their information needs, information seeking, and source use in academic contexts.

In terms of source preferences, the study findings show that frequently-used sources are

usually placed in the most preferred or the second-most preferred zones on their IH maps and

are typically consulted as one of the first two steps. For instance, personal collections (including

course materials), search engines, and the university or course websites are the top three

frequently-used sources. They are also popular sources included on students' IH maps and as

one of their first steps. This finding is consistent with the results from Head and Eisenberg

(2010a), OCLC's (2011) survey, and Library Journal's academic library user profiles (Bowker

Market Research, 2012) because these surveys also indicate that search engines and course

websites are frequently used by college students. However, in the current study, 67% and 44% of

the students at least occasionally use online and print resources, respectively, from the library

for course-related issues (e.g., course assignments). While students' frequency of

library-resource use in the current study is similar to what was found in Head and Eisenberg's

(2010a, 2011b) work, it is much higher than what was found in some extant studies (e.g., OCLC,

2011; Bowker Market Research [Library Journal], 2012). According to the OCLC's (2011) survey,

only 30% of the students use library online resources, and while half of the students believe that

information from the library resources are more credible than information from the search

engines, another half of the students believe that the credibility of the two sources are about the

same. In this study, most interview participants believe that library resources are more credible;

when using search engines, they filter out information that may not be credible. The

inconsistency between the current study and some of the existing surveys occurs probably

because the situations are defined differently. For example, while a situation of academic

research in the Library Journal survey is similar to some course-related situations in the current

study, the Library Journal survey defines academic research in a broader sense and includes not

only writing assignments but also fact-checking, writing a novel or non-fiction, and researching

a historical news article or local history.

When further examining the reasons for source preferences, the researcher finds that in addition to perceived accessibility and quality, as suggested by Savolainen and Kari (2004), instructors' expectations (e.g., at least certain number or types of sources are required to be used in an assignment) also play a role in students' IH. This finding also confirms what Logan and Pickard (2012) pointed out when examining FGC students' research experiences and source use behavior, as well as what Head (2010a, 2013) concluded when examining the reasons why college students turn to library resources. Moreover, the current study finds that students who placed a source in the second-most preferred (zone 2) usually considered a wider range of pros and cons of that specific source, and provided good explanations for those who placed the source in either the most preferred zone (zone 1) or the least preferred zone (zone 3). As to course-related and program-related issues, most students emphasized both perceived accessibility (e.g., convenience and familiarity) and perceived quality of the source (e.g., credibility) as factors influencing their preferences. However, in a course-related situation, some students considered instructors' expectations the dominant factor over perceived accessibility. As to coursework-related moral support, students referred to familiarity and trust as the main factors.

In attempting to learn how the concept of *situations* influences information needs, information seeking, and source use behavior, the study takes a step further to examine information-seeking situations in academic contexts and categorizes situations into: (1) goal-specific situations (i.e., course-related, program-related, and moral-support situations) and (2) typical-level situations (i.e., typical and special situations). Based on the interview findings, the researcher argues that a student has a stronger information need in a special situation than in a typical situation because a special situation usually suggests a more challenging issue such as switching majors. With a stronger information need, students tend to use a wide range of sources and pursue more steps in their information-seeking processes. However, regarding goal-specific situations, students tend to use a wider range of sources and pursue more steps in course-related situations, than in program-related situations, and finally in moral-support situations. Both the survey results and students' IH maps reveal that students' source diversity consistently decreases from course-related, program-related, to moral-support situations.

When further examining source stability across academic situations based on students' IH maps, all sources can be placed on a spectrum of two ends: situation-specific versus stable ends. On the stable end, peers appear to be the most stable source that is placed across all academic situations; on the situation-specific end, personal collections and library print

resources are highly situation-specific sources that are only placed in course-related situations.

Other situation-specific sources are between the two ends and can be categorized based on the

particular situation(s) they are often used in. While library online resources, search engines,

other online resources, and experts are situation specific for course-related and program-related

issues, non-experts are situation specific for moral support. These findings are also consistent

with the survey results.

5.2 Relationships Among Sources (Outcome)

In the previous section, the researcher discusses source preferences and the concepts of

contexts and situations in IH. Based on the IH framework, this section discusses the

relationships among sources in individuals' information-seeking processes and the concept of

networks in two circumstances: sequential steps and referral incidents.

When examining the sequential steps taken by students in their information-seeking

processes, survey findings show that personal collections and course catalogs are the most

popular information sources as one of their first three steps, and peers and TAs are the most

popular human sources. Only 41% of the students in this sample use search engines as one of

their first three steps for course-related purposes. This percentage is much lower than the

findings in the OCLC's (2011) survey and Library Journal's academic library user profiles

(Bowker Market Research, 2012) where 83% and about 60% of the college students use search

engines as a starting point for research. The inconsistency occurs probably because the samples

in other large surveys come from a wide range of institutions, including community colleges,

colleges, and research universities, and students in different types of higher education

institutions may have different information needs even if it is all for research purposes.

When further examining the strategies used by individuals in their information-seeking

processes, the researcher identifies strategies from a source use perspective, whereas other

researchers tend to analyze it from a perspective of information retrieval or human information

interaction. For example, some researchers discuss strategies, such as scanning, selecting, and

recognition, by focusing on the process in which individuals search for information (e.g., Fidel,

2012). Based on the interview findings, the current study identifies two strategies in students'

information-seeking processes: information-first and human-first strategies. Most students tend

to use an information-first strategy because they would like to get information and be prepared

prior to consulting human sources, especially prior to consulting professors; students who use

human-first strategy typically need to learn general information or where to start looking for

information. Some students believe that they tend to adopt a specific strategy due to their

personal styles or personality traits. These findings reinforce the idea of individuals' information needs affecting their information-seeking processes and imply that individuals' with different personality might choose a different strategy in their information-seeking processes.

Another finding also reinforces the concept of situations affecting individuals' information needs and information-seeking processes. As mentioned in the previous section, in a special situation with a stronger information need, students tend to pursue more steps in their information-seeking processes than in a typical situation. In these special situations, some students also exhibit a *cyclic pattern* in their information-seeking process, as Sonnenwald et al. (2001) described, by moving back and forth among sources from zone 1 to zone 3 on their IH maps. Steps taken by students in typical situations can be viewed as the *sequential chain pattern*, as Sonnenwald et al. (2001) illustrated. Based on an emerging finding from the interview, information-seeking processes that involve both sequential steps and referral incidents could occur in special situations where students have stronger information needs.

When examining which sources possess a referral quality, the researcher finds, in both survey results and interview findings, that most students experience search engines, peers, TAs, and professors directing them to other sources. And sources that possess this referral quality tend to be frequently-used sources and be included as one of the first three steps.

When further delineating the referral patterns in students' information-seeking

processes, the researcher presents referral incidents mentioned by the interview participants in

a network with nodes and links, and discusses the type of sources based on Sonnenwald et al.'s

(2001) analysis. Among the popular sources with many outgoing links mentioned above, the

search engine is a starting source with no incoming links; professors, TAs, and peers are

recommending sources with more outgoing than incoming links. In the referral network, we can

also identify popular focusing sources with more incoming than outgoing links such as articles

and online resources. In general, the visualization of the network not only helps us identify

sources that possess a referral quality and/or receive referrals, but also helps us identify sources

with links to and from unique sources. Professors and TAs are sources with many outgoing and

incoming links, and these links also connect them to a wide range of sources. Peers are also a

source in many referral incidents, but these links connect them with a narrower range of sources.

This means, compared to professors and TAs, peers may more frequently refer students to

certain sources rather than a variety of sources.

An emerging finding from the interviews is that the referral incidents mentioned by

students involve not only interactive information-seeking processes but also passive information

consumption. This occurs especially when students' information need increases from the time

they passively receive information to the time they actually need it. This is similar to the

concepts of passive consumption and interactive consumption of information, as described by

Manafy and Gautschi (2011). Manafy and Gautschi emphasize the transformation of

everyday-life information consumption of the digital natives (born after 1984) from passive to

interactive. In the current study, students retain both passive and interactive consumption in

academic information-seeking contexts. However, passive information consumption occurs

when experts refer students to official sources. The researcher argues that this type of passive

information consumption occurs mostly through influential socializing agents because students

are not likely to have the information for future references if it is recommended by a person who

is not influential.

5.3 Socialization and Source Use (Input-Environment-Outcome)

In the previous sections, the researcher discusses overall sources preferences and

relationships among sources used by all undergraduate participants in the current study. This

section first compares the different socialization experiences and source use behavior between

FGC and non-FGC students, and then addresses how students' source use behavior [O] is

affected by their background characteristics [I] (especially their FGC status) and their

environment [E] in terms of their interactions with socializing agents (i.e., professors, peers, and parents).

Survey results, interview findings, and students' IH maps show that the general trends of source preferences among various information and human sources [O] are similar between FGC and non-FGC students (see section 5.1). However, FGC students tend to use a narrower range of sources, especially human sources, and are less likely to consult parents and other non-experts in their academic information-seeking processes.

Students with different background characteristics [I] are likely to have different socialization experiences with professors, peers, and parents [E]. Based on the survey results, FGC underclassmen, FGC upperclassmen, non-FGC underclassmen, and non-FGC upperclassmen have different socialization experiences with parents, peers, and professors. More non-FGC students than FGC students view parents as socializing agents. Within either group of FGC or non-FGC students, more underclassmen than upperclassmen view parents and peers as socializing agents, while more upperclassmen than underclassmen view professors as socializing agents. And within each class cohort, more non-FGC students than FGC students view professors as socializing agents. These findings are consistent with other college impact studies (e.g., Astin, 1993; Pascarella & Terenzini, 1991).

When examining how the study findings support assumptions regarding students'

background characteristics [I] and their source use behavior [O], the researcher found that the

study findings support two of the assumptions regarding sources use differences between FGC

and non-FGC students and between underclassmen and upperclassmen: (1) FGC students use

fewer sources of information, especially human sources (Davis, 2010), than non-FGC students;

(2) upperclassmen use the library more frequently than underclassmen (Head & Eisenberg,

2010a; Tenopir, 2003). Although the assumption regarding source diversity between

underclassmen and upperclassmen is not supported by the survey results, the follow-up

interviews provide explanations for this phenomenon. Upperclassmen use a narrower range of

sources than underclassmen because they have identified useful, reliable, and preferred sources

and learned to use these specific sources more efficiently than the time they were freshmen.

Therefore, instead of seeking out a variety of sources, upperclassmen tend to utilize only certain

sources.

When examining how the study findings support assumptions regarding undergraduate

socialization [E] and their source use behavior [O], the researcher found that the study findings

support both assumptions: (1) FGC students are less familiar with the college culture than their

non-FGC counterparts (Davis, 2010; Stephens et al., 2012), and (2) differences in source use

behavior between FGC versus non-FGC students are more obvious among freshmen than among

seniors (Logan & Pickard, 2012). When describing students' source use behavior and

socialization experiences in college, some of the FGC and non-FGC students both mentioned in

the interviews that they did not realize how helpful it was consulting a TA or professor until they

actually did so. Nevertheless, compared to non-FGC students, only FGC students emphasized

issues that revealed their unfamiliarity with the university culture. For instance, especially in

their first year, FGC students described feeling lost, having to teach themselves how to be a

college student, and consulting TAs and professors only when their peers suggested doing so.

The survey results demonstrate that the source-use differences between FGC and non-FGC

underclassmen are more obvious than between FGC and non-FGC upperclassmen. Specifically,

significant source-use differences between FGC and non-FGC underclassmen can be found in

their use of official and unofficial sources, as well as non-experts, whereas differences between

FGC and non-FGC upperclassmen can only be found in consulting parents.

In general, socialization variables affect students' use information and human sources as

well as source diversity. As socializing agents, parents and peers have positive impacts on

students' use of information and human sources as well as source diversity; professors have a

positive impact on students' use of official sources and experts, but negatively impact their use

of unofficial sources and non-experts. The information literacy course (i.e., the CommA course) as a factor has a similar effect as viewing "professors as socializing agents," and it positively affects students' use of library and experts.

When further examining the study findings based on the I-E-O model, the researcher found that many other variables also affect students' source use behavior. In addition to the aforementioned input variables (i.e., FGC status) and college environment variables (i.e., class cohort and socialization variables), some of the other input and environment variables, such as ethnicity and major, which have been identified as important factors for undergraduate socialization (Astin, 1993; Weidman, 1989, 2006) also affect students' source use behavior.

As discussed in the survey results (section 4.3.2.1.2), disciplinary differences in students' source use behavior can be explained by students' gender and ethnicity. Students with certain gender and ethnic backgrounds tended to major in certain fields of study. Considering how various factors (e.g., gender, ethnicity, major) affect students' source use behavior provide us with an integrated view to learn undergraduate socialization in relation to their source use. For instance, more males than females major in engineering, and males tend to consult human sources less frequently; these phenomena can probably explain why engineering majors tend to consult experts less frequently than other students.

Moreover, based on the interview findings, some students view instructors' expectations as an important factor in their source use preferences (see section 4.1.2); other students learn how course requirements for their own fields of study might be similar to or different from those for other fields through discussion with diverse peers (see section 4.3.1.2.2). These personal accounts imply that socializing into a discipline plays a role in students' source use behavior. However, no direct evidence can facilitate further discussion on this topic because the current study focuses on students' interactions with socializing agents rather than how they socialize into a discipline. It would be interesting for future studies to further investigate how students socialized into a discipline and its effect on students' source use behavior (see section 6.4).

Finally, the web survey results can be further explained by interview findings because regression results regarding the impact of socializing agents on students' source use behavior parallels the interview findings regarding the referral incidents. Socializing agents who have impact on students' source diversity or their use of a specific source also tend to direct students to those sources. For instance, professors tend to direct students to official sources and experts, and professors as socializing agents positively affect students' use of official sources and experts. Peers tend to direct students to a variety of information and human sources, including official,

unofficial sources, experts and non-experts, and peers as socializing agents also positively affect

students' source diversity.

6. CONCLUSION

This chapter concludes the findings of the current study and identifies its practical and

theoretical implications, followed by discussions of its limitation and future studies.

6.1 Summary of Findings

The findings of the current study demonstrate that students with different FGC status

and in different class cohorts have different socialization experiences, and viewing parents,

peers, and professors as socializing agents are important factors affecting students' academic

source use behavior. Specifically, more non-FGC students and upperclassmen than FGC

students and underclassmen view professors as socializing agents. Within groups of students

with the same FGC status, more underclassmen than upperclassmen view peers as socializing

agents; within groups of students in the same class cohort, more non-FGC students than FGC

students view parents as socializing agents. While viewing parents and peers as socializing

agents positively affect students' source diversity, viewing professors as socializing agents

positively affect students' use of official sources and experts. Even though both FGC and

non-FGC students emphasized their learning of using the library and the Internet through trial-and-error in the interviews, both quantitative and qualitative findings reveal that information literacy courses (i.e., CommA courses) positively affect students' use of the library and experts.

While FGC and non-FGC students differ in their socialization experiences and in some of their source use behavior, they still share some similar source preferences. Both groups of students value perceived accessibility and quality as well as instructors' expectations when they select sources in an academic context. However, compared to non-FGC counterparts, FGC students consult human sources, especially parents, less frequently across different academic situations.

The general source use patterns, of both FGC and non-FGC students, in relation to the IH concept of situations can be summarized as follows: while goal-specific situations (i.e., course-related, program-related, and moral-support situations) affect students' frequency of use and source diversity among various information and human sources, typical-level situations (i.e., typical and special situations) affect their overall source diversity and the number of steps taken in their information-seeking processes.

Specifically, peers are frequently consulted in all goal-specific situations; search engines and library resources are more frequently consulted in course-related situations than in other goal-specific situations; advisors and other online resources (i.e., RateMyProfessors.com) are more frequently used in program-related situations than in other goal-specific situations; parents and other friends (e.g., pre-college friends and friends from an interest group) are more frequently consulted in moral-support situations than in other goal-specific situations. In terms of source diversity, students consulted a wider range of sources in course-related situations, than in program-related, and finally in moral-support situations. Compared to a typical situation (e.g., writing an weekly assignment or selecting courses for a new semester), students in a special situation (e.g., doing a challenging course project or switching majors) usually consult a wider range of sources and take more steps in their information-seeking processes because they tend to have a stronger information need in a special situation than in a typical situation.

Overall, findings derived from both phases of the study suggest that frequently-used sources are typically placed in the preferred zones on the IH map, are consulted as one of the first two steps, and possess a referral quality.

6.2 Implications

This section discusses the implications of the study for both practice and research. The researcher first describes implications for professionals, including implications for the university and university library, and then describes theoretical and methodological implications for information behavior research.

6.2.1 Implications for Professionals

Implications for the university and university library are identified from the study findings. First, specific suggestions for the university on providing services for FGC students are addressed; general suggestions for collaboration between the university library and university departments in developing and promoting information literacy instruction are also addressed.

Both qualitative and quantitative findings show that even if both FGC and non-FGC students rely more on peers and professors than parents regarding academic information seeking, professors seem to have greater influences on students' use of official sources and experts than peers. Interview findings also show that instructors' expectations may influence both FGC and non-FGC students' source preferences. Survey results suggest that using peers and professors as socializing agents is especially important to FGC students because they are

less likely to view parents as socializing agents than their non-FGC counterparts; even if most

FGC students report that they view peers or professors as socializing agents, they generally do

not consult human sources as frequently as non-FGC students. Consequently, ensuring that

both peers and professors act as socializing agents is critical to all students, especially to FGC

students. The university should continue fostering collaborative learning among students and

develop more pre-orientation programs targeting FGC students, especially by providing them

with advising resources and tutorial services.

In terms of information literacy education, both quantitative and qualitative findings

show the positive impact of viewing "professors as socializing agents" and taking "information

literacy courses" on students' use of the library and experts. However, only about 45% of the

students in the survey sample have taken the first-year information literacy course (i.e., the

CommA course) because many of them tested out the requirement. As discussed in section

4.3.2.1, students may test out of this information literacy course through several ways because it

is assumed that these students have already acquired sufficient knowledge of information

literacy. However, students who have been exempted from this requirement through an AP

exam may not have the same level of information literacy expertise with students who have been

exempted from the requirement through other methods.

Although more non-FGC than FGC students have tested out of their information literacy courses, nearly half of the FGC students have tested out of this requirement. This implies nearly half of the FGC students have already obtained sufficient information literacy education, and is belied by research suggesting that FGC students may not have received much information literacy education prior to college (e.g., Logan & Pickard, 2012). Although Tyckson (2000) suggests that FGC students' library experience is either at the expert or novice level, we cannot be certain about the level of information literacy expertise in FGC students because whether or not these students have been exempted from the information literacy course requirement may not be an accurate indicator of information literacy education they have received prior to college.

The university has been assessing the effectiveness of CommA courses with an emphasis on building students' written and oral communication skills (see UW-Madison, 2008b, 2011b). The university also reveals an increasing numbers of students testing out of the requirement and suggests that adjustments to how students test out of this requirement may need to be made. With all these in mind, the current study suggests that researchers and the university should further investigate and assess the effectiveness of CommA courses with an emphasis on information literacy components and develop different criteria for assessing whether or not

students have to fulfill the CommA requirement. This would not only help the university identify

students, especially FGC students, who need help with obtaining academic resources but also

help students better adjust to the academic environment in college.

In considering both FGC and non-FGC students, the researcher suggests the university

and the university library initiate collaborative projects focused on developing alternative forms

of information literacy education in addition to information literacy courses. Specifically, the

library might benefit from collaborating with different departments to develop instructional

plans that embed important information literacy components in courses for freshmen based on

guidelines such as the Information Literacy Competency Standards for Higher Education (ACRL,

2000) and Guidelines for Instruction Programs in Academic Libraries (ACRL, 2007).

From the interviews, the researcher finds that students may not be aware of or

understand what kinds of workshops and other services are provided by the library. On

reviewing students' narratives, the researcher finds that some of the students who had not taken

any information literacy courses had misconceptions regarding library services and using search

engines. For instance, one student did not realize that library databases can be accessed

remotely; another student believed that everything in a PDF format was credible. Students also

report that they are too busy to or do not feel the need to attend library workshops. Therefore,

the researcher suggests that librarians promote to faculty members new ways to integrate

information literacy instruction into academic courses. This would be an effective strategy

because even if students may not consult professors as frequently as peers, as to both interactive

and passive information consumption students take professors' recommendations seriously. If

both librarians and professors emphasize the value of information literacy education, it could be

more influential than having only the library promote it.

6.2.2 Implications for Information Behavior Research

Implications for information behavior theory and methodology are identified from the

study design and findings. First, the researcher addresses the theoretical implications of

incorporating new elements into the IH framework. The theoretical implications of examining

individuals' source preferences on the basis of user and source nature are also addressed.

Second, the researcher addresses the methodological implications of the current study for IH

research design and data analysis.

The current study incorporates the concept of socialization into the IH framework and

closely ties the three main IH concepts (contexts, situations, and social networks) to the three

most important elements of information behavior research—information needs, information

seeking, and information use. This study investigates how students' socialization experiences,

especially their interactions with parents, peers, and professors, affect their source use behavior

in academic contexts. By using socialization models that stress college impact and students'

interactions with socializing agents, the study differentially incorporates the concept of social

networks into IH by stressing the individually/ socially-determined nature of source selection.

When studying individuals' source use behavior, the study not only identifies how

students' information needs are shaped by contexts and situations, but also identifies how

source nature, in addition to perceived accessibility and quality, affects individuals' information

seeking and source use behavior. This advances the IH framework because it further examines

Sonnenwald's (1999, 2005) emphasis of studying the relationships among sources and adds

another viewpoint to Savolainen and Kari's (2004) emphasis of perceived accessibility and

quality as factors for source preferences. In academic contexts, this study associates information

needs with goal-specific and typical-level situations and further examines how information

needs in different situations influence students' information-seeking processes and their source

preferences.

Furthermore, the researcher argues that investigating the nature of sources expands our

understanding of individuals' source preferences and of the concept of networks emphasized by

IH. This study discusses the nature of sources in terms of: (1) whether the source is an

information source or a human source, (2) source stability across situations, and (3) referral

quality of a source (either possess a quality of directing individuals' to other sources or a quality

being directed to). With this in mind, IH provides a framework that allows researchers to study

individuals' source use behavior not only from an individual's perspective but also from a

perspective of source nature.

Finally, the current study bridges the gap in literature and in methodology. The study

employs an innovative research design to collect and analyze data. Specifically, the researcher

introduces quantitative survey method in addition to qualitative interviews, and adopts and

modifies data analysis techniques to present and analyze IH maps. Since the triangulation

augments the validity of this study and the emerging interview findings complement the survey

results, this explanatory mixed-methods sequential research design is effective to approach

individuals' IH. Based on Sonnenwald et al.'s (2001), Savolainen and Kari's (2004), and Huvila's

(2009) work, this study incorporates and modifies methods for analyzing individuals' IH maps

and their source preferences, especially in presenting analytic IH maps based on

participant-drawn maps, in examining source stability across situations, and in visualizing

academic information referral paths in a network.

6.3 Limitations

Although the current study employed a mixed-method research design in order to ensure

that the strengths of each method complement one another, the limitations of any

self-administered online questionnaire or face-to-face interview should be noted. The findings

of the current study cannot be generalized beyond the survey population. The research setting is

at a large elite public university in the Midwest of the United States. As some education

literature indicates, there are more FGC students at small two-year institutions than in large

four-year institutions, and many FGC student studies have been conducted in two-year

institutions; more research on FGC students in four-year institutions is needed (Acker-Ball,

2007; Davis, 2010). However, since source use behavior of FGC versus non-FGC students has

not yet been widely studied, similar studies conducted in another research setting may add to

the findings of the current study and better examine the FGC student versus non-FGC student

population from an LIS perspective.

Moreover, any survey may encounter a problem of self-selection bias. By comparing the

demographic distribution of the survey participants, in terms of class cohort, age, and ethnicity,

with that of the UW-Madison undergraduate population (UW-Madison, 2012a; see section

3.5.2.1.2 and Table 3.1), the sample in this study seems to be representative of the

undergraduate population at UW-Madison. However, when comparing survey participants' GPA

with that of the undergraduate population, the students who participated in this study had a

higher GPA than the population (UW-Madison, 2012f).[17] In the second phase of the study, even

if the researcher tried to recruit interview participants based on their FGC status, class cohort,

and ethnicity, a self-selection bias may still exist because during the interview sessions, three

students (i.e., I3, I4, and I12) mentioned that they graduated with Valedictorian honors of their

high school and many other students (i.e., I7, I8, I9, I16, I18, I19) also mentioned that they cared

about their grades very much or they have been getting very good grades in college. Even though

students' academic performance is not the focus of the current study, readers should be aware

that this sample consists of a portion of students who care about their academic performance

and perform very well.

Another limitation of the current study is that the study investigates only certain aspects

of the concept of socialization as well as limited independent variables affecting undergraduate

socialization. In Astin's (1991, 1993) I-E-O model, he identifies a wide variety of input and

environment variables measuring the impact of college. However, the current study only tested a

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[17] As of Fall 2012 when the survey was distributed, the average GPA of the undergraduate population at UW-Madison is 3.242, whereas 77.4% of the participants have a GPA greater than or equal to 3.1 (see Table 3.1).

small group of highly selective ones of interest. In Weidman's (1989, 2006) model of

undergraduate socialization, students' socialization processes in higher education institutions

mainly involve interaction, integration, and learning, and the normative contexts include both

academic and social aspects. Although the web survey of the current study includes questions

about students' learning (e.g., whether students took a CommA course or workshops), and the

follow-up interviews also investigate how students learn to use the library and the Internet, the

current study mainly focuses on students' interactions with parents, peers, and professors.

Students' academic interests and endeavors, and their integration and social involvement in

their college environment, as well as other input and environment variables, could be other

aspects that are worthy of research in the future.

6.4 Future Studies

Based on the findings and the limitations of the current study, the researcher identifies

several directions for future studies: (1) expanding the study population, (2) exploring the

concept of socialization at a more in-depth level, (3) examining additional variables to advance

the theoretical framework, and (4) employing innovative methods to collect and analyze IH

data.

1.   Expanding the study population

The current study sampled undergraduate population at a large public four-year

institution in the United States. Future studies can expand the scope of this study by including

students at different types of higher education institutions and by including students in some

Eastern and Western countries.

As mentioned in the previous section, the student population, especially FGC students,

in an elite large public university may be different from those at different types of institutions.

Additionally, institution type has been proved as one of the important factors affecting

undergraduate socialization (Astin, 1991, 1993; Pascarella & Terenzini, 1991; Weidman, 1989).

Therefore, studies including FGC and non-FGC students at different types of institutions would

yield important and interesting findings.

Ethnicity has also been identified to be one of the important factors affecting

undergraduate socialization (Astin, 1991, 1993; Padgett et al., 2008, 2010; Pascarella &

Terenzini, 1991). The study findings also show that ethnicity is one of the factors predicting

students' source use behavior, and Asian students especially have different source use behavior

than students with other ethnic backgrounds. This study did not further examine the differences

between students with different ethnicity and nationality (e.g., Asian Americans versus Asians)

because about 95% of the students in the sample were U. S. citizens. Future studies may include

students from different eastern and western countries to investigate how the roles of ethnicity

and nationality play in students' socialization and source use behavior.

2.   Exploring socialization concept at a more in-depth level

In order to investigate further the concept of socialization in relation to students' source

use behavior, future studies can either include additional aspects of undergraduate socialization,

or extend the study design to a longitudinal study tracing students from their senior year in high

school throughout their college years.

The current study emphasizes students' interactions with various socializing agents,

including some of the learning elements regarding information literacy. In addition to students'

interactions, future studies can include the integration aspect and other elements regarding

students' learning in college, as suggested by Weidman (1989, 2006). This helps researchers

introduce all three aspects of undergraduate socialization processes—interactions, integration,

and learning—in Weidman's model to information behavior (IB) research. Additionally, the

interview findings suggest that students valued learning career options from socializing agents,

and career choice is one of the elements in Weidman's socialization outcomes. Therefore, it would be especially effective to apply and advance Weidman's model in IB research if future studies include all three aspects of socialization (i.e., interactions, integration, and learning) and shift the focus to students' information seeking for career options.

The current study focuses more on students' socialization experiences rather than their socialization processes. Future studies can develop a longitudinal design which traces students at multiple time points—from the time students get their admissions to college until the time they become a senior in college. This can help researchers to learn students' socialization processes and transition from high school to college, as well as their socialization throughout their college years. This longitudinal design can also help researchers to better explain the differences not only between FGC and non-FGC students but also between underclassmen and upperclassmen.

3. Examining additional variables to advance the theoretical framework

The current study focuses on exploring IH, and thus emphasizes students' source use behaviors as outcome variables and only includes highly selective input and environment variables from Astin's model. Future studies may shift the focus and test other measures among

the 131 input measures and 192 environment measures, such as students' expectations and

involvement, in the I-E-O model in order to further depict a picture of college impact on

students' source use behavior. According to Astin (1993), students' GPA has been found to have

a positive impact on their learning, involvement, and growth in college. Students' academic

performance is also a popular topic in education literature, especially when studying FGC versus

non-FGC students. Future studies may investigate students' academic performance in relation

to their source use behavior by including variables regarding FGC and non-FGC students'

expectations and their involvement in college. Moreover, Astin also suggests that students' fields

of study and ethnicity, in addition to their institution environment, affect their peer

environment. The current survey findings reveal some significant results on students' fields of

study and ethnicity affecting certain source use behavior. However, the current study did not

systematically analyze the interaction effects of these variables because it is beyond the scope of

the current research inquiries. Interaction effects among factors can be analyzed and discussed

in future studies. Future studies may further examine students' fields of study and ethnicity in

relation to their peer environment, and how these factors affect students' source use behavior.

This type of study may reveal more in-depth findings regarding undergraduate socialization and

source use behavior. If future studies include students from different institutions, 15 measures

for institution characteristics, as Astin suggests, could also be included.

When including more measures to test the I-E-O model, more sophisticated statistical

analyses should be employed in order to explain how environment variables mediate inputs and

outcomes. Sequential equation modeling (SEM) can be applied to analyze the data in order to

learn the complex paths among variables as well as the role of the mediator between

independent and dependent variables. For instance, as discussed in sections 4.3.2.1.2 and 5.3,

the field of study is a variable of interest. Learning how students socialize into a discipline in

relation to their source use behavior may provide the university and its libraries with insights on

information literacy education. SEM can be used to analyze how students' fields of study and

other environment variables mediate their source use behavior.

In addition, the IH framework discusses IB by incorporating concepts of *information

needs*, *information seeking*, and *information use*. It also emphasizes the concepts of *contexts*,

situations, and *social networks* in relation to individuals' source use behavior. Certain emerging

findings of the current study provide insights to further expand this framework.

In terms of *information needs*, individuals' information needs are shaped by *contexts*

and *situations*, and the current study examines source use behavior in academic contexts. Many

interview participants asserted that the main thing they learned from various socializing agents is to explore various options, especially career options. Moving beyond academic contexts, future studies may examine students' source use behavior in career information-seeking contexts.

This study predetermines three goal-specific situations in academic contexts, namely, course-related, program-related, and moral-support situations. Emerging findings of this study identifies two typical-level situations: typical and special situations. Future research can further investigate both goal-specific situations and typical-level situations in different contexts in relation to individuals' information behavior.

With the term *information seeking*, we assume that individuals take an interactive action to seek information. However, one of the emerging findings reveals that in addition to the majority interactive information-seeking activities, students also passively receive information and use it later when needed. This idea parallels Manafy and Gautschi's (2011) discussion on the interactive and passive information consumption of the digital natives in everyday-life contexts. However, the current study finds that this passive information consumption especially occurs when experts recommend information sources, and students view it as information referral incidents. Future studies may further explore the phenomenon regarding interactive

information consumption versus passive information consumption in academic contexts.

In terms of *information use*, when students described how they used various sources, reasons for using one source instead of another directed us to future studies. For instance, some students mentioned that their personality as an introvert or perfectionist and other use styles influenced their source use behavior. During the interviews of the current study, some students mentioned that they used an information-first strategy or a human-first strategy possibly due to their personality. Future studies may further investigate the role of individuals' styles and personality traits in relation to their source use patterns. Including these factors when examining individuals' information-seeking processes and source use behavior may enrich the IH framework by closely tying it back to other IB models (e.g., Wilson's (1999) model).

4. Employing innovative methods to collect and analyze IH data

IH emphasizes the relationships among sources used by individuals, and *social network* is one of the important concepts. Haythornthwaite (1996) and Sonnenwald et al. (2001) explored and suggested the potential of applying social network analysis (SNA) to IB research, and Schultz-Jones (2009) reviewed IB research that examined social networks and discussed the significance of this stream of research. However, not many IB studies examined the concept

of social networks, fewer actually employed SNA. While Sonnenwald et al. (2001) analyzed

sources used by students with social matrix and presented a network of sources used by the

students, no existing IH research actually applied SNA to examine the features of networks

among an individual and the sources he or she used. Investigating networks among an

individual and the sources may advance IH research because it allows us to learn individuals'

source use behavior from both perspectives of users and sources. Nevertheless, in order to apply

SNA to examine the network among an individual and the sources he or she used, there should

be a closed boundary so that features of the nodes and ties, such as centrality, density, and tie

strength, can be calculated. Future studies may recruit participants in a setting with boundary.

For instance, recruiting students through departments or classes may be feasible avenues to

approach a closed setting in college. Given students' majors have been proven as a factor

affecting their socialization experiences and source use behavior, future research may recruit

students in certain departments or classes where people know one another and compare their

socialization and source use behavior by analyzing the features of the social networks they form.

This stream of research may advance the IH methodology by further adding a social network

perspective with more sophisticated SNA methods to IH research.

References

Acker-Ball, S. (2007). *A case study of the influence of family on first-generation college students' educational aspirations post high school*. (Unpublished doctoral dissertation, University of Maryland, College Park). Retrieved from ProQuest Digital Dissertations. (AAT 3297326)

Allen, B. (1997). Information needs: A person-in-situation approach. In P.Vakkari, R. Savolainen, & B. Dervin (Eds.), *Proceedings of an International Conference on Information Seeking in Contexts* (pp. 111-122). Tampere, Finland.

Allison, P. D. (2002). *Missing data*. Thousand Oaks, Calif.: Sage.

Association of College & Research Libraries, ACRL (2000). Information literacy competency standards for higher education. [Brochure]. Chicago: Association of College & Research Libraries. Retrieved from http://www.ala.org/acrl/sites/ala.org.acrl/files/content/standards/standards.pdf

Association of College & Research Libraries, ACRL (2011). Guidelines for Instruction Programs in Academic Libraries. Retrieved from http://www.ala.org/acrl/standards/guidelinesinstruction

Astin, A. (1977). Four critical years: Effects of college on beliefs, attitudes, and knowledge. San Francisco: Jossey—Bass.

Astin, A. (1984). Student involvement: A development theory for higher education. *Journal of College Student Personnel, 25*, 297-308.

Astin, A. W. (1991). *Assessment for excellence: The philosophy and practice of assessment and evaluation in higher education*. New York: American Council on Education and Macmillan Publishing Company.

Astin, A. (1993). *What matters in college? Four critical years revisited*. San Francisco: Jossey—Bass.

Attewell, P. & Lavin, D. (2007). *Passing the Torch: Does Higher Education for the Disadvantaged Pay Off Across the Generations?*. New York: Russell Sage.

Axinn, W. G., Link, C. F., & Groves, R. M. (2011). Responsive survey design, demographic data collection, and models of demographic behavior. *Demography*, *48*, 1127-1149.

Bhaskar, R. (1979). Societies. In *The possibility of naturalism: A philosophical critique of the contemporary human sciences* (pp. 31–101). New Jersey: Humanities Press.

Bhaskar, R. (1998). General introduction. In M. Archer, R. Bhaskar, A. Collier, T. Lawson, & A. Norrie (Eds.), Critical realism: Essential readings (pp. ix-xxiv). London: Routledge.

Bowen, W. G., Chingos, M. M., & McPherson, M. S. (2009). *Crossing the finish line : completing college at America's public universities*. Princeton, N.J.: Princeton University Press.

Bowker Market Research. (2012). *Patron profiles : understanding the behavior and preferences of U.S. academic library users*. New York, NY.

Brim, O. G. (1966). Socialization through the life cycle. In O. G. Brim & S. Wheeler (Eds.), *Socialization after Childhood: Two Essays*. New York: Wiley.

Brimeyer, T. M., Miller, J., & Perrucci, R. (2006). Social class sentiments in formation: Influence of class socialization, college socialization, and class aspirations. *The Sociological Quarterly*, *47*(3), 471-495.

Bronstein, J. (2010). Selecting and using information sources: source preferences and information pathways of Israeli library and information science students. *Information Research, 15*(4), n. p. Retrieved from http://informationr.net/ir/15-4/paper447.html

Brooks, D. (2012, July 10). The Opportunity Gap. *New York Times*, p. 21. Retrieved from http://ezproxy.library.wisc.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=aph&AN=77594343&site=ehost-live.

Callinan, J. E. (2005). Information-seeking behaviour of undergraduate biology students: A comparative analysis of first year and final year students in university college Dublin. *Library Review, 54*(2), 86-99.

Carlsson, S. A. (2003). Critical realism: A way forward in IS research. *European Conference on Information Systems (ECIS)*. Naples, Italy. Retrieved from http://csrc.lse.ac.uk/asp/aspecis/20030152.pdf

Charmaz, K. (2006). *Constructing grounded theory: A practical guide through qualitative analysis*. Thousand Oaks, CA: Sage.

Case, D. O. (2012). *Looking for information: A survey of research on information seeking, needs, and behavior* (3rd ed.). Bingley, UK: Emerald Group Publishing Limited.

Chen, S.-C. & Tang, M.-C. (2011). A study of the information seeking behavior of communication graduate students in their research processes. *Journal of Library and Information Studies, 9*(2), 91-122.

Cho, S. H., Gutter, M., Kim, J., & Mauldin, T. (2012). The effect of socialization and information source on financial management behaviors among low- and moderate-income adults. *Family and Consumer Sciences Research Journal*, *40*(4), 417–430. Retrieved from http://doi.wiley.com/10.1111/j.1552-3934.2012.02120.x

Chonwerawong, R. (2006). *The education experiences of low-income first generation college students of color at a major public university: An illusion of mitocracy and educational opportunity*. University of Wisconsin—Madison.

Corwin, J., & Cintrón, R. (2011). Social networking phenomena in the first-year experience. *Journal of College Teaching & Learning*, *8*(1), 25–37.

Cole, C. (2012). *Information need: A theory connecting information search to knowledge formation*. Medford, NJ: ASIS&T.

Corsaro, W. A., & Miller, P. J. (Eds.). (1992). *Interpretive approaches to children's socialization*. San Francisco: Jossey-Bass.

Corsaro, W. A., & Eder, D. (1995). Development and socilization of children and adolescents. In K. S. Cook, G. A. Fine, & J. S. House (Eds.), *Sociological perspectives on social psychology* (pp. 421–451). Boston: Allyn and Bacon.

Creswell, J. W. (2009). *Research design: qualitative, quantitative, and mixed methods approaches* (3rd ed.). London: Sage.

Creswell, J. W. (2012). Mixed methods designs. In *Educational research: planning conducting, and evaluating quantitative and qualitative research* (4th ed., pp. 534-575). Boston: Pearson.

Creswell, J. W., & Plano Clark, V. L. (2007). *Designing and conducting mixed methods research*. Thousand Oaks, CA: Sage.

Creswell, J. W., & Plano Clark, V. L. (2011). *Designing and conducting mixed methods research* (2nd ed.)(pp. 77-81). London: Sage.

Danermark, B. (2002). *Explaining society: critical realism in the social sciences* (pp. 115-176). New York: Routledge.

Davis, J. (2010). *The first-generation student experience: implications for campus practice, and strategies for improving persistence and success*. Sterling, VA: Stylus.

Delamater, J. (Ed.). (2006). Development and socialization. *Handbook of Social Psychology* (pp. 125–202). New York: Springer.

Donatelli, S. (2010). *Help-seeking attitudes and intentions among first generation college students*. (Unpublished doctoral dissertation, Purdue University). Retrieved from ProQuest Digital Dissertations. (AAT 3444509)

Duke, L. M., & Asher, A. D. (2012). *College libraries and student culture: What we now know*. Chicago: American Library Association.

Haythornthwaite, C. (1996). Social network analysis: An approach and technique for the study of information exchange. *Library & Information Science Research*, *18*(4), 323–342.

Hong, C., & Kircher, A. (2010). Supporting and retaining first generation students. The Education Advisory Board, Washington, D. C. Retrieved from http://www.depts.ttu.edu/diversity/pegasus/documents/Supporting_and_Retaining_First_Generation_Students.pdf.

Housel, T. H., & Harvey, V. (2009). *Invisibility factor: administrators and faculty reach out to first-generation college students*. Boca Raton, Florida: Brown Walker Press.

Hurrelmann, K., & Engel, U. (Eds.). (1989). *The social world of adolescents: International perspectives*. New York: de Gruyter.

Ekimyan, R. (2008). *First-generation Armenian American community college students' perception of events affecting their identity development*. (Unpublished doctoral dissertation). University of Southern California.

Fan, W., & Yan, Z. (2010). Factors affecting response rates of the web survey: A systematic review. *Computers in Human Behavior*, *26*, 132–139.

Feldman, K. A. (1972). Some theoretical approaches to the study of change and stability of college students, *Review of Educational Research, 42*(1), 1–26. Retrieved from http://www.jstor.org.ezproxy.library.wisc.edu/stable/info/1170154

Felmlee, D. H. (2003). Interaction in social networks. In Delamater, J. (Ed.). *Handbook of Social Psychology* (pp. 389–409). New York: Kluwer Academic.

Fidel, R. (2012). *Human information interaction: An ecological approach to information behavior*. Cambridge, MA: Massachusetts Institute of Technology.

Gardner, S. K., & Barnes, B. J. (2007). Graduate student involvement: socialization for the professional role. *Journal of College Student Development2*, *48*(4), 1–19.

Gonzales, R. G. (2010). On the wrong side of the tracks: understanding the effects of school structure and social capital in the educational pursuits of undocumented immigrant students. *Peabody Journal of Education*, *85*(4), 469–485. doi:10.1080/0161956X.2010.518039

Greene, J. C., Caracelli, V. J., & Graham, W. F. (1989). Toward a conceptual framework for mixed-method evaluation designs. *Educational Evaluation and Policy Analysis*, *11*(3), 255–274.

Gutter, M., Copur, Z., & Garrison, S. (2010). Social learning opportunities and the financial behaviors of college students. *Family & Consumer Sciences Research Journal*, *38*(4), 387–404.

Hair, J. F. (2010). *Multivariate data analysis* (7th ed.). Upper Saddle River, NJ: Prentice Hall.

Head, A. J. (2007). Beyond Google: How do students conduct academic research?. *First Monday, 12*(7). Retrieved from http://journals.uic.edu/ojs/index.php/fm/article/view/1998/1873

Head, A. J. (2008). Information literacy from the trenches: How do humanities and social science majors conduct academic research?. *College & Research Libraries, 69*, 427-446.

Head, A. J. (2013). Project information literacy: What can be learned about the information-seeking behavior of today's college students?. In Meuller, D. M. (Ed.), *Imagine, Innovate, Inspire: The Proceedings of the Association of College and Research Libraries (ACRL) 2013 Conference* (pp. 472-482). Chicago: ALA.

Head, A. J., & Eisenberg, M. B. (2009a). *Lessons learned: How college students seek information in the digital age* (Project Information Literacy Report). University of Washington, Information School.

Head, A. J., & Eisenberg, M. B. (2009b). *Finding context: What today's college students say about conducting research in the digital age* (Project Information Literacy Report). University of Washington, Information School.

Head, A. J., & Eisenberg, M. B. (2010a). *Truth to be told: How college students evaluate and use information in the digital age* (Project Information Literacy Report). University of Washington, Information School.

Head, A. J., & Eisenberg, M. B. (2010b). How today's college students use Wikipedia for course-related research. First Monday, 15(3). Retrieved from http://journals.uic.edu/ojs/index.php/fm/article/view/2830/2476

Head, A. J., & Eisenberg, M. B. (2011). *Balancing act: How college students manage technology while in the library during crunch time* (Project Information Literacy Report). University of Washington, Information School.

Huvila, I. (2009). Analytical information horizon maps. *Library & Information Science Research, 31*(1), 18-28.

Ishitani, T. T. (2003). A Longitudinal Approach to Assessing Attrition Behavior Among First-Generation Students: *Research in Higher Education, 44*(4), 433–449.

Jackson, D. L. (2011). *Transfer students in STEM majors: Gender differences in the socialization factors that influence academic and social adjustment. Dissertation Abstracts International Section A: Humanities and Social Sciences*. Iowa State University.

Jensen, U. (2011). Factors influencing students retention in higher education. In *Research & Evaluation*. Retrieved from http://www.ksbe.edu/spi/PDFS/Retention_Brief.pdf

Johnson, R. B., Onwuegbuzie, A. J., & Turner, L. A. (2007). Toward a definition of mixed methods research. *Journal of Mixed Methods Research*, *1*(2), 112–133.

Kari, J., & Savolainen, R. (2003). Towards a contextual model of information seeking on the Web. *New Review of Information Behaviour Research*, *4*(1), 155-175.

Kim, K.-S., & Sin, S.-C. J. (2007). Perception and selection of information sources by undergraduate students: Effects of avoidant style, confidence, and personal control in problem-solving. *The Journal of Academic Librarianship 33*(6): 655–65.

Kim, K.-S., & Sin, S.-C. J. (2011). Selecting quality sources: Bridging the gap between the perception and use of information sources. *Journal of Information Science, 37*(2), 178-188.

Knoke, D., & Yang, S. (2008). *Social Network Analysis.* (2nd ed.). Thousands Oaks, CA: Sage.

Kuh, G. D. (2003). *National Survey of Student Engagement: Conceptual Framework and Overview of Psychometric Properties*. Retrieved from http://nsse.iub.edu/pdf/conceptual_framework_2003.pdf.

Kvale, S., & Brinkmann, S. (2009). *InterViews: An introduction to qualitative research interviewing* (2nd ed.). Thousand Oaks, CA: Sage.

Lacy, W. B. (1978). Interpersonal relationships as mediators of structural effects: College students socialization in a traditional and an experimental university environment. *Sociology of Education*, *51*(3), 201–211.

Laguilles, J. S., Williams, E. A., & Saunders, D. B. (2011). Can lottery incentives boost web survey response rates? Findings from four experiments. *Research in Higher Education*, *52*, 537–553.

Lincoln, Y. S., & Guba, E. G. (1985). Naturalist inquiry. Beverly Hills, Calif.: Sage.

Little, R. J. A., & Rubin., D. B. (2002). *Statistical analysis with missing data* (2nd ed.). New York: Wiley.

Logan, F. and Pickard, E. (2012). First-generation college students: A sketch of their research process. In L. M. Duke, and A. D. Asher (Eds.). *College libraries and student culture: What we now know*. Chicago: American Library Association.

Lu, L., & Yuan, Y. C. (2011). Shall I Google it or ask the competent villain down the hall? The moderating role of information need in information source selection. *Journal of the American Society for Information Science and Technology, 62*(1), 133-145.

Lynch, S. M. & Brown, J. S. (2013). *Handling missing data in social research*. New York: Chapman & Hall. [preview] Retrieved from http://www.openisbn.com/preview/1439873968/

Manafy, M., & Gautschi, H. (2011). *Dancing with digital natives*. Medford: New Jersey: Information Today.

Marascuilo, L. A., & Serlin, R. C. (1988). *Statistical methods for the social and behavioral sciences*. New York: Freeman and Company.

Martinez, J. A., Sher, K. J., Krull, J. L., & Wood, P. K. (2009). Blue-collar scholars?: Mediators and moderators of university attrition in first-generation college students. *Journal of College Student Development*, *50*(1), 87–103.

McManus, D. (2011, Jan. 2). The upward mobility gap - Los Angeles Times. Retrieved from http://articles.latimes.com/2011/jan/02/opinion/la-oe-mcmanus-twous-20110102

Mead, G. H. (2007). The self as social structure. In S. E. Cahill (Ed.), *Inside social life: readings in sociological psychology and microsociology* (5th ed.). Los Angeles: Roxbury Publishing Company.

Metzger, M. J., Flanagin, A. J., & Zwarun, L. (2003). College student web use, perceptions of information credibility, and verification behavior. *Computers and Education, 41*(3), 271-290.

Miles, M. B., Huberman, A. M. (1994). *Qualitative data analysis: an expanded sourcebook* (2nd ed.). Thousand Oaks: Sage Publications.

National Center for Education Statistics, NCES (1999). Parent involvement in school-related activities. Indicator of the Month. U.S. Department of Education. (NCES 1999-001).

National Center for Education Statistics, NCES (2001). Bridging the gap: Academic preparation and postsecondary success of first-generation students. Statistical Analysis Report. U.S. Department of Education. (NCES 2001-153).

National Center for Education Statistics, NCES (2005). First-generation students in postsecondary education: a look at their transcripts. U.S. Department of Education. (NCES 2005-171).

National Center for Education Statistics, NCES (2011). The Condition of Education 2011. NCES. Retrieved from http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2011033.

National Center for Education Statistics, NCES (2012a). *Digest of Education Statistics 2011*. Retrieved from http://nces.ed.gov/programs/digest/2011menu_tables.asp.

National Center for Education Statistics, NCES (2012b). *The Condition of Education 2011*. (NCES 2012-045). Retrieved from http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2011033.

Nava, M.(2010). Exploring new paths: The first-year experiences for first-generation college students and the impact of participating in comprehensive programs. Ph.D. dissertation, The University of Texas at Austin, United States -- Texas. Retrieved April 11, 2011, from Dissertations & Theses: Full Text.(Publication No. AAT 3417476).

Nicholas, D. (2009). Student digital information-seeking behaviour in context. *Journal of Documentation, 65*(1), 106–132.

NSSE (2008). National Survey of Student Engagement 2008. Retrieved from http://www.liberalarts.wabash.edu/storage/assessment-instruments/NSSE2008_Sample.pdf.

O'Brien, H. L., & Symons, S. (2007). The information behaviors and preferences of undergraduate students. *Research Strategies, 20*, 409-423.

Odeh, A. Y. (2012). Use of information resources by undergraduate students and its relationship with academic achievement. *Libri: International Journal of Libraries & Information Services, 62*, 222–231.

Ohl-Gigliotti, C. A. (2008). *Social networks and social class: How Caucasian, working class parents of first-generation college students experience their child's first year of college*. Syracuse University.

Online Computer Library Center [OCLC] (2011). *Perceptions of libraries, 2010 : context and community : a report to the OCLC membership*. Dublin, Ohio: OCLC.

Olive, T. (2008). Desire for higher education in first-generation Hispanic college students enrolled in an academic support program: A phenomenological analysis. *Journal of Phenomenology Psychology, 39*, 81-110.

Padgett, R. D., Goodman, K. M., Johnson, M. P., Saichaie, K., & Umbach, P. D. (2008). The impact of college student socialization and socioeconomic status on cognitive outcomese. *Paper presented at the annual meeting of the Association for the Study of Higher Education*. Jacksonville, FL.

Padgett, R. D., Goodman, K. M., Johnson, M. P., Saichaie, K., Umbach, P. D., & Pascarella, E. T. (2010). The impact of college student socialization, social class, and race on need for cognition. *New Directions for Institutional Research - Diversity and educational benefits: Expanding the scope, deepening our understanding* (Vol. 145, pp. 99-111). San Francisco: Jossey-Bass.

Pallant, J. (2010). *SPSS survival manual: a step by step guide to data analysis using SPSS* (4th ed.). New York: McGraw-Hill.

Parsons, T., & Bales, R. F. (1955). *Family, socialization and interaction process*. Glencoe: Free Press.

Pascarella, E. T. (1985). College environment influences on learning and cognitive development. In J. C. Smart (ed.). *Higher Education: Handbook of Theory and Research, Vol. 1 (pp. 1-61). New York: Agathon Press*.

Pascarella, E. T., & Terenzini, P. T. (1980). Predicting freshman persistence and voluntary dropout decisions from a theoretical model. *Journal of Higher Education, 51*(1), 60-75.

Pascarella, E. T., & Terenzini, P. T. (1991). *How college affects students*. San Francisco: Jossey—Bass.

Pascarella, E. T., Pierson, C. T., Wolniak, G. C., & Terenzini, P. T. (2004). First-generation college students: Additional evidence on college experiences and outcomes. *The Journal of Higher Education, 75*(3), 249–284.

Patton, M. Q. (2002). *Qualitative research & evaluation methods* (3rd ed.). Thousand Oaks: Sage Publications.

Pettigrew, K. E. (2000). Lay information provision in community settings: how community health nurses disseminate human services information to the elderly. *Library Quarterly, 70*(1), 47–85.

Porter, S. (1993). Critical realist ethnography: The case of racism and professionalism in a medical setting. *Sociology, 27*(4), 591–609.

Porter, S. (2002). Critical realist ethnography. In T. May (Ed.), *Qualitative research in action* (pp. 53–72). Thousand Oaks, CA: Sage.

Richards, L. (2009). *Handling qualitative data: A practical guide* (2nd ed.) (pp. 90–95). Thousand Oaks, CA: Sage.

Riehl, R.J. (1994). The academic preparation, aspirations, and first-year performance of first-generation students. *College & University, 70*, 14-19.

Saks, A. M., Gruman, J. A., & Cooper-Thomas, H. (2011). The neglected role of proactive behavior and outcomes in newcomer socialization. *Journal of Vocational Behavior*, *79*(1), 36–46. doi:10.1016/j.jvb.2010.12.007

Saldaña, J. (2013). *The coding manual for qualitative researchers* (2nd ed.). Thousand Oaks, CA: Sage.

Saunders, M., & Serna, I. (2004). Making college happen: The college experiences of first-generation Latino students. *Journal of Hispanic Higher Education*, *3*(2), 146–163.

Savolainen, R. (2001). 'Living encyclopedia' or idle talk? Seeking and providing consumer information in an Internet newsgroup. *Library & Information Science Research, 23*, 67-90.

Savolainen, R. (2006). Spatial factors as contextual qualifiers of information seeking. *Information Research, 11*(4).

Savolainen, R. (2007). Information source horizons and source preferences of environmental activists: A social phenomenological approach. *Journal of the American Society for Information Science & Technology, 58*(12), 1709–1719.

Savolainen, R. (2008). Source preferences in the context of seeking problem-specific information. *Information Processing & Management, 44*(1), 274–293.

Savolainen, R., & Kari, J. (2004). Placing the Internet in information source horizons. A study of information seeking by Internet users in the context of self-development. *Library & Information Science Research, 26*(4), 415-433.

Sayer, A. (2000). Introducing critical realism. *Realism and social science* (pp. 1–28). Thousand Oaks, CA: Sage.

Schmidt, A. (2006). Social network theory. In *Encyclopedia of Governance*. Thousand Oak, CA: Sage Publications. Retrieved Oct. 14, 2009, from http://sage-ereference.com/governance/Article_n503.html.

Schultz-Jones, B. (2009). Examining information behavior through social networks: an interdisciplinary review. *Journal of Documentation, 65*(4), 592–631.

Shim, S., Barber, B. L., Card, N. A., Xiao, J. J., & Serido, J. (2010). Financial socialization of first-year college students: The roles of parents, work, and education. *Journal of Youth Adolescence, 39*, 1457–1470.

Sin, S.-C. J. (2009). *Structural and individual influences on information behavior: A national study of adolescents' use of public libraries*. University of Wisconsin—Madison.

Smith, W. L., & Zhang, P. (2009). Students' perceptions and experiences with key factors during the transition from high school to college. *College Student Journal, 43*(2), 643–657.

Social Science Computing Cooperative (SSCC), University of Wisconsin—Madison (2013). Multiple Imputation in Stata: Deciding to Impute. Retrieved from: http://www.ssc.wisc.edu/sscc/pubs/stata_mi_decide.htm.

Sonnenwald, D. H. (1999). Evolving perspectives of human information behaviour: contexts, situations, social networks and information horizons. In T. D. Wilson & D. K. Allen (Eds.), *Exploring the contexts of information behavior: Proceedings of the second international conference on research in information needs, seeking and use in different contexts* (pp. 176-190). Sheffield, UK.

Sonnenwald, D. H. (2005). Information horizons. In K. E. Fisher, S. Erdelez, & L. McKechnie (Eds.), *Theories of information behavior* (pp. 191–197). Medford, NJ: Information Today.

Sonnenwald, D. H., Wildemuth, B. M., & Harmon, G. L. (2001). A research method to investigate information seeking using the concept of information horizons: an example from a study of lower socio-economic students' information seeking behaviour. *The New Review of Information Behaviour Research*, *2,* 65-86.

Stanton-Salazar, R. D., & Dornbusch, S. M. (1995). Social capital and the reproduction of inequality: information networks among Mexican-origin high school students, *68*(2), 116–135. Retrieved from http://www.jstor.org.ezproxy.library.wisc.edu/stable/info/2112778

Steffes, E. M., & Burgee, L. E. (2009). Social ties and online word of mouth. *Internet Research 19*(1), 42–59.

Stephens, N. M. (2011). *A cultural mismatch: A cultural mismatch: The experience of first-generation college students in elite universities*. Retrieved from ProQuest, UMI Dissertation Publishing.

Stephens, N. M., Fryberg, S. A., Markus, H. R., Johnson, C. S., & Covarrubias, R. (2012). Unseen disadvantage: how American universities' focus on independence undermines the academic performance of first-generation college students. *Journal of Personality and Social Psychology, 102*(6), 1178-1197.

Stuber, J. M. (2011). Integrated, marginal, and resilient: race, class, and the diverse experiences of white first-generation college students. *International Journal of Qualitative Studies in Education, 24*(1), 117-136.

Tashakkori, A., & Teddlie, C. (Eds.). (2010). *Sage handbook of mixed methods in social & behavioral research* (2nd ed.). Los Angeles: Sage.

Teddlie, C., & Tashakkori, A. (2009). *Foundations of mixed methods research : integrating quantitative and qualitative approaches in the social and behavioral sciences*. Los Angeles: Sage.

Tenopir, C. (2003). Use and users of electronic library resources: an overview and analysis of recent research studies. *Council on Library and Information Resources*. Retrieved from: http://www.clir.org/pubs/reports/pub120/pub120.pdf.

Terenzini, P. T., Springer, L., Yaeger, P. M., Pascarella, E. T., & Nora, A. (1996). First-generation college students: Characteristics, experiences, and cognitive development. *Research in Higher Education*, *37*(1), 1–22. Retrieved from http://www.jstor.org/stable/40196208

Tierney, W. G. (1997). Organizational socialization in higher education. *Journal of Higher Education, 68*(1), 1-16.

Tinto, V. (1975). Dropout from higher education: A theoretical synthesis of recent research. *Review of Educational Research, 45*, 89-125.

Tinto, V. (1993). *Leaving college: Rethinking the causes and cures of student attrition* (2nd ed.). Chicago: The University of Chicago Press.

Tomlinson, S. D. (2002). *The roles of communication and self-presentation in the socialization of college students*. University of Washington.

Torres, V., Reiser, A., LePeau, L., Davis, L., Ruder, J. (2006). A model of first-generation Latino/a college students' approach to seeking academic information. *NACADA Journal, 26*(2), 65-70.

Tsai, T.-I. (2010). Information Horizons of Taiwanese Graduate Students. In Reilly, M. (Ed.) *2010 iConference Proceeding* (pp. 233-246). Urbana-Champaign, IL.

Tsai, T-I. (2012). Coursework-related information horizons of first-generation college students. Information Research, 17(4) paper 542. Retrieved from http://InformationR.net/ir/17-4/paper542.html

Twait, M. (2005). Undergraduate students' source selection criteria: A qualitative study. *Journal of Academic Librarianship, 31*(6), 567-573.

Tyckoson, D. A. (2000). Library service for the first-generation college students. In T. E. Jacobson & H. C. Williams (Eds.), *Teaching the New Library to Today's Users* (pp. 87-105). New York: Neal-Schuman.

UIC, Office of the Vice Chancellor for Student Affairs (2002). *Who are the first-generation students at UIC? An examination of the Fall 2002 beginning freshman class*. Retrieved from http://tigger.uic.edu/~ardinger/assessment/parent-ed.html

UIC, Office of the Vice Provost for Academic and Enrollment Services and Office of the Vice Chancellor for Student Affairs (2009). *Special comparison report from the 2009 administration of the UIC entering student survey – Students from Chicago Public Schools*. Retrieved from http://www.uic.edu/depts/ovcsa/research_docs/Report%20on%20CPS%20ESS%20200 9. pdf

UIC, Office of the Vice Provost for Academic and Enrollment Services and Office of the Vice Chancellor for Student Affairs (2011). *Report on the 2011 Administration of the UIC Entering Student Survey*. Retrieved from http://www.uic.edu/depts/oaa/degree_progress/Report%20on%20Entering%20Student %20Survey%202011%20final.pdf

University of Wisconsin—Madison, Applied Population Laboratory (2007a). Northern Wisconsin Higher Education Initiative: Demographic Profile. Retrieved from http://www.apl.wisc.edu/publications/NOW_report_final.pdf

University of Wisconsin—Madison, University General Education Committee [UW-Madison, UGEC] (2007b). An Assessment Study of the Effectiveness of the General Education

Communication 'A' Requirement at the University of Wisconsin—Madison. Retrieved from http://www.ls.wisc.edu/gened/documents/commA_surveyreport.pdf

University of Wisconsin—Madison, Office of Provost, Academic Planning and Analysis (2008a). Characteristics of first-generation new students at UW-Madison. Retrieved from http://apir.wisc.edu/advising/First_Generation_Student_Attributes_2008.pdf

University of Wisconsin—Madison, University General Education Committee [UW-Madison, UGEC] (2008b). Assessment Plan for General Education at the University of Wisconsin—Madison. Retrieved from http://www.ls.wisc.edu/gened/documents/2008AssessmentPlanGERfinal.pdf

University of Wisconsin—Madison, Office of Provost, Academic Planning and Analysis (2011a). Trends in New Freshman Applicants, Admits, and Enrollments in Fall Semesters. Retrieved from http://apir.wisc.edu/admissions/New_Freshmen_Applicants.pdf

University of Wisconsin—Madison, University General Education Committee [UW-Madison, UGEC] (2011b). An Assessment of Writing Outcomes in the First Semester of College at the University of Wisconsin—Madison: A Pilot Study. Retrieved from http://www.ls.wisc.edu/gened/documents/Comm-A_report--FINAL.pdf

University of Wisconsin—Madison, Office of Provost, Academic Planning and Analysis (2012a). 2011-2012 Data Digest. Retrieved from http://apir.wisc.edu/datadigest/DATADIGEST_12.pdf

University of Wisconsin—Madison, Office of Provost, Academic Planning and Analysis (2012b). NSSE 2011 Summary Report: An Overview of the National Survey of Student Engagement 2011 Results for UW-Madison. Retrieved from http://apir.wisc.edu/studentsurveys/NSSE_2011_Final_report.pdf

University of Wisconsin—Madison, Office of Provost, Academic Planning and Analysis (2012c). Retention and Graduation Rates of New Freshmen by Fall Semester Entrance Cohort: First Generation College Students. Retrieved from http://apir.wisc.edu/retentionandgraduation/Retention_Graduation_FirstGen.pdf

University of Wisconsin—Madison (2012d). UW Facts. Retrieved from http://www.wisc.edu/about/facts/

University of Wisconsin—Madison, Office of the Registrar (2012e). Library Collection Info. Retrieved from http://library.wisc.edu/collections/

University of Wisconsin—Madison (2012f). Average Semester Undergraduate Grade Point Averages. Retrieved from http://registrar.wisc.edu/documents/Stats_Scholars_2012-2013Fall.pdf

University of Wisconsin—Madison (2012g). Fall 2012 Registrar's Enrollment Report. Retrieved from http://registrar.wisc.edu/documents/Stats_all_2012-2013Fall.pdf

Wabash College, Center for Inquiry. (2011). Wabash National Study 2006- 2009: Outcomes and Experiences Measures. Retrieved from http://www.liberalarts.wabash.edu/study-instruments/.

Wallace, W. L. (1964). Institutional and life-cycle socialization of college freshmen. *American Journal of Sociology*, *70*(3), 303–318.

Wang, P. (2011). *Information* behavior and *seeking*. In Ian Ruthven & Diane Kelly (Eds.), *Interactive information seeking*, *behaviour,* and *retrieval (pp. 15-41). London: Facet.*

Wasserman, S., and Faust, K. (1994). *Social Network Analysis: Methods and Applications*. Cambridge: Cambridge University Press.

Weidman, J. C. (1989). Undergraduate socialization: A conceptual approach. In J. Smart (Ed.), *Higher Education: Handbook of Theory and Research (Vol. 5 289-322)*. New York: Agathon.

Weidman, J. C. (2006). Socialization of students in higher education: Organizational perspectives. *The Sage handbook for research in education* (2nd ed., pp. 253-262). Thousand Oaks, CA: Sage.

Wheeler, S. (1966). The structure of formally organized socialization settings. In O. G. Brim & S. Wheeler (Eds.), *Socialization after Childhood: Two Essays*. New York: Wiley.

Whitmire, E. (1998). Development of Critical Thinking Skills: An Analysis of Academic Library Experiences and Other Measures. *College & Research Libraries*, *59*(3), 266–273.

Whitmire, E. (2003). Cultural diversity and undergraduates' academic library use. *Journal of Academic Librarianship, 29*(3), 148-161.

Wikgren, M. (2005). Critical realism as a philosophy and social theory in information science? *Journal of Documentation*, *61*(1), 11-22.

Witte, J., & Wolfe, B. (2009). Is the University of Wisconsin–Madison becoming more elite? A partial answer. *La Follette Policy Report, 18*(2), 10-16.

York-Anderson, D.C. & Bowman, S. (1991). Assessing the college knowledge of first- generation and second-generation students. *Journal of College Student Development*, *32*(2), 116–112.

Zachariadis, M., Scott, S., & Barrett, M. (2010). Exploring critical realism as the theoretical foundation of mixed-method research: evidence from the economics of IS innovations. Retrieved from http://www.jbs.cam.ac.uk/research/working_papers/2010/wp1003.pdf.

Zappa, S. (2008). *The academic literacy socialization of Mexican exchange students at a Canadian university*. The University of British Columbia.

Appendix A: Questionnaire

Part A: Academic Information Use

The following questions are about your academic information use. You'll be asked a very similar set of questions in three different situations: 1. course-related, 2. program-related, and 3. moral-support issues.

1. **Course-related Issues** refer to situations:

   When you have questions about course content or logistical issues about courses (e.g., understanding course materials, how to do assignments or projects, what is covered in an exam).

   (1) How often do you use the following information sources when looking for information about **course-related issues**?

Information Source	Never	Rarely	Occasionally	Frequently	Very Frequently
Personal collections (e.g., syllabi, course materials, books you purchased)	1	2	3	4	5
Printed resources from the university library (e.g., books, journals)	1	2	3	4	5
Online resources from the university library (e.g., e-journals from the database, e-books from the library)	1	2	3	4	5
Course/university/department websites	1	2	3	4	5
Search engines (e.g., Google, Bing, Yahoo)	1	2	3	4	5
Online forums or Q&A sites (e.g., RateMyProfessors, Yahoo Answers)	1	2	3	4	5
Social networking (e.g., Facebook) or micro-blogging sites (e.g., Twitter)	1	2	3	4	5
Traditional mass media (e.g., TV, radio)	1	2	3	4	5
Other (please specify):_____	1	2	3	4	5

   (2) How often do you ask the following people for advice or information about **course-related issues**?

Human Source	Never	Rarely	Occasionally	Frequently	Very Frequently
Peers who take (or have taken) the same course with you	1	2	3	4	5
Friends from student organizations/ interest groups or a religious group	1	2	3	4	5
Friends who you met before college	1	2	3	4	5

Human Source	Never	Rarely	Occasionally	Frequently	Very Frequently
Roommates	1	2	3	4	5
Professors you are currently taking (or have taken) classes from	1	2	3	4	5
Advisors	1	2	3	4	5
TAs	1	2	3	4	5
School teachers who you met before college	1	2	3	4	5
Librarians	1	2	3	4	5
Writing center instructors	1	2	3	4	5
Parents	1	2	3	4	5
Siblings	1	2	3	4	5
Other (please specify):_____	1	2	3	4	5

(3) How often do the following sources or people **direct you to other sources** when you are looking for information about **course-related issues**?

*For example, **a friend** may suggest you to look up the syllabus or ask the TA; a **TA** may refer you to the professor; the **search engine** may direct you to other websites; a **book** may direct you to other books.*

If you have never used a source, please select "Not Applicable (N/A)."

Information/Human Source	Never	Rarely	Occasionally	Frequently	Very Frequently	N/A
Personal collections (e.g., syllabi, course materials, books you purchased)	1	2	3	4	5	8
Printed resources from the university library (e.g., books, journals)	1	2	3	4	5	8
Online resources from the university library (e.g., e-journals from the database, e-books from the library)	1	2	3	4	5	8
Course/university/department websites	1	2	3	4	5	8
Search engines (e.g., Google, Bing, Yahoo)	1	2	3	4	5	8
Online forums or Q&A sites (e.g., RateMyProfessors, Yahoo Answers)	1	2	3	4	5	8
Social networking (e.g., Facebook) or micro-blogging sites (e.g., Twitter)	1	2	3	4	5	8
Traditional mass media (e.g., TV, radio)	1	2	3	4	5	8

Information/Human Source	Never	Rarely	Occasionally	Frequently	Very Frequently	N/A
Peers who take (or have taken) the same course with you	1	2	3	4	5	8
Friends from student organizations/ interest groups or a religious group	1	2	3	4	5	8
Friends who you met before college	1	2	3	4	5	8
Roommates	1	2	3	4	5	8
Professors you are currently taking (or have taken) classes from	1	2	3	4	5	8
Advisors	1	2	3	4	5	8
TAs	1	2	3	4	5	8
School teachers who you met before college	1	2	3	4	5	8
Librarians	1	2	3	4	5	8
Writing center instructors	1	2	3	4	5	8
Parents	1	2	3	4	5	8
Siblings	1	2	3	4	5	8
Other (please specify):_____	1	2	3	4	5	8

(4) Which **sources (both information and human sources)** do you usually use first, second, and third for **course-related issues**? Please fill in 1, 2 and 3 for step 1, step 2 and step 3.

Step	Source
☐	Personal collections (e.g., syllabi, course materials, books you purchased)
☐	Printed resources from the university library (e.g., books, journals)
☐	Online resources from the university library (e.g., e-journals from the database, e-books from the library)
☐	Course/university/department websites
☐	Search engines (e.g., Google, Bing, Yahoo)
☐	Online forums or Q&A sites (e.g., RateMyProfessors, Yahoo Answers)
☐	Social networking (e.g., Facebook) or micro-blogging sites (e.g., Twitter)
☐	Traditional mass media (e.g., TV, radio)
☐	Peers who take (or have taken) the same course with you
☐	Friends from student organizations/ interest groups or a religious group
☐	Friends who you met before college

Step	Source
☐	Roommates
☐	Professors you are currently taking (or have taken) classes from
☐	Advisors
☐	TAs
☐	School teachers who you met before college
☐	Librarians
☐	Writing center instructors
☐	Parents
☐	Siblings
☐	Other (please specify):_____

(5) **Whom** do you usually consult first, second, and third for **course-related issues**? Please fill in 1, 2 and 3 for step 1, step 2 and step 3.

Step	Human Source
☐	Peers who take (or have taken) the same course with you
☐	Friends from student organizations/ interest groups or a religious group
☐	Friends who you met before college
☐	Roommates
☐	Professors you are currently taking (or have taken) classes from
☐	Advisors
☐	TAs
☐	School teachers who you met before college
☐	Librarians
☐	Writing center instructors
☐	Parents
☐	Siblings
☐	Other (please specify):_____

(6) **For course-related issues**, to what extent do you agree or disagree with the following statements?

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I am satisfied with the information I got	1	2	3	4	5
I will seek information in a similar way if I have a similar problem in the future	1	2	3	4	5

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I have enhanced my ability to find information I need during college	1	2	3	4	5

2. **Program-related Issues** refer to situations:

When you decide which courses to take or when you are looking for information about your major or program (e.g., curriculum, program requirements).

(1) How often do you use the following information sources when looking for **course selection or program-related information**?

Information Source	Never	Rarely	Occasionally	Frequently	Very Frequently
Personal collections (e.g., syllabi, course materials, books you purchased)	1	2	3	4	5
Course catalogs from the university websites	1	2	3	4	5
Search engines (e.g., Google, Bing, Yahoo)	1	2	3	4	5
Online forums or Q&A sites (e.g., RateMyProfessors, Yahoo Answers)	1	2	3	4	5
Social networking (e.g., Facebook) or micro-blogging sites (e.g., Twitter)	1	2	3	4	5
Other (please specify):_____	1	2	3	4	5

(2) How often do you ask the following people for advice or information when looking for **course selection or program-related information**?

Human Source	Never	Rarely	Occasionally	Frequently	Very Frequently
Peers who take (or have taken) the same course with you	1	2	3	4	5
Friends from student organizations/ interest groups or a religious group	1	2	3	4	5
Friends who you met before college	1	2	3	4	5
Roommates	1	2	3	4	5
Professors you are currently taking (or have taken) classes from	1	2	3	4	5
Advisors	1	2	3	4	5

Human Source	Never	Rarely	Occasionally	Frequently	Very Frequently
TAs	1	2	3	4	5
School teachers who you met before college	1	2	3	4	5
Librarians	1	2	3	4	5
Writing center instructors	1	2	3	4	5
Parents	1	2	3	4	5
Siblings	1	2	3	4	5
Other (please specify):_____	1	2	3	4	5

(3) How often do the following sources **direct you to other sources** when you are looking for **course selection or program-related information**?

*For example, **a friend** may suggest you to look up the syllabus or ask the TA; a **TA** may refer you to the professor; the **search engine** may direct you to other websites; a **book** may direct you to other books.*

If you have never used a source, please select "Not Applicable (N/A)."

Information/Human Source	Never	Rarely	Occasionally	Frequently	Very Frequently	N/A
Personal collections (e.g., syllabi, course materials, books you purchased)	1	2	3	4	5	8
Course/university/department websites	1	2	3	4	5	8
Search engines (e.g., Google, Bing, Yahoo)	1	2	3	4	5	8
Online forums or Q&A sites (e.g., RateMyProfessors, Yahoo Answers)	1	2	3	4	5	8
Social networking (e.g., Facebook) or micro-blogging sites (e.g., Twitter)	1	2	3	4	5	8
Peers who take (or have taken) the same course with you	1	2	3	4	5	8
Friends from student organizations/ interest groups or a religious group	1	2	3	4	5	8
Friends who you met before college	1	2	3	4	5	8
Roommates	1	2	3	4	5	8
Professors you are currently taking (or have taken) classes from	1	2	3	4	5	8
Advisors	1	2	3	4	5	8
TAs	1	2	3	4	5	8

Information/Human Source	Never	Rarely	Occasionally	Frequently	Very Frequently	N/A
School teachers who you met before college	1	2	3	4	5	8
Librarians	1	2	3	4	5	8
Writing center instructors	1	2	3	4	5	8
Parents	1	2	3	4	5	8
Siblings	1	2	3	4	5	8
Other (please specify):_____	1	2	3	4	5	8

(4) Which **sources (both information and human sources)** do you usually use first, second, and third for **course selection or program-related issues**? Please fill in 1, 2 and 3 for step 1, step 2 and step 3.

Step	Source
☐	Personal collections (e.g., syllabi, course materials, books you purchased)
☐	Course catalogs from the university websites
☐	Search engines (e.g., Google, Bing, Yahoo)
☐	Online forums or Q&A sites (e.g., RateMyProfessors, Yahoo Answers)
☐	Social networking (e.g., Facebook) or micro-blogging sites (e.g., Twitter)
☐	Peers who take (or have taken) the same course with you
☐	Friends from student organizations/ interest groups or a religious group
☐	Friends who you met before college
☐	Roommates
☐	Professors you are currently taking (or have taken) classes from
☐	Advisors
☐	TAs
☐	School teachers who you met before college
☐	Librarians
☐	Writing center instructors
☐	Parents
☐	Siblings
☐	Other (please specify):_____

(5) **Whom** do you usually consult first, second, and third for **course selection or program-related issues**? Please fill in 1, 2 and 3 for step 1, step 2 and step 3.

Step	Human Source
☐	Peers who take (or have taken) the same course with you

Step	Human Source
☐	Friends from student organizations/ interest groups or a religious group
☐	Friends who you met before college
☐	Roommates
☐	Professors you are currently taking (or have taken) classes from
☐	Advisors
☐	TAs
☐	School teachers who you met before college
☐	Librarians
☐	Writing center instructors
☐	Parents
☐	Siblings
☐	Other (please specify):_____

(6) **For course selection and program-related issues**, to what extent do you agree or disagree with the following statements?

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I am satisfied with the information I got	1	2	3	4	5
I will seek information in a similar way if I have a similar problem in the future	1	2	3	4	5
I have enhanced my ability to find information I need during college	1	2	3	4	5

3. **Moral-support Issues** refer to situations:

When you are confronted with personal problems regarding coursework (e.g., lack of motivation, problematic relation with a colleague or a professor).

(1) How often do you discuss **personal problems regarding coursework** with the following people?

Human Source	Never	Rarely	Occasionally	Frequently	Very Frequently
Peers who take (or have taken) the same course with you	1	2	3	4	5
Friends from student organizations/ interest groups or a religious group	1	2	3	4	5

Human Source	Never	Rarely	Occasionally	Frequently	Very Frequently
Friends who you met before college	1	2	3	4	5
Roommates	1	2	3	4	5
Professors you are currently taking (or have taken) classes from	1	2	3	4	5
Advisors	1	2	3	4	5
TAs	1	2	3	4	5
School teachers who you met before college	1	2	3	4	5
Parents	1	2	3	4	5
Siblings	1	2	3	4	5
Other (please specify):_____	1	2	3	4	5

(2) How often do the following people **direct you to other people** when you are confronted with personal problems regarding coursework?

*For example, **a friend** may suggest you to talk to another friend; a **TA** may refer you to your advisor.*

If you have never used a source, please select "Not Applicable (N/A)."

Human Source	Never	Rarely	Occasionally	Frequently	Very Frequently	N/A
Peers who take (or have taken) the same course with you	1	2	3	4	5	8
Friends from student organizations/ interest groups or a religious group	1	2	3	4	5	8
Friends who you met before college	1	2	3	4	5	8
Roommates	1	2	3	4	5	8
Professors you are currently taking (or have taken) classes from	1	2	3	4	5	8
Advisors	1	2	3	4	5	8
TAs	1	2	3	4	5	8
School teachers who you met before college	1	2	3	4	5	8
Parents	1	2	3	4	5	8
Siblings	1	2	3	4	5	8
Other (please specify):_____	1	2	3	4	5	8

(3) **Whom** do you usually consult first, second, and third for **personal problems regarding coursework**? Please fill in 1, 2 and 3 for step 1, step 2 and step 3.

Step	Human Source
☐	Peers who take (or have taken) the same course with you
☐	Friends from student organizations/ interest groups or a religious group
☐	Friends who you met before college
☐	Roommates
☐	Professors you are currently taking (or have taken) classes from
☐	Advisors
☐	TAs
☐	School teachers who you met before college
☐	Parents
☐	Siblings
☐	Other (please specify):_____

(4) **For personal problems regarding coursework**, to what extent do you agree or disagree with the following statements?

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I am satisfied with the support I got	1	2	3	4	5
I will seek help/support in a similar way if I have a similar problem in the future	1	2	3	4	5
I have enhanced my ability to get help/support during college	1	2	3	4	5

Part B: Socialization Experiences

The following questions are about your socialization experiences **in college** (except for "8. General High School Experiences" and "9. High School and Home Information Environment" questions are referring to your experiences during your **last year in high school**):

1. **Role Modeling**

    To what extent do you agree or disagree with the following statements?

    *Note: **academic information** refers to all coursework-related scenarios in the previous section.*

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I seek academic information based on what *(a) (b) (c)* have done in similar situations					
(a) my parent(s)	1	2	3	4	5
(b) my peers in college	1	2	3	4	5
(c) my professors	1	2	3	4	5
When it comes to seeking academic information, I look to *(a) (b) (c)* as my role models					
(a) my parent(s)	1	2	3	4	5
(b) my peers in college	1	2	3	4	5
(c) my professors	1	2	3	4	5
(a) (b) (c) have a positive influence on me when it comes to seeking academic information					
(a) my parent(s)	1	2	3	4	5
(b) my peers in college	1	2	3	4	5
(c) my professors	1	2	3	4	5

Please fill in the blank if you have other role model(s) for seeking academic information: _____

2. **Parental Direct Teaching**

    How often do your parent(s)/guardian(s)…

	Never	Rarely	Occasionally	Frequently	Very Frequently
Discuss coursework or program-related issues with you	1	2	3	4	5
Talk about the importance of getting a bachelor's degree or attaining higher education	1	2	3	4	5

	Never	Rarely	Occasionally	Frequently	Very Frequently
Talk about the importance of getting good grades					
Teach you how to study smart	1	2	3	4	5
Discuss how to access resources in college with you	1	2	3	4	5

3. Non-classroom Interactions with Faculty

To what extent do you agree or disagree with the following statements?

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Non-classroom interactions with faculty have had a positive influence on my personal growth, values, and attitudes.	1	2	3	4	5
Non-classroom interactions with faculty have had a positive influence on my intellectual growth and interest in ideas.	1	2	3	4	5
Non-classroom interactions with faculty have had a positive influence on my career goals and aspirations.	1	2	3	4	5
Since coming to this institution, I have developed a close, personal relationship with at least one faculty member.	1	2	3	4	5
I am satisfied with the opportunities to meet and interact informally with faculty members.	1	2	3	4	5

4. Cooperative Learning

How often do you have the following experiences?

	Never	Rarely	Occasionally	Frequently	Very Frequently
In my classes, students taught each other in addition to faculty teaching.	1	2	3	4	5
Faculty encouraged me to participate in study groups outside of class.	1	2	3	4	5
I participated in one or more study group(s) outside of class.	1	2	3	4	5

	Never	Rarely	Occasionally	Frequently	Very Frequently
During current school year, I worked with other students on projects outside of class.	1	2	3	4	5

5. Meaningful Discussions with Diverse Peers

How often do you …

	Never	Rarely	Occasionally	Frequently	Very Frequently
Have serious conversations with students from a different race or ethnicity.	1	2	3	4	5
Have serious conversations with students who are very different from you in religious beliefs, political opinions, or personal values.	1	2	3	4	5
Share personal feelings and problems with diverse students.	1	2	3	4	5

6. Forming a New Community of Support

To what extent do you agree or disagree with the following statements?

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I form a community with new people on campus or in class.	1	2	3	4	5
Classmates become student's support network.	1	2	3	4	5
I develop camaraderie among classes.	1	2	3	4	5
I disassociate from old friends because of new goals, interests, or aspirations.	1	2	3	4	5

7. General College Experiences

(1) What orientation programs did you participate in? (Multiple choices)

☐ SOAR (Student Orientation, Advising, and Registration)   ☐ Library workshops   ☐ DoIT STS (software training for students) workshops ☐ None   ☐ Other (please specify): _____

(2) Are you participating/ Did you participate in any first year interest groups (FIGs)?

☐ Yes   ☐ No

(3) Are you taking/ Did you take any Comm A courses (e.g., English 100, 118, Com Arts 100, EPD 155, or Fam Com 100/L Sc Com 100)?

☐ Yes ☐ No

(4) During your **current year in college**, how often did you …

	Never	Rarely	Occasionally	Frequently	Very Frequently
Study with a friend.	1	2	3	4	5
Socialize with friends.	1	2	3	4	5
Talk with faculty outside of class.	1	2	3	4	5
Participate in community service or volunteer activities.	1	2	3	4	5
Participate in extra-curricular activities.	1	2	3	4	5
Use the internet for homework or research.	1	2	3	4	5
Use the library for homework or research.	1	2	3	4	5

8. **General High School Experiences**

(1) What type of high school did you attend?

☐ Public ☐ Private (Catholic) ☐ Other private

(2) Where was your high school located?

☐ City ☐ Suburban ☐ Town ☐ Rural

(3) Did you live with your parents/guardians during high school?

☐ Yes ☐ No ☐ Other (please specify): _____

(4) How large is your high school graduating class? _____

(5) What is your high school GPA? _____

(6) Did you take any AP (Advanced Placement) or university-level courses prior to entering college?

☐ Yes ☐ No

(7) During your **last year in high school**, how often did you …

	Never	Rarely	Occasionally	Frequently	Very Frequently
Study with a friend.	1	2	3	4	5
Socialize with friends.	1	2	3	4	5
Talk with teachers outside of class.	1	2	3	4	5
Participate in community service or volunteer activities.	1	2	3	4	5

	Never	Rarely	Occasionally	Frequently	Very Frequently
Participate in extra-curricular activities.	1	2	3	4	5
Use the internet for homework or research.	1	2	3	4	5
Use the library for homework or research.	1	2	3	4	5

9. **High School and Home Information Environment**

(1) Do you have a computer at home?

☐ Yes, **before** I entered college　　☐ Yes, **after** I entered college

☐ No　　☐ Other (please specify): _____

(2) Do you have Internet access at home?

☐ Yes, **before** I entered college　　☐ Yes, **after** I entered college

☐ No　　☐ Other (please specify): _____

(3) Do you have more than 50 books at home?

☐ Yes, **before** I entered college　　☐ Yes, **after** I entered college

☐ No　　☐ Other (please specify): _____

(4) Did you have computer access in high school?

☐ Yes　　☐ No　　☐ Don't know

(5) Did you have general articles or news database access in high school?

☐ Yes　　☐ No　　☐ Don't know

(6) Did your high school library have automated book circulation system (i.e., Did your high school library use a computer or machine to check out/return books)?

☐ Yes　　☐ No　　☐ Don't know

(7) Was there a public library near your high school or home?

☐ Yes　　☐ No　　☐ Don't know

Part C: Demographics

1. Are you　☐ Female　☐ Male　☐ Other (please specify): _____
2. Are you a ☐ Freshman　☐ Sophomore ☐ Junior ☐ Senior ☐ Other (please specify): _____
3. Which of the following areas best describes your academic major?

☐ Arts and humanities　　☐ Journalism and mass communication

☐ Business　　☐ Law

☐ Education　　☐ Health and medical sciences

☐ Engineering　　☐ Natural and environmental sciences

☐ Social sciences   ☐ Other (please specify): _____

☐ Social work

4. Your current GPA is between: ☐ below 2.0 ☐ 2.0-2.5 ☐ 2.6-3.0 ☐ 3.1-3.5 ☐ over 3.5

5. Are you a full-time student? ☐ Yes ☐ No ☐ Other (please specify): _____

6. Where do you live during the semester? ☐ On-campus residence ☐ Sorority/Fraternity ☐ Off-campus housing ☐ At home with my family ☐ Other (please specify): _____

7. How many hours (per week) do you usually work for your job(s) besides school?

☐ I don't work besides school ☐ 1-5 hours ☐ 6-10 hours ☐ 11-15 hours ☐ 16-20 hours ☐ 21-25 hours ☐ 26-30 hours ☐ Over 30 hours

8. What age group are you in?

☐ 18-20; ☐ 21-25; ☐ 26-30; ☐ 31-35; ☐ 36-40; ☐ Over 40

9. Which of the following categories best describes your ethnicity?

☐ American Indian   ☐ Hispanic or Latino/a

☐ Asian or Pacific Islander   ☐ White, not of Hispanic origin

☐ Black /African American, not of Hispanic origin ☐ International/Multiracial

☐ Other (please specify): _____

10. Are you a citizen of ☐ The United States ☐ Another country

11. What is the occupation of your parent/guardian?

[Dropdown Menu based on the 13 categories in US Census]

12. What is your parents/guardian's highest level of education?

☐ No schooling completed   ☐ 2-year college degree (associates)

☐ Up to 6th grade   ☐ 4-year college degree (bachelor's degree; e.g.,

☐ 7th, 8th, or 9th grade   BA, BS, etc.)

☐ 10th, 11th, 12th grade, no diploma   ☐ Master's degree (e.g., MA, MS, MBA, etc.)

☐ High school diploma or equivalent (e.g.,   ☐ Doctoral degree (e.g., PhD, SJD, MD., etc.)

GED)   ☐ Other (please specify): _____

☐ Some college (attended but did not

graduate)

[If answer is above 4-year college degree, skip Q13.]

13. If anyone in your family has attended college, list their relationships to you and the highest degree (or year in college) they attained. If no one in your family has attended college please write N/A.

For example: uncle: master's degree, brother: bachelor's degree, sister: senior in college.

_____

14. In the previous year, what was the total household income from all sources? (If you are unsure about the amount, what is your best estimate?)

☐ Less than $10,000   ☐ $70,000 – $79,999

☐ $10,000 – $19,999   ☐ $80,000 – $89,999

☐ $20,000 – $29,999   ☐ $90,000 – $99,999

☐ $30,000 – $39,999   ☐ $100,000 – $149,999

☐ $40,000 – $49,999   ☐ More than $150,000

☐ $50,000 – $59,999   ☐ Don't know

☐ $60,000 – $69,999

Please leave your comments for this study here (You may comment on any information sources/people you access/consult, or don't access/consult; and explain why. For example, "I don't talk to my advisor very often because I think he/she is busy, but his/her suggestions are very important and helpful"; "I prefer asking my friends first because I feel more comfortable talking to friends; I usually confirm with professors later though"):

_____

If you want to be entered into our prize drawing for one of the six $50 Amazon gift cards, please leave your email here: _____

If you would like to participate in a follow-up interview, please leave your email here: _____

End of Survey

Thank you for your participation.

Appendix B: Interview Protocol

Part A: Introduction

1. Thank the participant for his/her time and willingness to participate in this study.

2. Introduce the goal of this study, the procedure for the interview session, and how the researcher will maintain the research confidentiality.

3. Emphasize that participation in this study is voluntary, ask for permission to record the interview, and obtain the participant's consent with their signatures on the consent form.

Part B: Background and Socialization Questions

1. Demographics:

(1) Are you ☐ Female ☐ Male ☐ Other (please specify): _____

(2) Which of the following categories best describes your ethnicity?

☐ American Indian ☐ Hispanic or Latino/a ☐ Asian or Pacific Islander

☐ White, not of Hispanic origin ☐ Black /African American, not of Hispanic origin

☐ International/Multiracial ☐ Other (please specify): _____

(3) What type of high school did you attend?

☐ Public ☐ Private (Catholic) ☐ Other private

(4) Are you a ☐ Freshman ☐ Sophomore ☐ Junior ☐ Senior ☐ Other (please specify): _____

(5) What is (are) your academic major(s)? _____

(6) Where do you live during the semester? ☐ On-campus residence ☐ Sorority/Fraternity

☐ Off-campus housing ☐ At home with my family ☐ Other (please specify): _____

(7) How many hours per week do you usually work for your job(s) besides school? _____

(8) When **in high school**, what type(s) of extracurricular activities were you involved in?

☐ None ☐ Sports ☐ Music ☐ Arts ☐ Other clubs/student organizations: _____

(*Note: For homeschoolers, obtain profiles about their sports, music, arts, and social life activities*).

(9) When **in college**, what type(s) of extracurricular activities are you involved in?

☐ None ☐ Sports ☐ Music ☐ Arts ☐ Other clubs/student organizations:_____

(10) How often did your parents attend your school-related activities **in high school**?

☐ Never ☐ Rarely ☐ Occasionally ☐ Frequently ☐ Very Frequently

(11) How often do your parents attend your school-related activities **in college**?

☐ Never ☐ Rarely ☐ Occasionally ☐ Frequently ☐ Very Frequently

(12) What is your parents/guardian's highest level of education? Mother: _____ Father: _____

(13) If you have siblings, do/did any of them go to college? If yes, did they enter college before or after you?

Sibling(s) entered college before you:_____ Sibling(s) entered college after you:

_____

2. **Information environment**:

   (1) Home information environment:

      Do you have access to a computer and the internet at home? When did you start having access to a computer and the internet at home? If the computer is shared among family members, who gets access most of the time? What about you? What do you usually use the computer and internet for?

   (2) High school information environment:

      What computer facilities and equipment did your high school library have? Can you briefly describe your use of computers and the library when you were in high school? What did you usually use them for?

3. **Interactions with family, peers, and professors (influential people and role models)**:

   (1) Do you talk to your family everyday or on a regular basis? In your family, what is a typical conversation like? Which family member gave you the most or the best information about how to succeed in college? What have you learned?

      [Probe: For FGC students: do you also talk to other relatives who went to college?]

   (2) To what extent do you and your friends talk about the academic part of college? What do you talk about? What have you learned from them?

   (3) Have you talked to your high school teachers after you entered college? To what extent do you talk to your high school teachers (when and how often do you talk)? What do you talk about? What have you learned from them?

   (4) Have you talked to your professors in college? To what extent do you talk to your professors in college (when and how often do you talk)? What do you talk about? What have you learned from them?

Part C: Information Horizon Map Drawing

1. Provide the participant with an instruction sheet for drawing his or her IH map (see instructions on the last page of this protocol).

2. Explain the procedure and encourage him/her to talk while he/she draws.

3. Ask the participant to explain the IH map and emphasize that he/she is welcome to modify and explain the details of the map as the conversation goes on or in the next session of the interview.

Part D: Information Use Questions

1. For all coursework-related issues you encountered during the past year (or past semester for freshmen) (e.g., information needs about your program of study, course selection, course contents, assignments, projects, or papers), can you think about when you recently needed information about your major and classes?

   (1) Where did you start looking for information? What did you do next? And why did you take these steps?

      [Probe: If started from non-human sources—How do you feel about talking to people first (or what's your concerns)? If started from human sources—How do you feel about starting with information sources?]

   (2) What sources (including information on the Internet, the libraries and on-campus resources) did you use to find information you needed? Who did you consult and why did you consult them?

[Probe: If this is not a typical situation, can you describe a typical situation when you need academic information?]

(3) Among these resources and people, were there any resources or people that led you to other resources, or referred you to other resources or people? Can you describe the situation?

(4) How did you use the information? Were you satisfied with the outcomes?

(5) Would you do it this way again if you needed similar information in the future? If not, what would you do differently?

2. What was the most difficult or the most challenging thing you encountered during the past year in school? What information sources did you access or use to solve this problem?
[Probe: Questions 1 (1)~(5)]

3. Can you think of any difficulty accessing any of these sources or talking to any of these people? Please describe any resources or people that you once thought about but didn't have a chance to access or use. Explain why you did not access or use them.
[Probe: If the participant didn't mention the library and parents, ask about their concerns—Why not using the library or consult your parents?]

4. Can you share a very satisfying experience (i.e., got exactly what you wanted/needed) when looking for academic information?

5. Can you share a frustrating experience (i.e., did not get information you wanted/needed or tried very hard and got very limited or unhelpful information) when looking for academic information?
[Probe: For underclassmen, ask about their high school experiences; for upperclassmen, ask about their previous experiences as freshmen—Comparing the time when you were in high school/a freshman and as for now, do you feel it's getting easier or more difficult to get information you need? And why?]

6. How do you describe your learning of using the library and internet in college (e.g., if you have taken comm A, Comm B courses, attended workshops, or taught yourself)? Do you see any connections between your learning and where and how you look for information when needed?
[Probe: Comparing the time when you were in high school/a freshman and as for now, do you see yourself using more diverse sources or fewer sources when looking for academic information? And why?]

7. Do you see any connections between where and how you look for information when needed and the influences from parents, peers, and professors?　How do you describe their influences?
[Probe: Remind the ones they didn't mention—How about influences from parents, peers, and professors? Why were they not as influential as _____ (the one being mentioned as the influential one or the role model)?]

8. Do you see any connections between where and how you look for information when needed and your home and/or high school information environment (e.g., internet access, library access)? How do you describe these influences?

Part E: Closing Remarks

1. Ask the participant if there is anything else he/she wants to share on this topic.

2. Give the participant a gift certificate as an incentive for his/her participation in the study.

3. Thank the participant again for his/her participation.

Note. Questions under Question 1 in Part D were based on Sonnenwald et al. (2001).

Appendix C: Instructions for Drawing an Information Horizon Map with Examples

Instructions for Drawing Your Information Horizon Map

Please draw a map describing your information source **preference** for course-related tasks (e.g. doing assignments, final projects or papers, etc.). Please try to include all the information and human sources you consulted for course-related tasks and place the sources you prefer the most in Zone 1, the second-most preferred sources in Zone 2, and the least preferred sources in Zone 3.

Zone 1

Zone 2

Zone 3
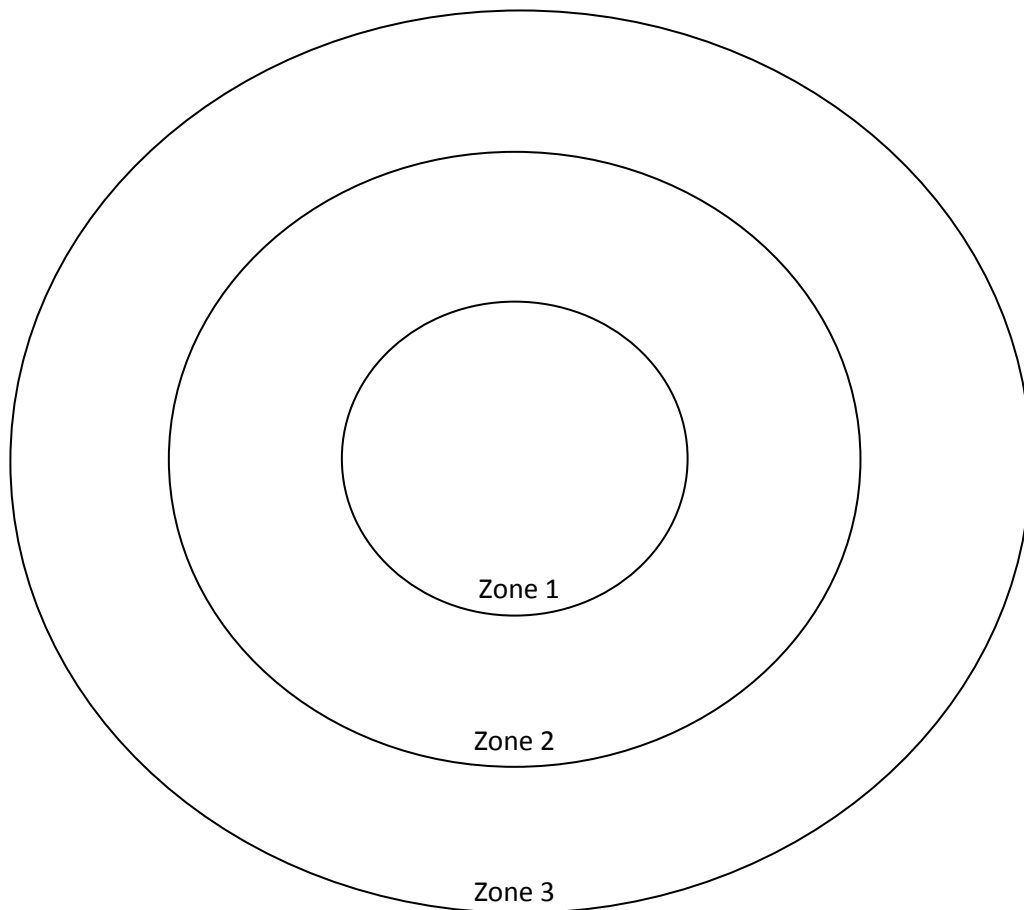
Please explain why you include these sources in different zones by giving examples from your coursework-related experiences (e.g. doing a final project or paper, etc.). How would the arrangement change (1) when you need information about your major or course selection, or (2) when you are confronted with personal problems regarding coursework (e.g., lack of motivation, problematic relation with a colleague or professor)?
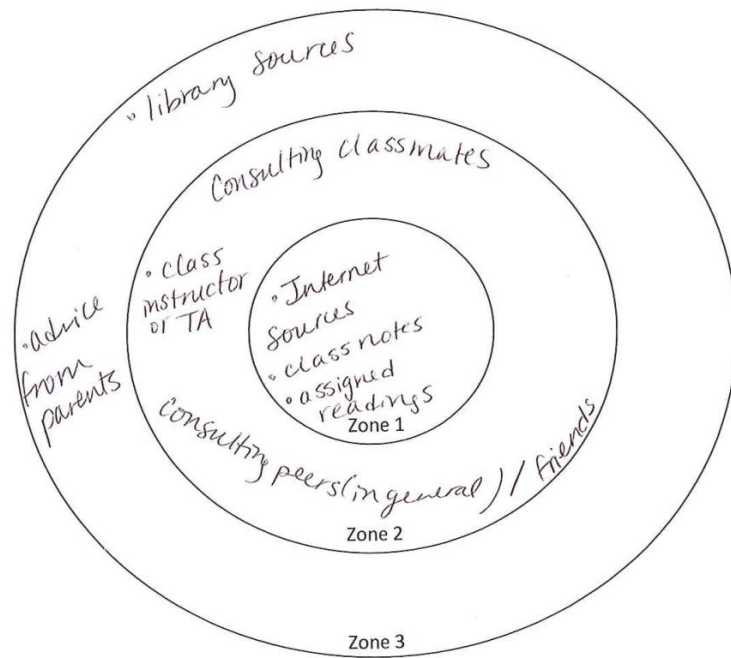
An IH map drawn by a non-FGC Student
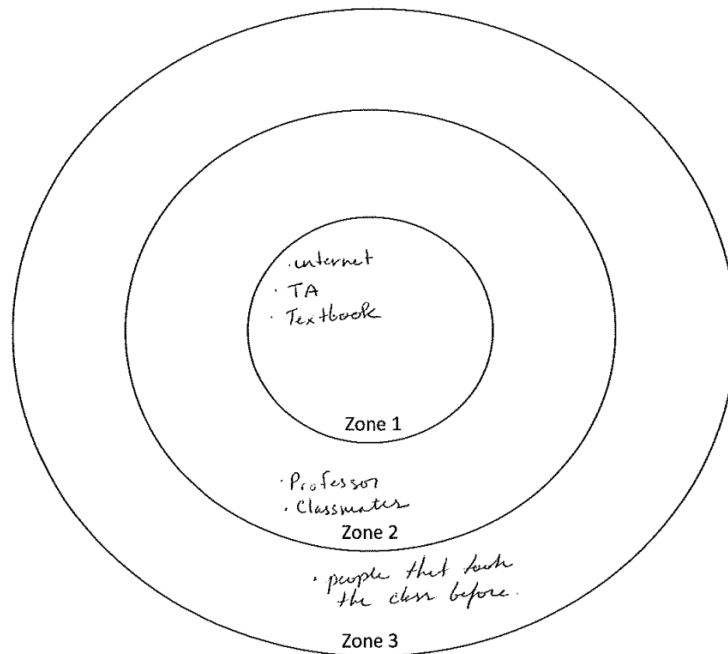
An IH map drawn by an FGC Student

Appendix D: Interview Coding Scheme

The coding scheme was developed based on the interviews conducted with ten first-generation and ten continuing-generation college students. A list of categories and sub-categories were identified from the analysis, including the following themes:

A. Information Environment (E)

  a. Computer access at home
  1. The time started having access
  (1) Before elementary school
  (2) Elementary school
  (3) Middle school
  2. Shared with family members
  (1) Till elementary school
  (2) Till middle school
  (3) Till high school
  3. Priority when sharing with family members
  (1) Parents first
  (2) Schoolwork first
  (3) Elder siblings first
  (4) Negotiate among siblings
  b. Computer access in high school
  1. In-class use
  2. Outside-of-class use
  (1) Leisure
  (2) Academics
  c. Pre-college library use
  d. Pre- college computer and Internet use
  1. Leisure
  2. Academics
  e. College computer and Internet use
  1. Leisure
  2. Academics

B. Socialization (S)

  a. Learning
  1. Learning from socializing agents (family, peers, high school teachers, professors, others)
  2. Learning from courses or workshops (Comm A, Comm B, Workshops)
  3. Learning from trial-and-error
  b. Interactions with socializing agents
  1. Family members
  2. Peers
  3. High school teachers
  4. Professors
  5. Others

C. Information Source Use (U)

  a. Source preferences
  1. Course-related IH: zone 1
  2. Course-related IH: zone 2
  3. Course-related IH: zone 3
  4. Program-related IH: zone 1
  5. Program-related IH: zone 2
  6. Program-related IH: zone 3
  7. Moral-support IH: zone 1
  8. Moral-support IH: zone 2
  9. Moral-support IH: zone 3
  b. Situation
  1. Course-related (typical vs. special situations)

2. Program-related (typical vs. special situations)

3. Moral support (typical vs. special situations)

c. Strategy

   1. Information source first and reasons (course-related, program-related, moral-support)

   2. Human source first and reasons (course-related, program-related, moral-support)

d. Steps

   1. Initial step (course-related, program-related, moral-support)

   2. Process between initial and final steps (course-related, program-related, moral-support)

   3. Final step (course-related, program-related, moral-support)

e. Referral paths

   1. Information source to information source

   2. Information source to human source

   3. Human source to human source

   4. Human source to information source

f. Reasons for using a source

   1. Convenience

   2. Familiarity

3. Quality or expertise

4. Reliability

5. Instructors' expectations

6. Up-to-date

g. Reasons for not using a source

   1. Inconvenience

   2. Unfamiliarity

   3. Not reliable or no expertise

   4. No need

   5. Outdated

   6. Other concerns

h. Experience with source use

   1. Satisfying

   2. Frustrating

i. Most influential agents

   1. Peers

   2. Professors

   3. Depends on situations

j. Influences from information environment

   1. Home

      (1) Computer and internet access

      (2) Books at home

   2. High school

      (1) Computer and internet access

      (2) Library

k. Changes over time

   1. Ease of use

   2. Source diversity