Journal of Library and Information Studies 10:1 (June 2012) p.19-45

Social Networks in the Information Horizons of Undergraduate Students

Tien-I Tsai[1]

Abstract

The information horizon is a mental map where users position their information sources in different contexts and situations, and the social network is one of the critical concepts in information horizons. Previous research on undergraduate and graduate students' information horizons has revealed that various human sources are used in academic or career-related contexts (Sonnenwald, Wildemuth. & Harmon, 2001; Tsai, 2010). While most literature shows that stronger tie sources are more likely to be used as a preferred or primary information source (Steffes & Burgee, 2009), Granovetter (1973) emphasizes the importance of "the strength of weak ties" in information diffusion. This study aims to examine undergraduates' social networks in their coursework-related information horizons as well as to investigate how strong and weak ties are positioned in their information horizons. A pretest of a web survey with 18 responses and 3 brief follow-up interviews were conducted with an undergraduate class at a large state university. After the pretest, fifteen undergraduate students were recruited to participate in the study. Results showed that undergraduate students tend to rely more on their colleagues and teaching assistants than on professors when they have questions on coursework-related issues. While stronger ties may be more frequently consulted for moral support, the tie strength does not necessarily determine the frequency of consultation about other coursework-related issues.

Keywords: Information Horizons; Information Use; Social Networks; Information Sources

1. Introduction

Information horizon is a theoretical framework proposed by Diane Sonnenwald. It has been used to describe people's information-seeking activities. An *information horizon map* refers to a mental map where users position their information sources according to their perceived preference in various contexts. For instance, a user may include university and/or public libraries, online forums, Google, friends, and family on their information horizon map during job hunting. The user may place the above information sources at varying distances from the center depending on context. Among the main concepts in the theoretical framework of information horizons, the social network is one of the critical elements (Sonnenwald, 1999). Previous research also demonstrates the

[1] School of Library and Information Studies, University of Wisconsin-Madison, USA
Email: ttsai5@wisc.edu

臺灣大學學術期刊資料庫

importance of social ties and word-of-mouth (WOM) communication in people's decision-making and information-seeking processes (Brown & Reingen, 1987; Steffes & Burgee, 2009). Thus, social ties are essential elements in an individual's social network, especially as information sources in an information-seeking process.

However, we can only learn about the importance of social networks and social ties in students' information horizons from a very few studies. Sonnenwald et al. (2001) have identified five human sources (i.e., faculty, friends, experts, family, and employers) on undergraduate students' information horizon maps, and all these human sources were often mentioned by most students. A study on graduate students' information horizons has shown that graduate students tend to emphasize the importance of their academic advisors in research contexts, while specific positions of information sources on the information horizon maps vary across disciplines (Tsai, 2010). For example, students from the hard sciences placed colleagues in a more central position than students from the social sciences and humanities.

The significance of investigating the roles of social ties in an individual's social network can be found through previous literature. A social tie may vary in strength, and the tie strength is "the level of intensity of a social relationship between two people" (Steffes & Burgee, 2009, p. 49). Granovetter (1973) emphasized the importance of the strength of weak ties in information diffusion. Steffes and Burgee's (2009) survey with undergraduate students on social ties and electronic word of mouth (eWOM) did not find evidence to support their hypothesis that the stronger tie sources are more likely to be used as a preferred or primary information source. These studies draw attention to the strong and weak ties, as information sources, in the information-seeking activities. The purpose of this study is to examine the social networks in undergraduate students' coursework-related information horizons. Specifically, the research questions for this study include: (1) How do undergraduate students perceive their strong and weak ties among the human sources (e.g., colleagues, friends, or family members) in their social network? And why are these human sources perceived as strong or weak ties? (2) How do students place the above human sources in their information horizons? And how are the strong and weak ties placed differently for different issues? (3) Who recommends students to other resources or people, and how does the referral information flow from one human source to the other?

臺灣博碩士學術期刊資料庫

2. Literature Review

In order to answer the research questions, two theoretical frameworks - information horizons and social network theory - and their applications are used to form the constructs of the questionnaire and to develop the interview guide (Appendix).

2.1 Information horizons

Information horizon - a perceived information environment where people position information sources according to their significance (Savolainen & Kari, 2004) - is an evolving theoretical framework proposed by Diane Sonnenwald in 1999. This theoretical basis "evolves a framework of information exploration, seeking, filtering, use, and dissemination" (Sonnenwald, 1999, p. 176). Savolainen and Kari (2004) further define information horizon as "an imaginary field which opens before the 'mind's eyes' of the onlooker, for example, information seeker" (p. 418).

Contexts, *situations*, and *social networks* are the three main concepts in the theoretical framework of information horizons (Sonnenwald, 1999, 2005). This framework adopts the definition of social networks from communication and social sciences and defines the social network as the "communication among individuals, in particular, patterns of connection and resonance interaction" (Sonnenwald, 1999, p. 180). Specifically, social networks help identify and explore people's information needs (Sonnenwald, 2005), and thus are important in the information-seeking process.

The theoretical framework of information horizons contains five propositions to describe the three fundamental concepts:

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 a variety of information resources, many of which have some knowledge of each other, information horizons may be conceptualized as densely populated spaces. (Sonnenwald, 1999, pp. 181-188)

Although this framework does not indicate how to design effective strategies for enhancing information seeking, it conceptualizes the three fundamental concepts (i.e., contexts, situations, and social networks) to describe information behavior and "incorporates cognitive, social, and system perspectives" (Sonnenwald, 1999,

臺灣大學圖書館 期刊資料庫

p. 188). These propositions also imply that social networks in the information horizons can construct and be constructed by situations and contexts.

Diane Sonnenwald provides a basic guideline for the research design of information horizons (Sonnenwald et al., 2001; Sonnenwald, 2005). To learn how users position their information resources, semi-structured interviews with a critical incident technique and a map-drawing technique are often used. The information horizon map, which shows all information resources, provides graphical articulation of the information horizon in a particular context, while the interview provides verbal articulation of the information horizon. These methods cannot only help identify information resources used, but also explain the role of these resources in users' information-seeking processes. In addition to interviews and map-drawing, Sonnenwald and her colleagues (Sonnenwald et al., 2001) also used a survey as a way of triangulating data for the information horizons research. Savolainen and Kari (2004) conducted interviews and used concentric circles to display humans' information horizons. Huvila (2009) proposed an analytical information horizon map (AIHM) that could be drawn by the researcher based on the information derived from the information horizon interviews. Overall, all these methods, with slight variations, show the refinement and evolution of information horizon research and the efforts made to strengthen the validity of the research design.

However, not much research has been done in applying this theoretical framework. Most of the few extant studies have been about information sources used for everyday life information behavior (Kari & Savolainen, 2003; Savolainen & Kari, 2004; Savolainen, 2007), and little is known about the information horizons of college students. Sonnenwald et al. (2001) conducted a study on the information horizons of 11 undergraduate students with lower socio-economic status and suggested that the university library is not a preferred information source and is not well integrated with other sources in their information horizons. The researchers identified 13 information sources that were used by the undergraduate students. However, their study only focuses on undergraduates with lower socio-economic status. It would be valuable to further investigate the information horizons of undergraduate students in general, as well as how students' information horizons shape or are shaped by specific contexts and situations. Tsai (2010) conducted a study on information horizons with nine Taiwanese graduate students and identified various information sources used by the students in research contexts. Chen and

臺灣大學圖書館 期刊資料庫

Huang (2011) investigated the coursework-related information horizons of graduate students in Kakka Studies and identified professors, peers, family members and experts as human sources. However, undergraduate students and graduate students may have different social networks for their course-related activities because of the different requirements and program objectives. Therefore, it would be worthwhile to investigate the information horizons of undergraduate students.

2.2 Social network theory

Social network theory is based on the general assumption that "social relations are the key to explain both individual action and collective interactions" (Schmidt, 2006; Wasserman & Faust, 1994). Knoke and Yang (2008) specify three underlying assumptions for social network theory. First, structural relations are more critical for understanding behaviors than other attributes such as age, gender, values, and ideology. Second, social networks affect perceptions, beliefs, and actions through a variety of structural mechanisms. Third, structural relations are dynamic processes. Felmlee (2003) also proposes three principles for a social network perspective. First, a social network perspective emphasizes relations, or ties, among actors. Second, individual behavior is dependent on others' behavior within a social network. Third, individual behavior is influenced by the network environment. These assumptions and principles show the important role of the relations or ties in a social network and imply the dynamic nature of individual behavior influenced by social ties and network environment.

Two important concepts in social network theory are *actors* and *relations* (or ties/linkages). Actors may be individual persons or groups of people. Sometimes network actors encompass mixed types, such as an organizational field comprising suppliers, producers, and customers (Knoke & Yang, 2008). A social tie is generally defined as a specific kind of contact or connection between a pair of actors. According to the number of actors and ties, relational ties can be categorized into different levels such as ego, dyad, or triad (Knoke & Yang, 2008; Wasserman & Faust, 1994). An egocentric network consists of one actor (ego) and all other actors with direct relations to the actor. Egocentric network research designs are appropriate for surveys of respondents who are unlikely to have any contact with one another (Knoke & Yang, 2008). A dyadic network includes ties between two actors, while a triadic network includes triples of actors and associated ties. There are also other types of networks that are more or less bounded, but this study focuses on social ties in egocentric networks.

臺灣大學圖書館 期刊資料庫

Ties can vary in strength and be assessed as either strong or weak by the relationships in a network (Schultz-Jones, 2009). According to Granvovetter (1973), "the strength of a tie is a combination of the amount of time, the emotional intensity, the intimacy (mutual confiding), and the reciprocal services which characterize the tie" (p. 1361). In his research, he assumes the tie to be positive and symmetric and suggests that weak ties may also be important for diffusion of influence information for an individual. An operational definition of a strong tie in a network is a tie with many links in common between actors, while a weak tie is one with few links (Felmlee, 2003). Social ties can be used to discuss the diffusion of information (Schmidt, 2006), and these ties are "channels for transfer or 'flow' of resources" between actors (Wasserman & Faust, 1994, p. 4).

Many studies apply social network theory or social network analysis in sociology, social psychology, and communication. In information science, social network theory has been used in scholarly communication, information behavior and knowledge management research. More studies in information behavior have begun to utilize this theory and approach, but the application has been focused more on theoretical concepts and specific methodology. And fewer studies have applied the social network theory in information-seeking research (Schultz-Jones, 2009). In general, applications of social network theory tend to view the social network as an independent variable, rather than as a set of dependent variables (Felmlee, 2003). However, in the field of information science, social network seems to be used as both independent and dependent variables since information behavior can be considered as a dynamic and recurring process rather than a linear one. Researchers focus either on how social networks influence users' behavior or on how other demographic/situational factors affect the social networks and the selection of human sources. In knowledge management, researchers study social networks to learn the flow of knowledge transfer and its impact on organizations. Some researchers evaluate factors that influence knowledge sharing in a collaborative environment (Herschel & Yermish, 2008; Sabetzadeh & Tsui, 2011). Others evaluate the impact of social networking on organizations and provide suggestions on utilizing social networking and network governance tools in an organization (Grasenick, Wagner, & Zumbusch, 2008; van Zyl, 2008).

Traditionally, several methods are used to approach social network theory. Wasserman and Faust (1994) introduced different research methods to investigate social networks: interviews, observation, archival records, and other methods such as a

臺灣大學學術期刊資料庫

cognitive social structure questionnaire asking about respondents' own ties, group problem-solving experiments, ego-centered/local network method asking about the ties among the people, and longitudinal data collection. In general, social network studies usually employ survey methodology, especially questionnaires (Schultz-Jones, 2009). In information science, information behavior studies employ various methods to incorporate social networks and capture relational data in several ways:

First, using a series of concentric circles as an instrument to show an individual's social network on a social network map; second, using surveys and interviews to identify information exchange connections; third, using agent-based technology to capture email and document flow across servers; and finally, using metrics to show the networks of journals, authors, citations, co-citations, websites, and online community positions. (Schultz-Jones, 2009, p. 595)

Although most social network studies are quantitative, social network theory can also be applied to ethnographic research in several ways. For example, Pettigrew (2000) investigated the flow of elderly people's human information services (HIS) with nurses at several local clinics. Based on Granovetter's theory of the strength of weak ties, she hypothesizes that the nurse is a weak tie who provides the senior with HIS, and the elderly would not act on this HIS until first confirming the provided information with strong ties, such as close family members. However, the results reject the hypothesis and reveal that the nurse is in a special position with characteristics of both strong and weak ties. While Granovetter (1973) provides operational measurements for the strength of ties by counting the number of ties observed in the network, Pettigrew (2000) did not quantify the tie strength and discussed the tie strength in a qualitative way. This shows researchers use various ways to approach and discuss the tie strength in people's social networks.

The operational definitions for the strong and weak ties do not fit into a system without a closed boundary. Hence, the current study views each human source as an actor in the social network and each link between the student (the ego) and the human source as a social tie. Through asking the students about the frequency of interaction and the perceived strength of relationships with different people, one can form an index to measure the tie strength in students' social networks. This study employed both qualitative and quantitative approaches to explore the information horizons of undergraduate students in coursework-related contexts.

Overall, the information horizon is a theoretical framework that views information

臺灣大學圖書館 期刊資料庫

behavior as a whole, and integrates information need, information seeking, and information use. Although this framework was proposed more than a decade ago, not much research has been done applying this theory. The theoretical framework is slowly developing with some recent studies, and this study tries to further develop the theoretical framework.

The social network is an essential component in information horizons, and it is important to incorporate social network theory into this study. Social network theory is widely applied in various fields and has become more popular in information behavior research. However, not much literature addresses the connection between social network theory and information horizons. This study aims to incorporate both theories and focus the discussion on social networks in undergraduate students' information horizons.

3. Methodology

In order to examine undergraduate students' social networks in their coursework-related information horizons as well as to increase the validity of the research, this study employed a mixed method research design using a survey and interviews. A web survey was used to determine the strong and weak ties in students' social networks as well as how strong and weak ties were placed in students' coursework-related information horizons, and to collect data about the frequency of consulting different people in different situations. Semi-structured interviews were used to collect qualitative data. Interviews helped clarify students' perceptions of social ties and also provided examples of specific situations and explanations about why they consulted certain people in certain situations. Furthermore, data from the interviews provided referral interpersonal sources from various human sources as well as human sources that provided this referral information.

3.1 Study sample

This research recruited undergraduate students as the study sample at the University of Wisconsin-Madison. Since undergraduate students need to take classes and write papers, they often encounter coursework-related problems in their daily lives and need to consult others in order to seek information and solve the problems. By focusing on undergraduate students, this study aims to illuminate students' social networks in their information horizons and further understand what might be helpful for assisting students on their coursework.

In Spring 2010, a pilot study was conducted to test and revise the research instrument for this current study. After finalizing the research instruments, 15 undergraduate students were

臺灣大學學術期刊資料庫

recruited in Fall 2010 by posting flyers on bulletin boards in campus residence halls and libraries. Based on the exploratory nature of information horizon research by Sonnenwald and Savolainen, etc., this study is to further explore information horizons with a social network perspective and learn undergraduate students' social ties in coursework-related contexts. A small sample of participants was recruited based on their majors and year in college. The researcher stopped recruiting participants when each of the above categories reached three to five people. Six female and nine male undergraduate students were recruited from various disciplines - three from humanities, five from social sciences, six from sciences, and one undecided. The 15 participants consisted of freshmen (*n*=3), sophomores (*n*=5), juniors (*n*=3), and seniors (*n*=4). Each participant completed a web survey and a face-to-face individual interview.

3.2 Data collection

The questionnaire used in this study was developed with care to increase its validity. First, based on a previous information horizon empirical study with nine graduate students (Tsai, 2010), this questionnaire included 20 human sources in the social networks. Second, the concepts of this questionnaire were based on the above literature review and the assumptions of its theoretical frameworks. Finally, this study adopted the format of certain questions from other social network questionnaires (CPRE, 2007; De Lange, Agneessens, & Waege, 2004).

The online questionnaire consisted of four sections: (1) consultation on coursework activities; (2) people consulted for coursework-related issues; (3) perception on the people consulted; and (4) demographics. Key concepts included in the questionnaire are social ties, social networks, and demographics. The social ties in this study include strong ties and weak ties. The social networks in coursework-related information horizons were measured by the frequency that the students consulted specific human sources. Other concepts that can be used to explain the social networks include helpfulness, friendship, profoundness, and formal relations. Specifically, the social ties were measured by user ratings of the perceived profoundness of the relationship. The human sources with positive scores were determined as strong ties, and those with negative or neutral scores were determined as weak ties. The social networks in coursework-related information horizons were measured by the frequency of consultation with specific human sources. All in all, the concepts were examined to ultimately address what the social ties and the social networks on students' information horizon maps were.

The interview guide included questions

臺灣大學學術期刊資料庫

about social ties, consultation on specific coursework-related issues, and recommended sources from the consulted human sources (see Appendix). During the semi-structured interviews, a critical incident technique was employed to help students recall their information needs and information source selection experiences. Participants were asked to recall the experiences of their coursework-related activities in the past year. As Knoke and Yang (2008) pointed out, event-based strategy may help define boundaries of the networks. Therefore, this event-based strategy was used by focusing on coursework-related issues. Every interview was audio recorded and transcribed for later analysis. Pseudonyms were assigned to each participant in order to maintain confidentiality.

3.3 Data analysis

This study viewed each human source as an actor in the social network and each link between the student and the specific human source as a social tie. A variant analytical information horizon map (AIHM) by Huvila (2009) was used for analyzing data. The information horizon maps were presented in concentric circles like those Savolainen and Kari (2004) used for presenting their results in the information horizon study. The researcher drew the information horizon maps based on the information collected from the questionnaires. The more frequently the human source was consulted by the student, the more central this human source would be placed on the information horizon map. NVivo 8 was used as an analysis tool. Data collected from the interviews were analyzed in descriptive, topic, and analytical levels according to Richards (2005).

4. Findings

4.1 Social ties and perceptions of people consulted

Table 1 shows the average scores of undergraduate students' self-reported perceptions of people they consulted. The scores ranged from -3 (i.e., not helpful, unfriendly, superficial, or informal) to 3 (i.e., helpful, friendly, profound, or formal). Figure 1 displays the strength of social ties on a spectrum. This is a representation of strong and weak ties perceived by participants. In general, these participants rated family members, friends, and roommates as stronger ties, and department staffs and strangers from online forums as weaker ties.

Except for strangers from online forums, almost all the other interpersonal sources were viewed as more or less helpful and friendly with positive scores (see Table 1). Advisors, family members, and colleagues were especially helpful with average scores greater than one. Family members, roommates, friends,

臺灣大學圖書館 期刊資料庫

colleagues, advisors, and librarians were particularly friendly with average scores greater than one. In contrast, professors, department staffs, and advisors were rated as formal. That is, all strong ties, family members, friends, roommates, and advisors, were considered friendly but not always helpful or informal. For instance, friends were perceived as rather unhelpful, and advisors were viewed as formal.

Some details can be found in Table 2. Colleagues who are taking the same course with the student were rated as more helpful and friendly than other colleagues. Friends at the same university were more helpful and informal

Table 1. Undergraduate Students' Perceptions of People They Consulted (*n*=15)

Human Source	**Formality**	**Friendliness**	**Helpfulness**	**Profoundness**
Family members	-2.27	2.73	1.33	2.53
Friends	-2.08	2.33	-0.10	1.88
Roommates	-2.50	2.43	0.80	1.86
Advisors	1.13	1.33	1.43	0.07
Colleagues	-1.43	1.68	1.03	-0.01
Professors	1.89	0.93	0.30	-0.26
Librarians	1.00	1.08	0.10	-0.90
Department staffs	1.69	0.80	0.15	-1.00
Strangers from online forums	-2.25	-0.14	-0.22	-2.00

Note. The average self-reported scores ranged from -3 (not helpful, unfriendly, superficial, or informal) to 3 (helpful, friendly, profound, or formal). The above human sources are sorted by tie strength (see Figure 1).

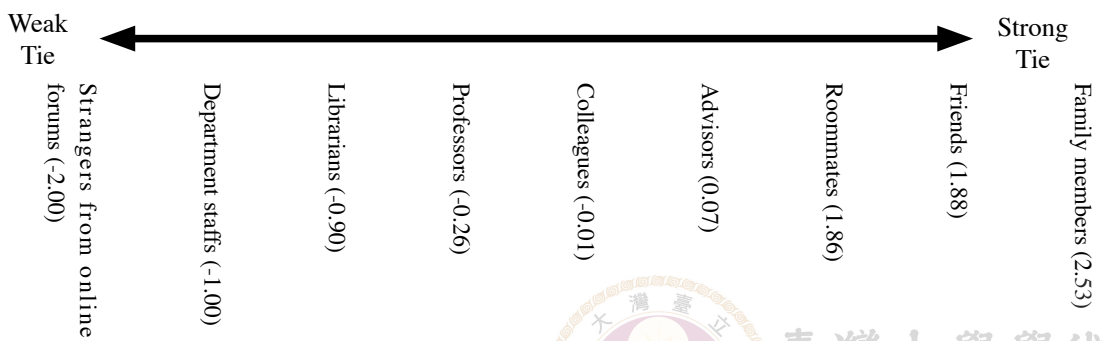


Figure 1. Human Sources with Different Strength of Social Ties

Note. Numbers in the parentheses are the average scores of profoundness for each human source.

臺灣大學學術期刊資料庫

than other friends, while friends from religious communities were rated friendlier than other friends. Professors from whom students are currently taking classes were more helpful, friendly, and formal, while professors from whom students previously took classes were less helpful, friendly, and formal.

It is interesting to note that while results from the interviews are similar to the above discussion of results from the survey, participants

Table 2. Undergraduate Students' Perceptions of People They Consulted (Detailed) (*n*=15)

Human Source	**Formality**	**Friendliness**	**Helpfulness**	**Profoundness**
Family members or relatives	-2.27	2.73	1.33	2.53
Friends from church	-1.29	2.50	-1.17	1.50
Other friends at UW	-2.50	2.43	0.87	2.07
Friends at other institutions	-2.46	2.07	0.00	2.07
Roommates	-2.50	2.43	0.80	1.86
Advisor	1.13	1.33	1.43	0.07
Colleagues who take the same course with you	-1.73	1.87	1.86	0.27
Colleagues who have taken the same course with you (not currently)	-2.00	1.93	1.27	0.14
Colleagues who are in the same department with you	-1.43	1.86	1.14	-0.29
Colleagues who are in the same class year with you	-1.80	1.80	0.79	0.20
Colleagues who are in a senior class year	-0.71	1.43	0.42	-0.36
Colleagues in your lab or research team	-0.92	1.21	0.71	0.00
Professors you are currently taking classes from	2.36	1.27	1.60	0.00
Professors you have taken classes from (not currently)	2.07	1.07	0.77	0.00
Other professors at UW	1.62	0.73	-0.17	-0.18
Professors at other institutions	1.50	0.67	-1.00	-0.86
Librarians	1.00	1.08	0.10	-0.90
Department staffs	1.69	0.80	0.15	-1.00
Strangers from online forums	-2.25	-0.14	-0.22	-2.00
Others	2.00	2.00	0.75	1.00

Note. The average self-reported scores ranged from -3 (not helpful, unfriendly, superficial, or informal) to 3 (helpful, friendly, profound, or formal). The above human sources are sorted by tie strength (see Figure 1).

臺灣大學學術期刊資料庫

mentioned that family, friends, and roommates are the closest during the interviews. Although most students considered their advisors helpful, no one mentioned their advisors when describing people with closer relationships in their social networks. I5 and I9 represented the typical perception of stronger and weaker ties in students' social networks:

I5: I'll first consider my family the closest, and then the next would be my roommates. And then further out I have some friends who I like to see and hang out with, and then way beyond that are people who I work with, people who I see in classes, and there will also be professors.

I9: Friends and family would be the most close, and then probably like professors and TAs are the least close. I mean professors are even more distant than TAs because professors don't really know everybody.

From participants' statements in the interviews, we can see the use of "friends" can be very general. Friends can be either very close or less close to the students. Specifically, several students emphasized the significance of their boyfriend or girlfriend and indicated that they share almost everything with such friends.

I2: The closest to me is my boyfriend because I'm not afraid to show that like to be embarrassed or something ... He obviously knows what classes I'm taking and if I have struggled before. He can maybe provide some advice just as knowing me for sure what I'm talking about.

Among the weak ties, even if most students think professors and teaching assistants (TAs) are both friendly and willing to help, TAs are considered closer to the students than professors because TAs know the student and are more approachable. The following are typical descriptions and impressions of professors and TAs:

I9: I feel that the TAs are more direct to you because they actually know who you are, more likely, because there's a smaller group whereas the professor has a lot of kids to deal with.

I3: It's hard to be close to a professor. You know, there is not like they are not friendly, but they are busy, so the TAs obviously care a little bit more ... but still, they are little more distance, they have coursework to do and they have their own work to do. But the professor, he didn't really like to be a part of the students. He answers questions but he wouldn't get deep personal issues.

I11: I think professors are more like too smart for their own good, so that's why they think something is easy. I think a TA is better understanding those problems.

Additionally, people with multiple

臺灣大學學術期刊資料庫

connections with the students are the ones students more frequently consult. In this situation, a strong tie may become even stronger, and a weak tie may become a strong tie in a student's perspective.

I3: Since mostly I took math and science courses, a lot of the kids in my dorm are actually in the same classes with me. A lot of them are taking the same courses in high school, too ... so I usually talk to them.

I12: I often go to the office hours, and I actually become a friend with one of my TAs.

Therefore, social ties may be more complex than they seem to be (i.e., social ties can be divided into strong and weak ties). It may be difficult to measure tie strength because of dynamic interpersonal connections and individuals' perceptions. And this could be why the results from the web survey are slightly different from the results found in the interviews.

4.2 Social ties and consultation on specific issues

The frequency of undergraduate student consultation varies across different coursework-related issues. Based on the findings presented in Table 2, three information horizon maps (see Figure 2 -Figurer 4) on different issues are drawn to illustrate student consultation on program-related issues (e.g., curriculum or program requirements), course-related issues (e.g., course materials or assignments), and moral support (e.g., lack of motivations or problematic relations with other students, professors, etc.).

As Figures 2 to 4 show, the strong ties (e.g., family members, friends, roommates, advisors) were consulted in various situations, but were not necessarily the most frequently consulted sources across different situations. Actually, the top three strong ties were consulted mainly for moral support (see Figure 4). Most students turned to family members, roommates, and friends, but rarely colleagues and advisors, for moral support. Other than moral support, some strong ties were consulted for program-related issues. Students consulted their advisors most frequently on questions about the program and received referrals. However, most strong ties were not often consulted for course-related issues. Most students only sometimes or rarely consulted roommates on questions about courses, research (e.g., project, thesis, or final paper), or resources (e.g., bibliography, books, or articles) (see Table 3). They didn't usually consult friends for these issues either. Friends at the same institution tended to be consulted more than friends at other institutions, while friends from religious communities were the least consulted among friends for all the issues (see Table 4).

臺灣博碩士學術期刊資料庫

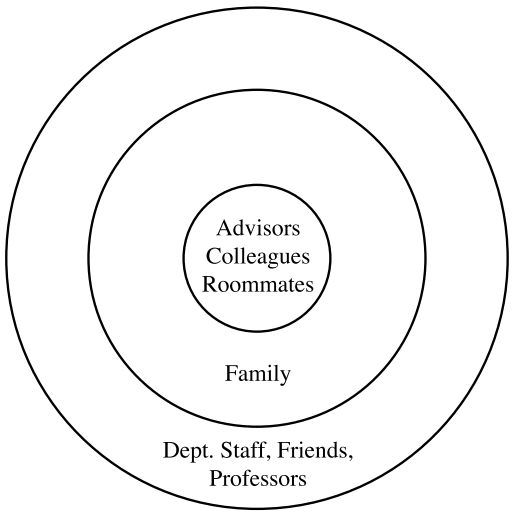


Figure 2. Information Horizons of Undergraduate Students: Consultation on Program

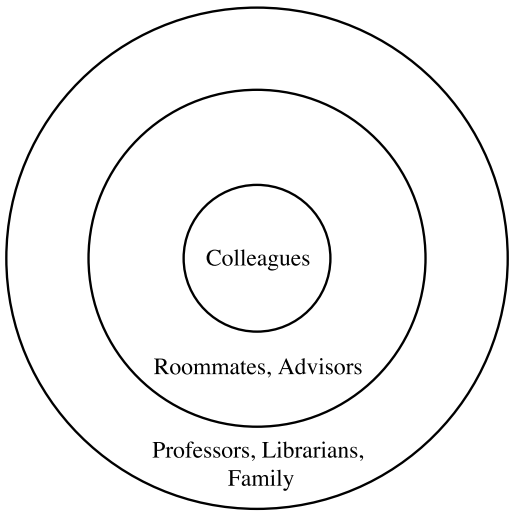


Figure 3. Information Horizons of Undergraduate Students: Consultation on Courses

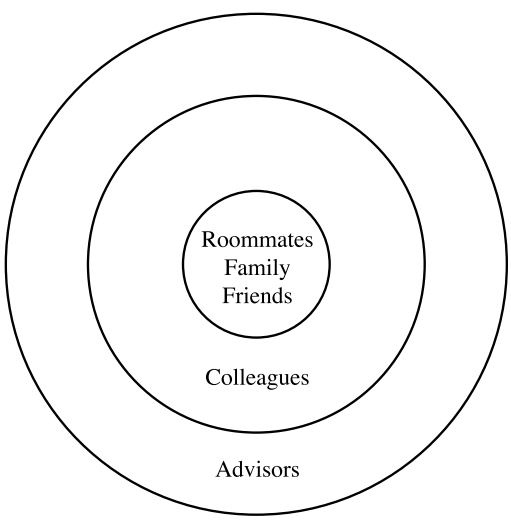


Figure 4. Information Horizons of Undergraduate Students: Consultation on Moral Support

Note. The human sources consulted by participants are positioned in three areas (central, middle, and peripheral) on the information horizon maps according to the average of the frequencies (f) in Table 2: Central Area: $f < 2.5$ Middle Area: $2.5 < f < 3.0$ Peripheral Area: $3.0 < f < 3.5$

臺灣大學圖書館 期刊資料庫

In contrast, among the weak ties, colleagues were the most frequently consulted human source on course-, research-, and resource-related issues. Most students sometimes consulted colleagues on program-related issues and got referrals from them (see Table 3). Colleagues who were taking the same course with the student were the most often consulted human source for all the above issues, including program, course, research, resource questions, referral information, and moral support. Colleagues in the senior class level were the least consulted human source among all the colleagues (see Table 4). In a similar vein, while professors from whom students were currently taking classes were consulted more often than any other professors (see Table 4), they were in general rarely consulted on course-related issues (see Table 3). Interestingly, although not many students consulted librarians on research or resource questions, librarians tended to be consulted more often than professors (see Table 4).

Results from the interviews are again similar to the survey results discussed above but provide more details about when students consult different people. Besides consulting colleagues, all participants primarily consulted their advisor about course planning, and some participants also consulted TAs for program-related issues.

I15: Usually for planning I'd go to my advisor because they'll have more resources, and they can tell me the variety of classes. They'll be able to give me a list of interesting classes.

Table 3. Frequency of Consultation on Specific Coursework-Related Issues (*n*=15)

Human Source	Course	Moral Support	Program	Referral	Research	Resources
Family members	3.07	1.53	2.87	3.47	3.20	3.27
Friends	3.37	2.31	3.09	3.40	3.47	3.38
Roommates	2.60	1.73	2.27	2.67	2.80	2.60
Advisors	2.80	3.00	1.80	2.14	3.40	3.13
Colleagues	2.27	2.75	2.19	2.58	2.36	2.45
Professors	3.12	3.58	3.20	2.98	3.07	3.02
Librarians	3.60	3.87	3.60	3.20	3.00	2.80
Department staffs	3.33	3.60	3.07	3.13	3.13	3.13
Strangers from online forums	3.67	3.80	3.73	3.80	3.73	3.67

Note 1. The scores indicate the average of frequency; 1=Very Often, 2=Sometimes, 3=Rarely, 4=Never.

Note 2. The above human sources are sorted by tie strength (see Figure 1).

臺灣大學圖書館 期刊資料庫

Table 4. Frequency of Consultation on Specific Coursework-Related Issues (Detailed) (*n*=15)

Human Source	Course	Moral Support	Program	Referral	Research	Resources
Family members or relatives	3.07	1.53	2.87	3.47	3.20	3.27
Friends from church	3.73	3.33	3.67	3.87	3.87	3.93
Other friends at UW	2.00	1.53	2.40	2.80	2.87	2.87
Friends at other institutions	3.57	2.07	3.20	3.53	3.67	3.33
Roommates	2.60	1.73	2.27	2.67	2.80	2.60
Advisor	2.80	3.00	1.80	2.14	3.40	3.13
Colleagues who take the same course with you	1.47	2.27	1.67	2.20	1.67	1.80
Colleagues who have taken the same course with you (not currently)	2.13	2.53	2.20	2.20	2.33	2.20
Colleagues who are in the same department with you	2.20	2.73	2.00	2.73	2.27	2.33
Colleagues who are in the same class year with you	2.33	2.80	2.00	2.79	2.53	2.80
Colleagues who are in a senior class year	2.87	3.47	2.67	2.87	3.07	3.27
Colleagues in your lab or research team	2.60	2.67	2.60	2.67	2.27	2.27
Professors you are currently taking classes from	1.93	3.20	2.33	1.86	1.67	1.60
Professors you have taken classes from (not currently)	3.07	3.53	3.13	2.93	3.13	3.13
Other professors at UW	3.67	3.73	3.60	3.50	3.67	3.60
Professors at other institutions	3.80	3.87	3.73	3.64	3.80	3.73
Librarians	3.60	3.87	3.60	3.20	3.00	2.80
Department staffs	3.33	3.60	3.07	3.13	3.13	3.13
Strangers from online forums	3.67	3.80	3.73	3.80	3.73	3.67
Others	3.50	4.00	3.00	3.67	3.25	2.89

Note. The scores indicate the average of frequency; 1=Very Often, 2=Sometimes, 3=Rarely, 4=Never.

I2: I definitely talked to a few TAs as far as getting help and choosing classes where my major can take me after college.

For course-related issues, students usually consulted other students in the class for course material questions before talking to the TA or

臺灣大學學術期刊資料庫

professor. Almost all students stated that they consulted TAs before professors. If there was no TA in the class, they would then consult the professor. However, most of the undergraduate classes for the participants seem to have TAs in class. Almost all students pointed out that TAs are more approachable than professors because professors are usually busy and do not know every student in the class. A few students further admitted that they never talk to professors.

I5: I tried to read the notes, I talked to friends, and the TA couldn't explain it, I wanted more in-depth answers to the question and I went to the professor. ... if I thought the professor was not worth asking ... I would only ask the TA.

Some students explained that it is easier and more convenient to ask another student in the class, especially when the student are doing the assignments late at night. Many students also mentioned their experiences of using email or Facebook to ask other students questions.

I7: I remember particularly I asked one student in my calculus class last year, and often we tried to do the homework late at night, and if we had a question, we asked the other person. He texted me or emailed me. We were on Facebook sometimes.

Two students in particular stated the use of online Q & A sites or online forums, but both clarified that they never directly asked any online stranger questions. This confirms the results from the survey that almost all participants have never consulted a stranger from an online forum.

I9: I've never really posted anything [on Yahoo Answers] but sometimes you can search on there for questions other people asked ... Sometimes if you have a math problem, you can find the exact problem, so it's really useful if you're trying to figure out something like that.

I11: I've used a forum with solutions and stuff, and I use that to double-check my answers, but otherwise it helps me figure out how to solve problems. I guess I don't directly ask questions, but I look for people who have similar problems.

On the other hand, most students tended to talk to TAs and professors for more structural issues related to courses, such as questions about their grades, exams, and asking for permission, because they trust the authority of the TA and professor and wanted to make sure to get an accurate answer. This phenomenon may also explain the result from the survey. Professors are rarely consulted for course-related issues because students tend to consult them only for severe issues about coursework.

I5: I'm considering taking a class as auditing the class, and a few of my friends kind of told me how that works, but I'm definitely going

臺灣大學圖書館 期刊資料庫

to confirm that with my advisor and make sure that that's okay for that specific class.

I9: The things that I talk to a TA something about was like something that students wouldn't really know, a course requirement or something confusing, or I needed to meet them for some reason, I would email them about them.

I11: If I got an exam, and the score I got was not what I expected, I would go talk to the professor because I'd like to be concerned of the grade. They might talk you through and give you a hand of how to improve or something.

For more research-oriented questions about paper writing, most students also not only asked other students in the class but also asked TAs and professors. Many students identified that they usually discuss their paper ideas with other students in the class.

I2: I had classes with all papers you have to write. I had a couple of these classes with a friend of mine, so we just really worked out what the question's asking, where he is going to start, where I think I might start, and just bounced ideas with each other.

Some indicated that they trust the authority and the expertise of the TA or the professor who grades their work. Additionally, they sometimes ask questions via email rather than face-to-face because it is easier not to make an appointment or go to the office hours.

I1: I usually email a professor or talk to them because I don't want to get the information wrong. I don't trust other students if it's something it's going to be a big part of my grade. I'd rather get the information straight from the person who will be grading it.

I10: Because they [TAs] are the ones who grade me, they know what they're looking for. So I feel it's a good source to ask questions. My friends they may not always know the answers, but TA always knows.

For moral support, most students tended to talk to strong ties, especially their family members. Other students commented that they talk to friends more than their family about course-related personal issues such as lack of motivation or problematic relations with other students or TAs.

I5: If I was having a big problem, I would definitely share with my family. And my sister goes to this university as well, so she is really easy to talk to when a lot of similar situations ...

I9: I don't really talk to my family as much about it as my friends because they're closer and they can help me better because they're here.

Some students particularly emphasized the importance of their boyfriend or girlfriend when talking about more personal issues.

臺灣大學圖書館 期刊資料庫

I2: I always consult my boyfriend because he is my best friend, so he can always calm me down and make me look at things rationally.

However, one student pointed out that he would talk about his personal issues to friends who are not so close to him after some time had passed and he could take it easy.

I14: I would also talk to friends in my class when I can laugh at it [frustration in class].

Overall, from the interviews, we can see similarities among students' consultation behaviors. Students tend to consult advisors and friends about program-related issues, consult TAs and professors about course-related issues, and turn to family and friends for moral support. Based on the results from the web survey, we can see a difference between the consultation of strong and weak ties on different issues (see Table 3). Family members are the most frequently consulted for moral support, and advisors are the most frequently consulted for questions about programs.

4.3 Referrals and human source recommendation

In the process of consultation, students sometimes obtained information about other recommended resources or referrals from the people they consulted. Some participants mentioned the experience of getting recommended resources from their advisors, family members, friends (or other students in the class), professors, TAs, and librarians. Resources suggested from strong ties, such as advisors, family members, and friends, are usually online resources about the program requirements or career development, books, or articles on the Internet. Resources suggested from weak ties—other students in the class, professors, TAs, and librarians—are more research-oriented. These recommended resources are usually books or articles, or databases to find articles for their course assignments or final papers. Few students had consulted librarians about finding resources for their papers. However, students who had consulted a librarian provided very positive comments on these experiences.

I2: I would say I definitely really rely on librarians because they know what sort of materials are out there and where to find the materials and what I'm looking for like a subject area or a topic area ... If I'm going to write a research paper using the stuff outside of class, then I usually just ask the librarians.

From the interviews, some participants provided incidents where they obtained referrals from the person they consulted. If the person the student consulted could not answer the question, that person usually referred the student to another person who might have the expertise to answer the question. Generally speaking, students gave more positive comments on

臺灣大學圖書館 期刊資料庫

friends' referral suggestions. They considered the referral information very helpful in general. Advisors, friends, other students in the class, house fellows (Note 1), and TAs are the sources who usually provided referrals to the students. Advisors, professors, TAs, other friends, other students, and the writing center (instructors) were usually the recommended human sources. The results here confirm the results from the survey somewhat. From the survey results, the people students consulted the most for certain issues were usually the one who often provide referrals. Interview results revealed that advisors, TAs, and friends seem to be consulted more and to give more referrals. Some typical referral situations, illustrated in Figure 5, are described by students as follows:

Situation 1. Friend to advisor

I2: I'm a double major, and the only reason that I'm doing my second major is because my friend mentioned to me that he was meeting with his legal studies advisor and that he was really, really friendly and helpful, and that he thought I might be able to do his major without taking many more courses, and so he recommended me to go meet with her.

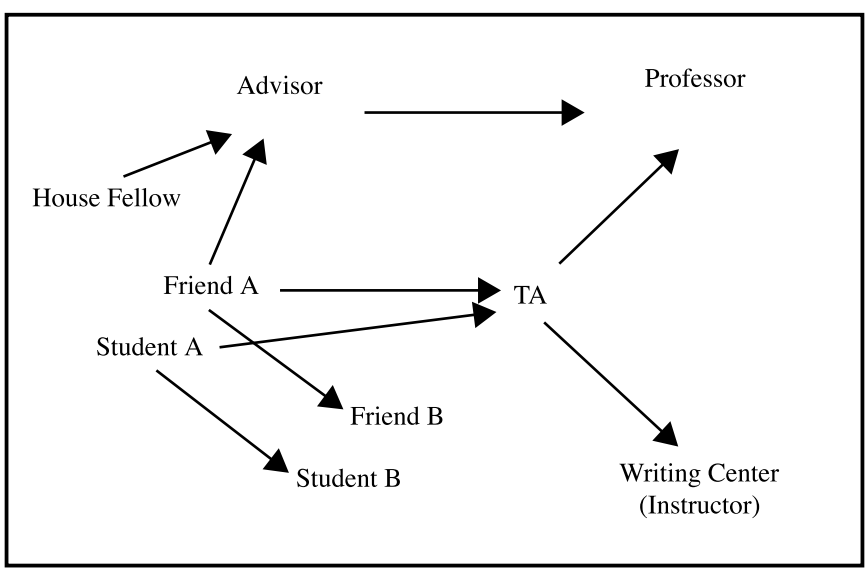


Figure 5. Referral Human Sources for Students

Note. The arrows indicate the referral direction, meaning that person A (who starts the arrow) refers the student to person B (who receives the arrow).

臺灣大學學術期刊資料庫

Situation 2. House fellow to advisor

I4: I live in a residence hall, and I went to my house fellow. She gave me some very good advice but then suggested that I also go see my advisors. And they were very helpful as well, so I take advantage of their help.

Situation 3. Friend to friend

I9: I guess if I was asking my friends, "How do you do this problem," or something, and they said, "Well, I don't know, but this person was in the class before." Like my roommate, I was talking to her about accounting, and she says, "I'm not in that, but my boyfriend already took it already, so he can help you with something." That happens a lot if you're asking your friends.

Situation 4. Friend to TA

I13: Yeah, a friend told me, "I met with the TA. It really helped out." I would like [would say] "Cool!"

Situation 5. TA to writing center

I2: Usually the friends just [provide] ideas, but the TAs would know more specific things, like they recommend in the English class the writing center. TAs are good for that.

According to the information horizon map analysis (Sonnenwald et al., 2001), a receiver who does not recommend resources to others is an "ending resource." A person who only recommends resources to others is a "starting resource." A person who has more outgoing than incoming connections to other resources is a "recommending resource." In contrast, one who has more incoming than outgoing connections is a "focusing resource." And a person who has equal incoming and outgoing connections is a "balancing resource." In Figure 5, friends and other students in the class are recommending sources, the advisor is a focusing resource, the professor is an ending resource, and the TA is the only balancing resource in students' information horizons.

This matches the results from the interviews, in which some students confirmed the fact that referral information among friends happens a lot. Students usually made friends with other students in the class and consulted them if needed. Some of the students attended some study groups to help one another. All students mentioned incidents of consulting TAs and their advisors, and most of them found the consultation very helpful. Students may have shared their useful experiences of consulting other people, and that makes advisors and TAs receive more incoming connections. Finally, most students seldom talked to professors, so it would be reasonable that professors only have incoming connections where other people refer the student to them.

In addition, most participants argued that they are willing to obtain referrals and try different resources. They not only trust

臺灣大學圖書館 期刊資料庫

the strong ties (e.g., friends) based on their friendship or close connections, but also trust the authority or expertise of those weak ties (e.g., TAs and professors). This could also explain why professors have more incoming connections, while friends have more outgoing connections. We can possibly conclude that recommending resources (friends, students) and balancing resources (TAs) play more active roles than focusing (advisors) and ending resources (professors) in this coursework consultation context. However, this finding does not match Chen and Huang's (2011) finding that professors, peers and family members are recommended resources. This could be worth further investigation since graduate students tend to work more closely with their advisors and other professors than undergraduates. In sum, the above discussion about the referral information in students' consultation processes helps us understand the relationship of different information sources in the information horizons of undergraduate students.

5. Conclusion

Information horizons can depict individuals' information-seeking behaviors in certain contexts, and the social network constitutes one of the important concepts in the information horizon maps. This study attempts to explore three main issues regarding undergraduate students' social networks in their coursework-related information horizons, including the strong and weak ties in their social networks, their consultation on specific coursework-related issues, and the referrals and recommended human sources obtained in the process of consultation.

Based on previous studies, this research further discussed social ties on a spectrum (see Figure 1) and on information horizon maps, and identified TAs as one of the crucial human sources for undergraduate students. Results showed that family members, roommates, and friends tend to be considered strong ties. Although colleagues and TAs are generally considered weak ties, they are often consulted for coursework-related issues. Friends and other students in the same class are considered more helpful than professors, and relationships with professors are considered more formal. Students tend to consult advisors and friends for issues about course planning and their programs, and consult other students in their current classes before consulting the TA or professor on course-related issues. Family members and friends are used mainly for moral support. In general, while strong ties are frequently consulted for moral support (see Figure 4), the tie strength may not necessarily determine the frequency of consultation on program- or course-related issues (see Figure 2 and Figure 3). Multiple

臺灣大學圖書館 期刊資料庫

connections with a person may also increase the frequency of students' consultations. In addition, referral information is usually provided by TAs, friends, or other students in the class, whereas advisors, professors, and TAs are usually referred by others.

All in all, this study may contribute in several ways. First, this study incorporates information horizons and social network theory for further understanding of information sources used by undergraduates. It also tests the usefulness of online survey combined with interviews as an alternative method for information horizon research. Second, this study also contributes to the literature on undergraduate students' social networks and the social network's role in information seeking. Finally, this study can help libraries and departments understand undergraduates' information behavior and provide suggestions for improving information services targeted to undergraduates in relation to their coursework-related activities. For instance, libraries may work with departments to incorporate information literacy workshops into orientation events, especially promoting the role of reference librarians as well as specific on-campus information and human sources.

More research is needed to develop multiple measurements for gauging the strength of social ties in order to increase the validity and reliability of the study. It would also be worthwhile to incorporate path analysis to investigate students' consultation processes—that is, what sources are likely to be consulted first and what sources are used next. Such a path might mirror the spatial proximity in the information horizons but would provide further information on specific steps to follow and sources used in each step. Adopting path analysis may help better explain the dynamic consulting process as well as the information referral process, and help gain a better understanding of students' coursework information horizons.

Acknowledgement

The author would like to thank Professors Kyung-Sun Kim, Chi-Shiou Lin, and Ms. Marshelle Woodward for providing comments and suggestions on this paper.

Notes

Note 1 House fellows were mentioned by several participants during interviews. They were usually seniors when the student was a freshman. Therefore, they should be distinguished from the roommate, who was usually the same age as the student.

臺灣大學學術期刊資料庫

References

Brown, J. J., & Reingen, P. H. (1987). Social ties and word-of-mouth referral behavior. *Journal of Consumer Research, 14*, 350-362.

Chen, C.-M., & Huang, Y.-H. (2011). The information behavior of graduate students for Hakka Studies: A perspective of information horizons. *Journal of Library and Information Studies, 15*(1), 144-170.

Consortium for Policy Research in Education. (2007). *Study of school leadership school staff questionnaire*. University of Wisconsin-Madison.

De Lange, D., Agneessens, F., & Waege, H. (2004). Asking social network questions: A quality assessment of different measures. *Metodološki Zvezki, 1*(2), 351-378.

Felmlee, D. H. (2003). Interaction in social networks. In J. Delamater (Ed.), *Handbook of social psychology* (pp. 389-409). New York: Kluwer Academic.

Granovetter, M. (1973). The strength of weak ties. *American Journal of Sociology, 78*, 1360-1380.

Grasenick, K., Wagner, G., & Zumbusch, K. (2008). Trapped in a net: Network analysis for network governance. *VINE: The Journal of Information & Knowledge Management Systems, 38*(3), 296-314.

Herschel, R. T., & Yermish, I. (2008). Knowledge transfer: Revisiting video. *International Journal of Knowledge Management, 4*(2), 62-74.

Huvila, I. (2009). Analytical information horizon maps. *Library & Information Science Research, 31*(1), 18-28.

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.

Knoke, D., & Yang, S. (2008). *Social network analysis*. (2nd Ed.). Thousands Oaks, CA: Sage.

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.

Richards, L. (2005). *Handling qualitative data: A practical guide*. Thousand Oaks, CA: Sage.

Sabetzadeh, F., & Tsui, E. (2011). Social motives polarity and its impact on knowledge sharing. *VINE: The Journal of Information & Knowledge Management Systems, 41*(1), 76-88.

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.

臺灣大學圖書館 期刊資料庫

Savolainen, R. (2007). Information source horizons and source preferences of environmental activists: A social phenomenological approach. *Journal of the American Society for Information Science and Technology, 58*(12), 1709-1719.

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.

Sonnenwald, D. H. (1999). Evolving perspectives of human information behavior: 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 in information needs,* (pp. 176-190). London: Taylor Graham.

Sonnenwald, D. H., Wildemuth, B. M., & Harmon, G. (2001). A research method using the concept of information horizons: An example from a study of lower socio-economic students' information seeking behavior. *The New Review of Information Behavior Research, 2*, 65-86.

Sonnenwald, D. H. (2005). Information horizons. In K. Fisher, S. Erdelez, & L. McKechnie (Eds.), *Theories of information behavior*. Medford, NJ: Information Today.

Steffes, E. M., & Burgee, L. E. (2009). Social ties and online word of mouth. *Internet Research, 19*(1), 42-59.

Tsai, T. –I. (2010). Information horizons of Taiwanese graduate students. In M. Reilly (Ed.), *2010 iConference Proceeding* (pp. 233-246). Urbana- Champaign, IL.

van Zyl, A. S. (2009). The impact of social networking 2.0 on organisations. *Electronic Library, 27*(6), 906-918.

Wasserman, S., & Faust, K. (1994). *Social network analysis: Methods and applications*. Cambridge: Cambridge University Press.

(Received:2011/7/20; Accepted: 2011/9/23)

臺灣大學學術期刊資料庫

Appendix. Interview Guide

Social Networks in Undergraduate Students' Information Horizons Interview Guide

This interview is intended to help the researcher understand undergraduate students' social networks and how they make use of such networks for coursework-related activities. The information you provide in this interview will be confidential and will not be shared with anyone else.

1. For all coursework-related problems you encountered during the past year (e.g., problems with your program of study, courses, assignments, projects, or papers), with whom did you usually consult and why? Please describe some typical situations that you consult with those people on coursework-related issues.
2. Who do you think had closer/ more profound relationships with you? Who do you think had less close/more superficial relationships with you in your social network? What kind of coursework-related problems did you share/discuss with those people? Please describe some typical situations that you would discuss the problems with them and why you consult them.
3. For different types of problems, do you tend to consult different people? If you do, please describe some typical situations that you consult different people with different issues.
4. To whom did you usually ask for advice or information **about your program** (e.g., curriculum, program requirements)? To whom do you usually ask for advice or information **about courses** (e.g., course contents, assignments)? To whom did you usually ask for advice or information about **research** (e.g., project, thesis, or final paper)? How often did you consult them and why did you consult with them (e.g., you know him/ her well, they are helpful, friendly, etc.)?
5. Who usually recommended you more useful **resources for research** (e.g., bibliography, books, or articles for your project, thesis, or final paper)? How often did you consult them and why did you consult with them? After getting the information, who would you usually go for **confirmation**? And why did you confirm with them?
6. Who usually **referred you** to other people/ resources (e.g., a colleague may refer you to a professor with certain expertise)? How often did people refer you to others when you consulted them?
7. Suppose that you are confronted with **personal problems** regarding coursework (e.g., lack of motivation, problematic relation with a colleague or professors). With whom would you discuss these problems and why do you discuss with them?

臺灣大學學術期刊資料庫

臺灣大學學術
期刊資料庫