Integrating information behaviour and information literacy during academic writing tasks: A study of Japanese and Canadian undergraduate students in Canada

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December 2012

A thesis submitted to McGill University in partial fulfilment of the requirements of the degree of doctor of philosophy

ABSTRACT

The number of international students on North American campuses is increasing. Improving these students' learning experiences, especially in relation to information literacy skills, is a key for academic success in this emerging population. Although some academic librarians have tried to facilitate international students' learning, many past studies in the library and information science field have focused only on barriers that result from cultural and linguistic differences. Also, these studies were often based on librarians' anecdotal experience. Thus, before planning strategies to improve students' skills, it is important for academic librarians to go beyond cultural and linguistic differences in understanding the nature of international students' research processes during assignment tasks and potential differences with domestic students.

This study focused on Japanese undergraduate students' experience in Canadian universities. The overall objective was to understand the nature of Japanese students' information behaviour during academic tasks as compared to Canadian students. In particular, this study investigated three research questions regarding students' information behaviour, intervening factors affecting the behaviour, and information literacy skills.

A qualitative approach was used in this study. Data were collected through research project portfolios, phenomenological interviews, and flowcharts. In total, eight Japanese and eight Canadian students participated. Each individual's information behaviour, intervening factors, and information literacy skills were analysed. Participants' information literacy skills were assessed using *Information Literacy Competency Standards for Higher Education* created by the Association of College and Research Libraries. Similarities and differences between Japanese and Canadian students were also examined.

Seven categories of information behaviour were identified: finding a focus, locating information, information selection, information extraction and organisation, information analysis, writing and editing, and citing sources. Among these categories, differences between the Canadian and Japanese groups were observed in the following categories: locating information, information selection, information extraction and organisation, and information analysis.

These seven categories of information behaviour were affected by seven intervening factors: assignment characteristics, help from others, past experience, affective aspects, personalisation of behaviour, time management, and academic expectations. Some factors (e.g., suggested assignment topics) affected only one aspect of behaviour, while other factors (e.g., past learning and research skills) showed connections to more than one element of behaviour. Canadian students' behaviour related more strongly to factors such as past experience, personalisation of behaviour, and academic expectations, while assignment characteristics and help from others were important factors for Japanese students.

Finally, the comparison of information literacy skills illustrated that Canadian students tended to perform better than Japanese in many areas. In particular, differences were observed in: identifying types and formats of potential resources, selecting information retrieval systems for accessing resources, constructing and implementing search strategies, applying new and prior information to the planning and creation of papers, evaluating information and its sources, and acknowledging information sources used. These differences between the two groups originated from the behavioural differences, which are associated with the intervening factors.

Analysis of students' processes, factors, and skills revealed that these components are interrelated and not separable. Thus, it is important to think about the continuity of elements when seeking to understand students' research processes. Skill development can be better facilitated by instructional interventions when informed by an understanding of the factors that affect the information behaviour processes with particular focus on differences and similarities between Japanese and Canadian students.

The holistic approach of this research contributes to a more accurate understanding of students' research processes. It supports the development of effective methods to improve students' learning experiences by going beyond the static approach of information literacy standards.

RÉSUMÉ

Le nombre d'étudiants étrangers est en augmentation sur les campus nord-américains. L'amélioration de leur expérience d'apprentissage, notamment en ce qui concerne leurs compétences informationnelles, est une clé du succès scolaire de cette population grandissante. Bien que des bibliothécaires universitaires aient tenté de faciliter l'apprentissage des étudiants étrangers, beaucoup d'études dans le domaine de la bibliothéconomie et des sciences de l'information se sont uniquement concentrées sur les obstacles engendrés par les différences culturelles et linguistiques. De plus, ces études étaient souvent fondées sur des expériences anecdotiques des bibliothécaires. Par conséquent, avant d'élaborer des stratégies pour améliorer le savoir-faire des étudiants, il est important que les bibliothécaires passent outre les différences culturelles et linguistiques pour comprendre la nature du processus de recherche des étudiants étrangers dans leurs devoirs, et pour identifier les différences potentielles avec les étudiants nationaux.

Cette étude se concentre sur l'expérience des étudiants de premier cycle japonais des universités canadiennes. L'objectif principal est de comprendre la nature du comportement informationnel des étudiants japonais pendant leurs devoirs en comparaison de celui des étudiants canadiens. Plus particulièrement, nous avons examiné dans cette étude trois facettes : le comportement informationnel, les facteurs influençant ce comportement, et la compétence informationnelle.

Une approche qualitative a été adoptée dans cette étude. Des données ont été collectées à travers des dossiers de projets de recherche, des entrevues phénoménologiques et des diagrammes. Au total, sept étudiants japonais et sept canadiens ont participé. Pour chacun, le comportement informationnel, les facteurs d'influence et les compétences informationnelles ont été analysés. Les compétences informationnelles des participants ont été évaluées à l'aide des Information Competency Standards for Higher Education (Standards de compétence informationnelle pour l'éducation supérieure) créés par l'Association of College and Research Libraries (Association des bibliothèques d'université et de recherche). Les similitudes et différences entre les étudiants japonais et canadiens ont aussi été examinées.

Sept catégories de comportement informationnel ont été identifiées : définition de la question de recherche, localisation de l'information, sélection de l'information, extraction et organisation de l'information, analyse de l'information, édition et correction, citation des sources. Parmi ces catégories, les principales différences entre étudiants japonais et canadiens ont été observées dans la localisation, la sélection, l'extraction et l'organisation, et l'analyse de l'information.

Ces sept catégories de comportement informationnel sont influencées par sept facteurs : les caractéristiques du devoir, l'aide des autres, l'expérience, les aspects affectifs, la personnalisation du comportement, la gestion du temps et les attentes du milieu universitaire. Certains facteurs, comme les sujets de devoir suggérés, n'affectent qu'un aspect du comportement; d'autres facteurs, comme l'expérience d'apprentissage et de recherche, ont un effet sur plusieurs éléments du comportement. Le comportement des étudiants canadiens est fortement influencé par des facteurs tels que l'expérience, la personnalisation du comportement et les attentes du milieu universitaire, tandis que celui des étudiants japonais est très influencé par les caractéristiques du devoir et par l'aide des autres.

Finalement, la comparaison des compétences informationnelles a montré que les étudiants canadiens réussissent plutôt mieux que leur les japonais dans de nombreux domaines. En particulier, les plus importantes différences ont été observées dans l'identification des types et formats des ressources potentielles, la sélection des systèmes d'extraction des ressources, l'élaboration et l'application des stratégies de recherche, l'utilisation des nouvelles et anciennes informations pour la planification et la création des devoirs écrits, l'évaluation de l'information et de sa source, et la reconnaissance des sources d'information. Ces différences entre les deux groupes découlent des différences de comportement, qui sont associées aux facteurs d'influences.

L'analyse du cheminement des étudiants, de leurs savoir-faire et des facteurs d'influence a révélé que ces composantes sont interdépendantes et inséparables. Par conséquent, il est important de garder la continuité de ces éléments à l'esprit lorsqu'on étudie le processus de recherche des étudiants. Le développement du savoir-faire peut être facilité par des interventions de l'instructeur ayant une bonne compréhension des facteurs

qui ont une influence sur le comportement informationnel, en mettent l'accent sur les différences et similarités en étudiants japonais et canadiens.

L'approche holistique de cette recherche a contribué à une meilleure compréhension du processus de recherche des étudiants. Elle soutient le développement de méthodes efficaces pour améliorer l'expérience d'apprentissage des étudiants en allant au-delà de l'approche statique des standards de la compétence informationnelle.

ACKNOWLEDGEMENTS

First of all, I would like to thank the 16 participants in my study. Without their cooperation, it was impossible to complete this work. The data collection was time consuming, so it was really generous for them to participate while they were very busy with other assignments.

I would also like to thank my supervisor, Joan Bartlett, for her guidance and encouragement as I completed my doctoral work. In addition, it was a great honour for me to work with her on various other research studies. The experience has become an important foundation for my research career. Finally, I would like to thank her for financial support of my doctoral research from her research grants.

I greatly appreciate the support and thoughtful feedback from my dissertation committee members: Jamshid Beheshti, France Bouthillier, and Lynn Butler-Kisber. Their support was indispensable to improve and strengthen my study.

This research would not have been completed without help from my wife, Megan Fitzgibbons. Without her continuous support, I would not have been able to complete my dissertation. Also, I should note that I greatly appreciated her time and effort to support my English writing abilities.

Finally, I would like to thank my mother who allowed me to continue studying in Canada. I am really fortunate to have her emotional support and encouragement. I am proud that I am her son.

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1 INTRODUCTION

1.1 Background

The focus of this study is to capture how Japanese students, in contrast to Canadian students, interact with information to complete their writing assignments and to determine how the process is associated with recommended guidelines. This study was designed to expand my previous research on Japanese students through an in-depth comparison of Japanese and Canadian undergraduate students' research experience in Canadian universities.

Globalisation is accelerating the number of students seeking educational opportunities abroad. From the viewpoint of academic institutions, these students bring an international perspective, add diversity to classrooms, bring financial benefits to both universities and local communities, and contribute intellectually to universities (Association of Universities and Colleges of Canada, 2002; Lee & Rice, 2007; J. Taylor, 2004). According to data from Statistics Canada (Statistics Canada, 2007, 2012), international students in Canadian universities increased from 30,885 in 1995 to 97,734 in 2009. In particular, the number from cultural and linguistic backgrounds different from North America has increased (e.g., China, India, and South Korea).

Although the population has been increasing, recruitment is not always accompanied by a strong consideration of students' experiences after enrolment, which can lead to their dissatisfaction (Lee & Rice, 2007). Thus, academic libraries, as centres of research and teaching in their campus communities, need to be active in improving students' learning experiences and facilitating their intellectual contributions in Canada. Among various options, improving students' information literacy skills is an important potential solution in today's information-intense environment. According to Shapiro and

Hughes (1996), information literacy should be recognised as *a new liberal art* referring to liberal arts in medieval society (i.e., grammar, logic, and rhetoric) that were the core of education. They claim that information is an important part of humans' intellectual activity, and information literacy is a fundamental component for students to know how to deal with information. The American Library Association (ALA, 1989) defined information literacy as skills in recognising information needs, and finding, evaluating, and using information effectively for problem solving or decision making. Thus, students who have high information literacy skills effectively utilise information to solve problems in academia and achieve academic success (Eisenberg, Lowe, & Spitzer, 2004).

However, researchers have argued that international students tend to have barriers to information literacy-related skills due to their cultural and linguistic differences from the domestic culture (e.g., Liao, Finn, & Lu, 2007; Sarkodie-Mensah, 1998). The research has tended to focus on librarians' opinions, perceptions, and experience rather than on empirical evaluations of students (Curry & Copeman, 2005). Other studies were based on students' self-assessment, which limited understanding of students' actual information literacy skills (e.g., Ishimura, Howard, & Moukdad, 2008). Thus, before planning strategies to improve their skills, first, it is critical for academic institutions to understand how students conduct research and to what extent they are information literate.

In order to do so, this study combines information behaviour models (what kind of process/steps students take) and information literacy (how the process/steps satisfy recommended guidelines). When comparing the major elements of each concept, the two are similar in that they encompass the same range of activities. However, the nature of the activities involved is different for each (see Table 1; see also Section 2.6 for more detail, p. 34).

Table 1. Comparison of definitions

Information behaviour (Wilson, 1999)	**Information literacy (American Library Association, 1989)**
Information needs (Recognising information needs)	Recognising when information is needed
Information seeking (Searching for information to meet the needs)	Locating the needed information effectively
Information use (Using information obtained)	Evaluating and using the needed information effectively
Process oriented	*Quality oriented*

In information science, a few information behaviour models (e.g., Wilson, 1999) consider each process (i.e., information needs, seeking and use) as dynamic and inter-dependent on each other. Analysis of the process as a complete, inter-related whole reveals the efficiency and effectiveness of students' tasks, which is a component of information literacy. On the other hand, many past studies focus on a single specific dimension of information behaviour, such as information needs (e.g., B. Allen, 1996; Belkin, 2005; R. S. Taylor, 1968), seeking (e.g., Ellis, 1989; Kuhlthau, 2004), or use (R. S. Taylor, 1991). This type of research does not shed light on the entirety of the process, but complements the broader models by providing in-depth detail about elements of the process.

Although there are differences among models in terms of the scope of their examination of the process, the concept of information behaviour is a useful framework for understanding how people engage with information to satisfy their goals. However, information behaviour models do not usually address the *quality* of each element of the process (i.e., information needs, seeking, and use).

In contrast, information literacy is concerned with the *quality* of each process in relation to its desired outcomes (ALA, 1989). Analysis of students' information behaviour using an information literacy framework sheds light on how well students

conduct individual research tasks and the existence of gaps between the ideal and actual state of their skills. However, in the information literacy approach, each step is considered as independent rather than interrelated. This does not answer the question of how the entire process determines the quality of students' output.

Therefore, the combination of both information behaviour models and information literacy frameworks complements existing research and reveals a more complete picture of students' process and skills.

1.2 Research Questions (RQs)

This study aimed to understand Japanese students' information behaviour during their research tasks. In particular, academic writing tasks that required use of outside sources were the central focus. The behaviour of Japanese students during these tasks was studied along with that of Canadian students in order to investigate factors that may be related to group differences. The study was guided by three research questions:

RQ1. What is the student's information behaviour during an academic writing task?

RQ2. What factors are involved in information behaviour during an academic writing task?

RQ3. What information literacy skills are present in the student's information behaviour?

1.3 Motivation for Current Research

This research followed directly from my master's thesis, the goal of which was to investigate Japanese students' information literacy skills, in Canadian universities, with reference to the *Information Literacy Competency Standards for Higher Education*, developed by the Association of College and Research Libraries (ACRL, 2004). The standards function as a framework to assess students' skills in articulating information

needs, finding information efficiently, evaluating information critically, organising information effectively, and using information appropriately. In each step of the research process, commonly-observed difficulties among students were compared with ideal states of skills defined by the standards. The study revealed that cultural and linguistic differences affected each step and contributed to frustration during the research process.

These findings prompted unanswered questions that are addressed in this present research. First, since the previous study was based on students' self-assessment, their actual information literacy skills were unknown. Students' information literacy skills and factors affecting acquisition of the skills needed to be examined. Second, use of a focus group methodology led to variation in the amount of data from each individual. Investigation of each individual's skills was necessary to obtain a more complete picture of students' competencies and information behaviour. Third, the previous study illustrated that Japanese students did employ strategies to enhance their information literacy skills. This finding is contrary to previous arguments that international students are less information literate and therefore warranted further investigation.

1.4 Chapter Outlines

Chapter two provides an overview of literature that frames this research. In particular, literature on information behaviour models, information literacy standards, information literacy skills assessment, and the information behaviour and information literacy of international students was reviewed. Chapter three discusses data collection and analysis such as participants of the study, data collection site, data gathering methods and schedule, and data analysis. Chapter four presents results based on the research questions: 1) information behaviour of students, 2) factors affecting information behaviour, and 3) information literacy skills assessment. Chapter five presents the

discussion of each research question, the contributions of this research, limitations of the study, conclusions, and future research.

2 LITERATURE REVIEW

2.1 Overview

In order to investigate how and why students behave in certain ways during their research tasks, the literature on information behaviour models was reviewed. In this chapter, first, the literature on information needs, seeking, and use is discussed separately, and then those elements are consolidated. Information literacy standards and assessment methods were also reviewed in order to give context for examining to what extent students have information literacy skills. The focus of this research was on international students, so literature on international students' information behaviour and information literacy skills was reviewed as well. Finally, all reviewed literature is summarised and the conceptual framework of this research is presented.

2.2 Information Behaviour Research

When conducting research, students had to seek out and use specific information to complete their assignments. For the purpose of this research, analysis of information behaviour patterns added a rich context to students' research process. At its core, information behaviour research focuses on ways that people seek information to accomplish their goals or solve problems. Information behaviour has been defined many ways. For example, Taylor (1991) defined information behaviour as a sum of active searches conducted in order to resolve problems using information obtained. During research tasks, students needed to find the focus of their task, seek information, and present the results by analysing obtained information. Considering these actions, this study used Wilson's (1999) definition of information behaviour, which consists of *information needs*, *information seeking*, and *information use*, because his model incorporated essential behaviour required for students' research tasks. As expanded on by

Choo (2006), information needs has come to refer to the state in which people recognise gaps in their knowledge and want to make sense of experiences. Information seeking is the purposeful search for information in order to increase their knowledge or understand their experience. In information use, information is selected and processed to change people's state of knowledge to make sense and develop understanding of an experience. Following Wilson's three categories, each category was examined in depth for this study.

2.3 Information Needs

2.3.1 Generating information needs

In order to accomplish a task, students in this study needed to identify what kind of information was needed. For this research, it was important to recognise the ways in which information needs were manifested to better understand the needs. Dervin and Nilan (1986) identified paradigms in information needs and use studies. In the *old* paradigm, information was seen as objectively representing reality. Information needs were treated as what the information system needed in order to process information rather than what users needed. On the other hand, users were the focus of the *new* paradigm that considered that information is actively constructed by users. Information needs were defined as human's recognition of a lack of something (i.e., knowledge) needed to accomplish their task. Although both the old and new definitions were useful for certain purposes, some scholars have argued that alternative approaches were more suitable than traditional ones in understanding users. Thus, users' perspectives were a key to understand information needs. In considering users' cognition, Belkin, Oddy, and Brooks (1982a, 1982b) argued that information needs were an *anomalous state of knowledge* (ASK). This implied that information needs originated when users realised an anomaly in their cognition and needed information to resolve the anomaly. Often, users could not

specify what was missing to cope with the situation. Belkin, Oddy, and Brooks examined the nature of information behaviour by analysing how and why people responded to problem situations with certain information behaviour. Belkin (2005) claimed that their hypothesis was significant in information science because it shifted the focus of information behaviour from computer systems to humans.

Similarly, in the sense-making model (Dervin & Dewdney, 1986; Dervin & Frenette, 2001; Dervin & Nilan, 1986; Dervin, 1992), information needs occurred when people felt gaps in their knowledge and could not make sense of encountered situations without constructing a new knowledge structure. Dervin (1992) categorised where information needs lie. When situations were blocked, the scenario was called *situation stops*:

- Decision stop (several options available),
- Barrier stop (stumbling blocks on the path),
- Spin-out stop (no options to select),
- Wash-out stop (disappearing solutions),
- Problematic stop (forced onto a wrong path).

Her model explained that people needed information to overcome the situation stops.

The kind of information needed to accomplish a task is determined by its type. Byström and Järvelin (1995) laid out five task categories. *Automatic information processing tasks* were determined beforehand and could be automated. *Normal information processing tasks* were nearly pre-defined but could be partially case-dependent. *Normal decision tasks* were very structured processes but largely case-dependent. In *known, genuine decision tasks*, "the type and structure of the result" were

known beforehand but the process and needed information was not determined yet. *Genuine decision tasks* were new processes. Needed information could not be identified beforehand (pp. 194-195). There were three types of potential information needs for the tasks. Types of information included *problem information*, *domain information*, and *problem solving information*. Problem information included "structure, properties, and requirements of the problem," domain information was "known facts, concepts, laws, and theories in the domain of problem," and problem solving information described ways of viewing problems and the information needed for problem solving (pp. 195-196). When the authors investigated matching tasks and types of information, they found that more complicated tasks required more complicated information. These research results implied that the complexity of a research project was determined by what kind of information was needed to satisfy students' information needs in this study.

Similarly, expanding Byström and Järvelin's study, Vakkari (1999) claimed that *task complexity*, *problem structure,* and *prior knowledge* were interrelated and affected how people seek information (*information actions*). Task complexity meant the degree to which users could anticipate information requirements, processes, and outcomes of the tasks beforehand. Problem structure was categorised as either well- or ill-structured, which affected the degree to which people could anticipate the kind of information needed. If people had prior knowledge about the tasks, they could determine what kind of information was required to accomplish them. In sum, the implication is that if students in their study had sufficient knowledge of tasks, they could identify their needs and form an effective seeking strategy.

The findings above suggested that information needs could be generated when students realised that outside information was required to bridge their knowledge gaps

and to accomplish their research tasks. The shaping of their information needs would be affected by the kind of tasks they had and their knowledge of the tasks.

2.3.2 Fluidity of information needs

Humans' information needs are not fixed and change during the information seeking steps. Harter (1992) argued that information needs were a dynamic process because an individual's mental state changed during the search process. Similarly, Case (2002) claimed that information needs changed constantly "with new, relevant sensory inputs. In other words, new questions emerged as old ones were answered or even partially satisfied" (p. 82). From users' perspectives, Taylor (1968) identified four levels of information needs that were formed before users asked questions of librarians. He identified that users' information needs changed as the information seeking process progressed. The four levels of need were: *visceral need, conscious need, formalized need,* and *compromised need.* Visceral needs referred to the state in which people felt the gaps of their knowledge consciously or unconsciously. The need was real, but it was often very vague and often could not be expressed in linguistic terms. This need changed its form and became concrete when users added more information to their knowledge, analysed it, or recognised its importance through further investigation. This need often shaped itself as an ambiguous and rambling statement describing their uncertainty, which constituted the conscious need. The ambiguity may have gradually reduced by talking with other people. After the disappearance of the ambiguity, clearer statements could have been formed at the level of formalized need. The question to be answered was described using concrete terms, but users may not have considered the context or requirement of an information retrieval system to obtain information. Finally, questions were modified or compromised with regard to how information systems and intermediaries could

understand the questions. In the end, the input question did not necessarily reflect what was initially in users' minds. The question was modified in response to what was anticipated to be retrieved from an information resource. This form of question represented a compromised need.

Taylor's model, in particular, illustrated that information needs had multiple layers and were developed through encountering information. In order to find the students' real needs in my study, it was necessary to look at not only compromised needs but also formalized or conscious needs.

2.3.3 Complexity of information needs

In addition to the cognitive aspects of needs discussed above, Wilson (1981, 1997) claimed that various contexts influenced information needs and were interrelated with each other. At a personal level, an individual had affective, cognitive, and physiological states, which may have generated information needs. These three needs were interrelated with each other rather than isolated. Multiple needs may have occurred simultaneously. At a larger level, the individual had a role in a social life which also affected those three needs. At the largest level, the role was performed under certain environments, namely work, socio-cultural, politico-economic, and physical environments. The environment had an impact on individuals' roles and individuals themselves (Wilson, 1981).

In addition to Wilson's argument, Taylor (1991) claimed that information flow and use were decided by the nature of problems that groups of people in a peculiar context encountered. Thus, it could be considered that information needs were dependent on specific groups of people, the nature of problems, and the settings. The elements that affected information needs, according to Taylor, are presented with supplemental comments in the following list:

- Characteristics of people
    - The profession (e.g., engineers, lawyers, and teachers)
    - The entrepreneurs (e.g., business owners)
    - Special interest groups (e.g., citizen groups and political action groups)
    - Special socioeconomic groups (e.g., information-poor and ethnic minorities)
    - Demographic variables
        - Age, gender, marital status, ethnicity
        - Socioeconomic status
        - Education
    - Non-demographic variables
        - Types of media used (e.g., academic versus trade journals)
        - Social networks as means of communication (e.g., invisible college)
        - Attitude toward education, new technology, risk taking, and innovation
- Characteristics of problems
    - Dynamic and changing all the time by information obtained and users' perceptions and positions
    - Discrete classes of problems under certain settings and professions
    - Problem dimensions
        - Well versus ill structured
        - Complex versus simple
        - Assumptions agreed upon versus not agreed upon

        - Familiar versus new patterns
- Settings the people work in
    - Importance of organisation style and structure
    - Domain of interest
    - Access to information (i.e., accessibility)
    - History and experience of organisations (R. S. Taylor, 1991, pp. 231–232)

In certain social contexts, information needs may be neglected. Chatman (2000) found that elderly women in nursing homes used deception to maintain an appearance of normalcy in their shared life with others. Although they needed information or advice, "they pretended that they were successfully coping without having it" (p. 6). The information was too risky to pursue in their life situation. Although this was an extreme example, four elements such as *social norms*, *worldview*, *social types*, and *information behaviour* decided how people in general behaved in a certain environment. Social norms meant the standards members of the certain groups needed to follow their behaviour. Worldview represented the collective agreement deciding what kind of events members responded to or ignored. Decision making on certain actions was associated with members' belief in maintaining their normative life.

As Wilson, Taylor, and Chatman illustrated, information needs were not solely shaped by factors that are internal to individuals. Various elements residing outside of individuals also had a significant impact on information needs. Allen (1996) strongly supported this argument, claiming that information needs could be understood by examining relationships between individual and social factors and how they were influenced by many perspectives. Four types of models were identified for understanding

information needs and taking actions to satisfy the needs: the *cognitive model* (individual influences on individual behaviour), the *social model* (individual influences on social behaviour), the *social cognition model* (social influences on individual behaviour), and the *organizational model* (social influences on social behaviour).

The cognitive model described the fact that different individuals had different information needs due to their internal knowledge structure. In particular, when individuals were not familiar with a situation, they needed to perceive the problems inherent in the situation before realising their information needs. In order to meet the needs, a new knowledge structure needed to be created. Their existing structure did not provide them with enough knowledge to take an appropriate action. In order to select among potential courses of action to satisfy the needs, they needed to understand the consequence of particular actions.

The social model was concerned with the way that social factors influenced individuals' perceptions of information needs. When individuals found themselves in a group to which they did not belong, they could not understand the situation. This uncertainty created information needs, but at the same time it often caused difficulties in articulating information needs. In order to satisfy the needs, individuals had to identify possible courses of action that fitted a particular social context.

The social cognition model explained how individuals influenced groups' information needs. Groups' needs were essentially the collective information needs of individuals. Collective perception of information needs occurred when both individuals and other members in certain groups perceived a situation in the same way. When a group sought alternative actions to cope with the needs, consideration of the options should have created an understanding of the group's existing perceptions of a problematic situation.

Otherwise, alternatives were not accepted. In order to take action to satisfy the needs, information that enabled rearrangement of groups' knowledge was necessary to cope with the novel situation.

The organisational perspective considered how the information needs of groups within a particular social context were influenced by the social context. How groups perceived a certain situation was influenced by organisational factors. Information needs were generated when an unfamiliar situation arose in the groups' activities. Often, it may have been impossible for a group to articulate information needs. In order to satisfy the unmet, unvoiced needs, potential actions needed to satisfy both a particular situation and an organisational context. In order to resolve information needs, potential courses of action were meant to consider both the nature of problems and the organisational environment in which the group was working.

In analysing the four models, Allen concluded that information needs were influenced by a highly complex interaction of individuals and society variables. Since individuals had multiple social groupings, both individual characteristics and contexts needed to be considered to understand an individual's information needs. The model that emerged from this analysis was called a *person-in-situation model.*

In sum, humans' cognitive gaps are a starting point for recognising information needs. Information needs change as the information process progresses, and they are not predetermined. Information needs are influenced by a complexity of various elements. For example, the nature of the tasks and psychological, demographic, environmental, and societal factors play significant roles in shaping information needs. In this study, analysis of a complexity of information needs constituted an important element for understanding students' behaviour during their research tasks.

2.4 Information Seeking Behaviour

2.4.1 Elements of information seeking

Students in my study often needed to seek out information to complete their tasks. Knowledge of the factors that motivate people to seek information was useful for understanding their behaviour during academic tasks. It has been argued that individuals could make sense of uncertain situations or gaps by asking questions "relating to the timing and location of events, understanding causes, projecting outcomes, and identifying characteristics of self, others, events, and objects" (Dervin & Nilan, 1986, p. 21). Those questions were the foundation of a strategy to bridge gaps in knowledge. Marchionini (1995) claimed that "information seeking is a process driven by human needs for information so that they can interact with the environment" (p. 28). According to him, information seeking was affected by interactions of six elements: *information seeker*, *task*, *search system*, *domain*, *setting* and *search outcomes*. The information seeker was the central factor for information seeking and was motivated by information needs that were formed internally based on their unique characteristics, such as "mental models, experiences, abilities, and preferences" (p. 33) affected their seeking behaviour. The task emerged from the information seeker's problem, which led to information seeking activities. The task was affected by an individual's available time, cognitive and affective resources, and ability. The search system referred to interface (rules of information transfer) and a database (source of information). Domains referred to areas of study. Setting referred to physical and social elements and the "information seeker's physical and psychological states" during information seeking (p. 46). Outcomes consisted of *products* and *process*. Products were results obtained from the information system. Process was information seekers' experience of the information search. Using outcomes,

information seekers changed their knowledge structure and made decisions as to whether they wished to continue seeking information. Situational factors, such as cognitive, affective, and information of problems, affected information seeking behaviour.

These findings from the literature suggest that students' information seeking behaviour may be affected by their personal characteristics. In addition, their surrounding environment influences their information seeking process. Thus, students themselves and the environment in which they live and study may determine how they seek information.

2.4.2 Information seeking processes

In addition to understanding factors affecting information seeking behaviour, it was useful to know how users enacted the information seeking process. Many models of the process have been developed. In her *berrypicking* model, Bates (1989) argued that in real life settings, a broad topic or a reference was used as a starting point for information seeking. Encountering new information or documents from a variety of sources brought new ideas and thoughts, which showed paths to new conceptions of queries. The query evolved as a part or whole of the search process. Satisfaction was not brought solely by the final set of information. Selected references and information encountered by each query decided users' satisfaction. Search techniques and the format and content of sources changed throughout the searching process. As shown in her model, information seeking was a dynamic rather than static process. This implied that students' information seeking behaviour during their tasks was dynamic as well.

The information seeking process had more specific steps. Ellis's studies provided rich descriptions of information seeking activities. Ellis (1989), Ellis, Cox, and Hall (1993), and Ellis and Haugan (1997) compared similarities and differences of information seeking patterns among scientists, physicists and chemists, and engineers and scientists to

identify information seeking patterns of those groups. There were eight general patterns of information seeking: *starting*, *chaining*, *browsing*, *differentiating*, *monitoring*, *extracting*, *verifying* and *ending*.

- Starting: The initial action to obtain an overview of information (e.g., informal communication between colleagues and searching the internet).
- Chaining: A process for following chains of resources to find new information from the information already gathered (e.g., reference lists of articles).
- Browsing: A semi-structured search process of scanning information related to individuals' topics of interest
- Differentiating: An activity of ranking the importance of the information gathered based on users' criteria
- Monitoring: An activity of regularly following sources to keep up-to-date through both formal and informal channels (e.g., regularly checking particular journals)
- Extracting: Systematically locating materials of interest for particular purposes (e.g., preparation for academic presentation)
- Verifying: Checking accuracy of information
- Ending: Completing information seeking for particular activities (Ellis et al., 1993, pp. 359–365)

Even if the names of the categories were the same, the actual behaviour observed among different disciplines has sometimes been observed to be different. For example, Ellis and Haugan (1997) analysed the information seeking behaviour of engineers and scientists and concluded that it was similar to other experts such as physicists, chemists,

and social scientists, as was discussed in the authors' previous work, but engineers' information seeking behaviour was more strongly affected by limitations on time and the availability of information (Ellis & Haugan, 1997). Although Ellis (1989) claimed that information seeking patterns were dependent on time and circumstances and that the order of the process was fluid, Wilson (1999) suggested that the process had a distinct starting point. Browsing, chaining, or monitoring followed next but did not have a specific sequence. After those processes, differentiating, extracting, verifying, and ending followed. Ellis's research results were based on experts rather than novice individuals. Students may not demonstrate all of the elements of information seeking behaviour categories Ellis developed, but his categories were a reasonable guideline to use in developing a classification for students' information seeking behaviour in this study.

Another pivotal model was Kuhlthau's (1991, 1993, 1995, 2004) information search process (ISP) model. Kuhlthau (2004) claimed that the process approach gave students opportunities to understand ways of learning from various information to construct meaning from it, and applying it to any life situation. In order to achieve information literacy, she articulated that it was important for students to build a "sense of the process of the learning" from information and construct knowledge from this information (p. 164). The ISP consisted of six stages: *initiation*, s*election*, *exploration*, *formulation*, *collection*, and *presentation*.

- Initiation: Being aware of lack of knowledge and recognising information needs
- Selection: Identifying general topics or approaches for the tasks

- Exploration: Investigating information on the general topic for increasing understanding
- Formulation: Generating a focus for the topic from the obtained information
- Collection: Gathering information related to the topic through libraries or other information systems
- Presentation: Finishing search and preparing for presenting the results or using information (pp. 81-84)

While Ellis's information seeking studies focused on processes, the ISP also highlighted affective, cognitive, and physical aspects of students' research process. As users proceeded through the stages, the initial uncertainty feeling changed to optimism, confusion, clarity, confidence, and satisfaction. At the beginning stage, users had vague thoughts but these became focused later in the process. Students explored and sought focused information at the later stage. Understanding the research process provided strategies to overcome information overload, to construct meaning, and to make sense from information (Kuhlthau, 1995).

Both Ellis's and Kuhlthau's models had rich implications for understanding how students followed certain potential steps during their research tasks. In addition to the particular steps, the ISP also shed lights on the affective elements that could be observed during information seeking.

The information seeking process was affected by various elements. Brown (1991) proposed a general information seeking behaviour model, which consisted of *condition*, *context*, and *process.* The assumption of her model was that information seeking was a continuous improvement of behaviour. Among the three elements, the context in

particular played an important role in the information-seeking process. In terms of context, individuals were a *self* with cognitive, affective, and physiological needs who worked in a *role* under a certain *environment* (e.g., social, cultural, political, and economic). The boundaries among the three elements could possibly be barriers to information seeking. Recognition of information needs and motivation for satisfying them initiated information seeking. How and where to seek information was then determined by *source preference* (own knowledge, other people, and non-human resources), *searching behaviours,* and *search strategy.* This model was a good example of depicting information seeking hindered by various barriers of self, role, and environment in which individuals lived.

Focusing on university students, George et al. (2006) found that graduate students' information seeking behaviour was influenced by people (e.g., colleagues, professors, and librarians), convenience of access, and time factors. Students extensively used online sources for their research. Similar approaches could be found in Barrett (2005) and Callinan (2005). The former research investigated information seeking habits of graduate students majoring in humanities fields, and the latter compared course-related information seeking behaviour of biology students in their first and final years of study.

Information seeking for leisure has also been to seen to be affected by various factors. Savolainen (1995) described *everyday life information seeking* (ELIS), which consisted of two major components *way of life* and *mastery of life.* Way of life simply referred to the "order of things" (p. 262). Thus, various activities were prioritised subjectively and objectively. Mastery of life was "preparedness to approach everyday problems in certain ways in accordance with one's values" (p. 264). Types of mastery of life were determined by the combination of cognition and emotion, and optimism and

pessimism. Way of life and mastery of life affected each other and were affected by individuals' values and attitude toward life in general and their current life situation. How much financial, social network, and educational capital individuals possessed also decided the condition of their way of life and mastery of life. Although ELIS may not be applicable to students' behaviour especially for academic tasks, the influence of educational and economic background on behaviour had rich implications for this study.

Focusing on environmental factors, Chatman presented extensive findings on the information seeking behaviour of various populations in unique environments, for example, janitors (as an example of a lower-class population), women in a maximum-security prisons, and low-income people (Chatman, 1991, 1996, 1999). Chatman (2000) consolidated results of previous studies and presented a theory of normative behaviour, providing examples of how particular contexts affected the information seeking behaviour of inhabitants of a particular world. Social norms—standards or codes of what was and was not allowed in their context— "play an important role in holding a small world together" (p. 11). The standards were chosen by members of the particular world. The members also shared common perceptions and values in a social world (world-view) which determined which events were important. Members' classification in the social world determined their information access and use. In the context of a social world, information behaviour included a person's decision to use information or not, and in some cases, this decision meant the difference between life and death. The decision to initiate information seeking was made according to whether the action disturbs members' normative life. Spink and Cole (2001) also found that types of information decided which channel was used, and that social condition (income) affected information-seeking channels.

As these models demonstrate, information seeking behaviour has been seen to be a dynamic process that changed overtime. The behaviours were not solely decided by the actors. Rather, the behaviour was influenced by the environment that surrounded them. In relation to my research, students demonstrated information seeking steps and certain tendencies because of outside factors such as classmates and professors, cultural and educational background, and time pressures.

2.4.3 Information searching behaviour

Literature on information seeking tends to discuss the larger context of the process. But it was necessary to draw attention to smaller aspects of information seeking because information searching through computers is the norm at present. Humans and computer systems interact with each other during information retrieval, a fact that led Wilson (1999) to describe *information searching behaviour* as "a sub-set of information seeking" (p. 263).

Saracevic (1996) provided a *stratified interaction model,* which depicted interaction between information retrieval system and users, and users' information use along with cognitive and situational elements. The model consisted of three levels: *surface, cognitive,* and *situational*. The surface level referred to users' action for information retrieval and computer systems' responses to these actions. The cognitive level referred to users' thought process (e.g., interpretation and judgement) in relation to texts from the systems. Finally, users judged the relevance of retrieved information according to the situation. Often, the cognitive and situational components were fluid and changed over the process.

More specifically, scholars investigated the factors that affected information retrieval. Saracevic's studies of cognitive processes (Saracevic, Kantor, Chamis, &

Trivison, 1988; Saracevic & Kantor, 1988a, 1988b) found that variables such as users, questions, searches, and searchers had significant relationships to information retrieval. If users had high abilities in word association and abstract learning, they tended to be more successful to retrieve relevant items. Also, not only keywords themselves but also context attached to the keywords was important for effective information retrieval. When questions were vague, broad, complex, and involved many presumptions, it was more likely that users would retrieve relevant items. Searchers' word association skills and learning style had a high relation to information retrieval, but different searchers chose different keywords for searching and retrieved different results. In terms of search, tactics and efficiency were important to retrieve relevant (desired) information. The elements mentioned here were particularly useful when investigating how students found relevant information and why they could not retrieve desired results from computer system.

Users judged the information they retrieved according to certain criteria for relevance, which had several dimensions: *system or algorithmic relevance* (the query in comparison to the retrieved text), *topical or subject relevance* ("aboutness" versus the retrieved text), *cognitive relevance or pertinence* (information need versus retrieved text), *situational relevance or utility* (situation versus retrieved text), and *motivational or affective relevance* (emotional state versus retrieved text) (Saracevic, 1999). Spink, Greisdorf, and Bateman (1998) expanded the concept of a relevance judgement using a three dimensional model that consisted of *level of relevance* (from Saracevic, 1999), *relevance region* (from high to low relevance), and *time.* The elements were interrelated and represented relevance judgement as a dynamic process.

Using Kuhlthau's ISP as a framework, Vakkari and Hakala (2000) revealed that the relevance criteria used to assess references and documents changed according to a

person's problem stages. The further students participating in their research proceeded with their tasks, the more they were able to distinguish relevant versus irrelevant references found in databases. Their increased knowledge about a topic gave them a more defined focus. The relevance of references was strongly affected by information content. In particular, topicality was a major criterion for accepting or rejecting references during all stages of the process. Information type was another major criterion. Students tended to look for general background and theoretical information at the beginning stages, but they did so less at the later stages. Students' interests led them to accept references for further examination and their interest grew as the process progressed.

On the other hand, relevance criteria for documents were different from criteria for references. In the first stages of students' examination of full-text documents, topicality and information types were equal in importance. In the middle stage of the process, students started looking for specific types of information, such as general information, theories, methods, or empirical results. Therefore, the importance of information types increased here compared to topicality because students could judge the relevance of the document by skimming the text itself, looking for particular information types. In the final stages of the seeking process, when students began to read documents in-depth, topicality emerged as the most significant consideration for selecting information to fulfil the purpose of their tasks. As Vakkari and Hakala (2000) put it, "individuals are not searching for documents on the topic in general, but about particular aspects of the topic reflecting the stage of task performance" (p. 558). This study contributed understanding of how students judged which information was useful with regard to their research process.

Like the judgement process, the searching process itself has been seen to be complex. Vakkari, Pennanen, and Serola (2003) investigated how search tactics and terms change during students' research proposal writing. Students in the study increased the number of search terms across two time periods. In particular, the more narrower terms and facets were added, the more students found useful references. During the process, students developed greater understanding of the topic which resulted in the use of more related and narrower vocabularies. The number of searches using the AND operator increased after the first session, which enabled students to find more useful references. However, they seldom demonstrated the use of other Boolean operators such as OR and NOT. Without using the OR operator, they could not use parallel tactics. Thus, they tended to swap search terms frequently and could only retrieve partial sets of relevant information. Students were also observed to use limits and intersect tactics. The research results demonstrated that even though students' subject-specific vocabulary increased, they could not increase the efficiency of obtaining relevant documents due to their limited ability in using Boolean operators.

Searching tasks could be more complex. Spink, Ozmutlu, and Ozmutlu (2002) introduced the concept of *multitasking information seeking and searching process,* in which users "seek and search on more than one topic concurrently due to the complex nature of work or living tasks" (p. 648). The four levels of information seeking and searching were: *single search on single topic*, *successive searching*, *multitasking searching*, and *multitasking successive searching.* Single search on single topic was just that: one search, one topic. Successive searching involved a single topic but multiple searches. Multitasking searching was focusing on more than one topic with a single search. But the search process evolved depending on the situation. Finally, multitasking

successive searching was “more than search on multiple topics” (p. 648). This study implied that searching behaviour may affect the technology inference environment.

When people seek information, the process is dynamic and affected by information seekers’ content and their own cognition, feelings, and characteristics. This property of information seeking has had a consensus in the literature. Information seeking has been described as clearly an interactive process, involving human cognition, and taking place in a context of positive and negative feedback (Spink, 1996). Studies of information searching behaviour also revealed that retrieving relevant information was a dynamic process and changed according to the situation. However, as Vakkari, Pennanen, and Serola’s (2003) study showed, a dynamic process does not guarantee the effectiveness of a search, which has rich implications for information literacy.

2.5 Information Use

After finding information, students in this study needed to use information to accomplish their purposes. Before discussing information use, it was essential to clarify the definition because there has been misinterpretation on the concept of information use (Spink & Cole, 2006). Some studies have categorised use of sources of information as information use, but this was about use of information channels to reach the sources. In keeping with this notion, information use has been better defined as an activity that “involves the selection and processing of information to answer a question, solve a problem, make a decision, or make sense of a situation” (Choo, 2006, p. 65). Thus, information use engages cognitive activity using information for particular purposes.

2.5.1 The purpose of information use

Dervin (1992) explained the ways in which people use information: “creating ideas, finding directions or ways to move, acquiring skills, getting support or

confirmation, getting motivated, getting connected to others, calming down or relaxing, getting pleasure or happiness, and reaching goals" (p. 75). Similarly, Taylor (1991) provided eight categorisations of information use based on information needs perceived by users in particular situations: *enlightenment, problem understanding*, *instrumental*, *factual*, *confirmational*, *projective*, *motivational*, and *personal or political*.

- Enlightenment: Creating context or making sense of a situation
- Problem understanding: Better comprehension of particular problems
- Instrumental: Finding out what to do and how to do something
- Factual: Understanding of situation using precise data (quality of data itself and users' perception of the quality are important)
- Confirmational: Information verification
- Projective: Prediction for future possibilities
- Motivational: Personal desires and goals
- Personal or political: Used for relationship, status, reputation, and personal fulfilment (R. S. Taylor, 1991, p. 230)

However, Taylor claimed that those categories were not mutually exclusive. Although it was impossible to cover all purposes of information use, the studies described above addressed key implications of reasons for information use.

Savolainen (2009) claimed that information use was not well-researched compared to information needs and seeking research. To widen the concept of information use, he compared the concept of information use between a constructivist approach (information science) and a human information processing approach (consumer research).

According to Savolainen, the constructive approach has often been connected to the idea of a cognitive viewpoint, which suggested that by using information, individuals actively construct knowledge structures. People and their creation of meaning were the focus of this approach, which argued that throughout the information utilisation experience, information was added and integrated with existing knowledge.

On the other hand, Savolainen argued, the information processing approach regarded information as the basis for judgement and interpretation. The focus was on the process of decision-making and its outcome rather the individual's act of creation. Important considerations of the processing approach included the ways that people judged and interpreted information, such as weight adding (i.e., compiling "scores" for the relevance of items according to the presence of relevance criteria), lexicographic selection (selecting items by most important attribute), and "satisficing" strategies (selecting alternatives that satisfied predetermined cut-off levels of criteria).

In the constructivist view, information use was a process or series of steps for constructing and changing meanings from information (e.g., Kuhlthau's ISP) while information processing focused on the closure of information processing for judgement or decision making with regard to available time resources. In other words, the constructivist approach focused on creation and the information process approach focused on interpretation and judgement. Although there were differences between the two approaches, Savolainen concluded that both processes existed within the human mind. Interpreting the quality of information and drawing conclusions based on the interpretation were common between two.

Participants in these studies did not randomly use information; information use was associated with a specific purpose. Thus, my research addressed the question of *why* people used information.

2.5.2 Processing information

In order to understand information use, it was also necessary to understand the process inside users' minds during information utilisation. Using a fundamental equation, Brookes (1980) explained how knowledge structures were modified by information.

$$K[S] + \Delta I = K[S + \Delta S] \quad \text{(p. 131)}$$

As Todd (1999a) explained, the equation represented the idea that people's existing knowledge structure (K[S]), when added to an increment of information (ΔI) resulted in modified knowledge K [S + ΔS]. The effect of the modification was represented by ΔS. ΔI represented "information in the cognitive phase" (p. 861). Thus, certain information was selected and cognitively processed from physical information (e.g., books) which was a foundation for modifying their existing knowledge. As opposed to information, knowledge was described as "a collective entity, summation, integration and transformation" of coherently organised information (p. 862). Information input was selected or rejected according to the individuals' existing knowledge structure. When selected, it became an integrated part of the structure, which caused transformation rather than a simple addition. Thus, K [S + ΔS] represented the idea that information utilisation brought changes in the knowledge structure and that "the cognitive effects of the modification of ΔS" constituted an integral part of people's action (i.e., as graphically depicted by the square brackets) (p. 863).

Influenced by Brookes, Cole (1997) investigated how individuals' cognition changed during the information process. He found that an individual's knowledge

structure was modified through information processing. Encountering information caused the individual to puzzle over a situation due to gaps between encountered information and their knowledge. Using the sought information, what was known and unknown was processed and integrated into the seekers' existing knowledge. Finally, the knowledge structure was modified.

In another study, Todd (1999b) focused on changes in knowledge structure brought by the cognitive process of utilising information. The five cognitive processes involved getting: *a complete picture*, *a changed picture*, *a clearer picture*, *a verified picture*, and *a position in a picture*. A complete picture referred to information was used to obtain "an expanded, more complex picture" (p. 15). In this information utilisation, the existing knowledge structure underwent *inclusive, elaborative,* and *integrative* changes. The changed picture involved the removal of incorrect ideas from the existing knowledge structure utilising information. The knowledge structure was revised through three stages: *construction*, *deconstruction*, and *reconstruction*. A clearer picture resulted when people were able to clarify and explain ideas by using information. *Explanation* and *precision* allowed for additions to the existing knowledge structure. A verified picture referred to people's reduction of uncertainty in their minds. Information processing could result in knowledge: *no change* or *emphatic*, *inclusive* or *defensive change* in the structure. Finally, a position in a picture referred to when people "form an opinion or state a view point" by utilising information (p. 19). The knowledge structure became *reactive*, *formative*, *potential positioning,* and *predictive*. Reactive referred to generating responses, formative referred to drawing conclusions, potential positioning represented knowledge acquired for the future, and predictive referred to predicting future impacts resulting from knowledge change.

Information is transformed in individuals' own minds and the process is not often observable. Information processing studies therefore contributed an understanding of what was happening in students' knowledge structures during the use of information in this study.

2.5.3 Elements affecting information use

Information use is an important part of sense making and unmaking. Thus, "all kinds of cognitive and affective elements" are necessary to make sense (Savolainen, 2006, p. 1123). In addition, "information is used in a context" (Saracevic, 1999, p. 1054). Taylor (1986) claimed that the environment determined usefulness of information for tasks. Thus, individuals in a particular environment added additional value to information in order to utilise it for "the problems and tasks of the environment," which consisted of *geographical*, *organizational*, and *social/intellectual/cultural* factors (p. 15). Information was not necessarily useful when a situation changed, even if it potentially helped users at a particular time (Dervin & Dewdney, 1986). Dervin's study suggested that there were no definite categories of information use. Information use changed based on users' situation, purposes, and time. Thus, information use was "time-space bound" (Dervin, 1992, p. 65).

Like information needs and information seeking, information use has been seen to be affected by various elements such as purposes for seeking information and the situations that people are in. When purposes and situations change, information is used in different ways. This may imply that understanding *why* students demonstrated certain types of information use revealed how these outside factors described in previous research affected the process. Literature on processing information was also particularly helpful to understand how information was processed and how it changed people's knowledge structure.

2.6 Relationships between Information Behaviour and Information Literacy

Since my research aimed to combine information behaviour and information literacy studies, it was useful to know how previous studies, especially in the information science field, described and explained relationships between information literacy and information behaviour.

As previously discussed in this literature review, Kuhlthau's ISP model described how successful students behaved during the research process. Students who understood the ISP could cope with ambiguity and uncertainty at an earlier stage and tended to personalise the process. The ISP "had become an important way to learn rather than just a means for fulfilling requirements for a course" (Kuhlthau, 1991, p. 368). Thus, it could be said that students who engage in this type of process became information literate.

A similar approach could be seen in Eisenberg and Berkowitz's (1990) the *Big6 Skills* model, which consisted of *task definition, information-seeking strategies, location and access, use of information, synthesis*, and *evaluation*.

- Task definition: Identify the information problem and what kind of information was lacking in order to solve the problem
- Information-seeking strategies: Developing search strategies in order to find information effectively
- Location and access: Based on the strategies created, information was located through both humans and text by using various criteria to decide priorities.
- Use of information: Engaging information and extracting information
- Synthesis: Organising and presenting information for satisfying the purpose

- Evaluation: Evaluating the process and product (efficiency and effectiveness) (pp. 5-9)

Those skills were necessary for successful information problem-solving in any life situation. The elements of this model did not always follow a linear and step-by-step sequence. Rather, the process took feedback loops. Each step was important to achieve successful information problem-solving, but individuals could customise each process to fit their personal preference (e.g., time spent, approach, sequence, and strategies of each skill). Different individuals could approach information problems differently (e.g., time allocation, strategy, process, and personality). The Big6 model explained that how students behaved was connected to information literacy achievement. In sum, both the ISP and the Big6 model showed that information literacy was not a discrete set of skills but a process which referred to "connected activities that encompass a way of thinking about and using information" (Eisenberg et al., 2004, p. 43). Although these two models as an entire process were a foundation for achieving information literacy, how each step should be performed to achieve a high level of literacy was not thoroughly discussed.

A few other studies have mentioned information literacy, but few articulated the connection with information behaviour. Branch (2003) studied non-traditional undergraduate students' information seeking behaviour for their academic work and everyday life. After taking a credit-based course on information literacy, participants evaluated themselves on their abilities to find information effectively and efficiently compared to before the course. Although Branch referred to the concept of information literacy, her recommendations only prompted thought about the implications for literacy through her interviews of students about their information seeking behaviour. Without

assessment of their information literacy skills, the connection between information seeking behaviours and information literacy was weak.

Pinto and Sales (2007) investigated students' information behaviour in order to provide a foundation for developing information literacy instruction. They first used a survey with open-ended questions to elicit teachers' opinions about the information skills that students needed to have. Next, students' own perceptions of which information skills were important and which were difficult were collected using a questionnaire of open and closed-ended questions. Although the authors claimed that this study was focusing on information behaviour, it was more accurately about information literacy skills assessment based on experts' desired outcomes of the behaviours. Thus, similar to Limberg and Sundin's (2006) study, students' information behaviour and information literacy were not explicitly described within the scope of the research.

Studies conducted by Heinström (2006a) investigated university students' information seeking behaviour. The author argued that instruction in how to seek and use information had rich implications for information literacy education. Three information seeking behaviour patterns were identified: 1) *fast surfing*, 2) *broad scanning*, and 3) *deep diving*. Fast surfing was described as minimal effort for locating information and analysing the content. Students tended to be impatient and easygoing when taking this approach. Often, these behaviour patterns were caused by stress and lack of time. As a result, they were tempted to seek easily digestible information, which negatively affected their understanding of topics and their content evaluation skills. Their academic achievement tended to be low when these behaviours were employed.

Students who showed broad scanning characteristics demonstrated spontaneous and wide search patterns. They were open to new information and appreciated serendipity in

finding of information, which could guide them to a new direction in their work. They paid attention to the quality of information and evaluated it critically. Interestingly, this seeking pattern was often observed among “social” types students (e.g., outgoing and curious). This pattern may often be found in students who major in the social sciences.

In the deep diving style, students devoted considerable effort to locating high quality of information to expand their knowledge. Their search strategy was systematic to retrieve their desired results. Due to these characteristics, they tended to have the highest academic achievement.

This study illustrated that certain information seeking patterns implied the degree of information literacy skills. As a similar study with high school students demonstrated, “surface level” students (low skills) focused only on “access and use of sources” but “deep” students (high skills) “analyse and used the acquired documents” in addition to using the basic strategies of surface students (Heinström, 2006b, discussion section, para. 6). Although this research offered evidence that certain information behaviour patterns were connected to students’ academic achievement, this analogy did not provide a measurement of their information literacy.

Similar to Heinström’s approach, Tanni and Sormunen (2008) investigated how learners’ characteristics, tasks, and information behaviour were related to each other. Each element is explained as follows:

- Learners’ dimension
    - Cognitive aspect: Prior knowledge
    - Affective aspect: Extrinsic versus intrinsic motivation; self-efficacy
    - Learning style and approach (e.g., surface and strategic)
- Learning task dimension

    - Learning environment: Curriculum; nature of assignments; learners' collaboration
    - Learners' perception on assignments by learners
    - Learning and documentation process (e.g., Kuhlthau's ISP)
    - Task output and learning outcomes
- Access and interaction dimension
    - Information seeking and search patterns
    - Document selection (e.g., relevance criteria) (pp. 898-907)

Analysis of interrelationships among those three elements implied that certain learners' information behaviour patterns were connected to their learning achievement. Thus, the authors concluded that good information behaviour, as a part of task-based learning, was essential for students to be information literate. For this research, clues as to how the elements affected information behaviour elucidated the connections to information literacy skills. However, this research did not discuss to what degree students are information literate when certain patterns were observed.

Limberg's papers were among the few examples clearly highlighting conceptual connections between information behaviour and information literacy clearly. Limberg and Sundin (2006) argued that information behaviour as a theoretical ground and information literacy as an empirical ground could be matched to create better user education. They argued that the outcomes of students' information seeking were closely related to their learning goals, which was information literacy. Their research results illustrated that information seeking instruction taught by professors focused on seeking and finding information, even though students were assessed on how information was used. The

authors claimed that the teaching of information seeking as a means of achieving information literacy needed to consider and the specific learning context and outcomes.

In another article, Limberg and Alexandersson (2010) analysed how, from a constructivist viewpoint, learning and information seeking were connected. The authors claimed that many past studies have not discussed learning processes or outcomes as the result of information seeking. Although they offered examples of interplay between the two concepts, their arguments about learning and teaching information seeking were especially relevant to this dissertation. In terms of learning information seeking skills, students' inquiry-based assignments required independent information seeking involving finding, evaluating, and using information critically for knowledge construction from sources they found. Also, teaching information seeking was aimed at developing students' abilities to seek and use information for various purposes. Information literacy is concerned with mastering skills in utilising information for learning, and therefore information seeking and information literacy were found to be connected to each other.

Finally, Limberg, Sundin, and Talja (2012) tried to connect the concepts of information behaviour and information literacy by viewing them through three theoretical perspectives: 1) phenomenography, 2) sociocultural, and 3) discourse analysis. In the phenomenographic approach, teaching information literacy was not seen as simply a list of skills. Rather, this approach was oriented toward how learners constructed meaning from information and changed their experience of information seeking, ultimately using information differently based on experience. The sociocultural perspective focused on how information seeking was conducted under different social practices, such as academic communication. Information literacy, then, entailed an understanding of the meaning of information seeking in a particular sphere of practice. Finally, discourse

analysis addressed how information seeking behaviour was socially, culturally, and historically shaped. Overall, the authors claimed that information literacy could be viewed as multiple abilities in utilising information to construct new knowledge, with the associated information behaviour shaped by the three perspectives.

Limberg's articles are among the very few examples of work that discussed the strong relationship between information behaviour and information literacy. Although learning has been seen as a key concept for information literacy, past literature has taken a rather high level perspective on the connection. It is therefore important to seek a more direct connection between specific elements of information behaviour and information literacy.

In a more empirical approach, a longitudinal study initiated by Urquhart and Rowley (2007) and Rowley and Urquhart (2007) presented information literacy as a factor affecting information behaviour. Their project aimed to build a framework for understanding how students search for and use information and what kinds of context hinder or facilitate their use of electronic information sources for learning in higher education in the United Kingdom. The model that they developed showed that students' information behaviour was influenced by micro and macro factors. Micro factors *directly affected* their information behaviour, and macro factors were about the institutional context which might have *influenced* information behaviour.

Micro factors included:

- Information literacy: Students' competencies which affected information retrieval, use, presentation, and evaluation
- Search strategies: Routine habits in students' information seeking, which were often unsophisticated (cf. information literacy)

- Academics' roles in changing information behaviour: Acting as examples of thinking and practice in disciplines and setting expectations for students' behaviour
- Discipline and curriculum: Deciding how knowledge and skills were learned
- Pedagogy: Academic staff's teaching approaches
- Support and training: Support or training in developing students' information skills which were often provided by librarians

Macro factors include:

- Information resource design: Matching students' level of learning needs with design, structure, and level of the resources
- Information and learning technology infrastructure: Infrastructure that provided access to digital resources
- Availability and constraints on access: Provision and restriction of universities' digital resources in certain circumstances
- Organisational leadership and culture: Administrators allocated necessary resources to develop students' information behaviour
- Policies and funding: Articulating how universities educate students on a broad level (Urquhart & Rowley, 2007, pp. 1190–1191).

This research showed that information literacy skills and various external contexts influenced students' information behaviour. However, the model treated information literacy as an entity that resided outside of information behaviour rather than as an outcome of information behaviour. Also, the authors did not provide details of students' information behaviour process due to the broad scope of the research.

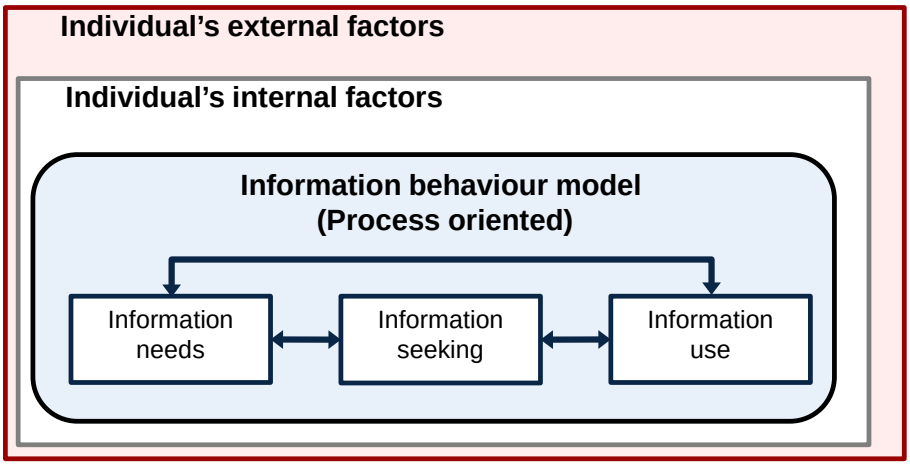
In sum, there were few instances of information behaviour research that discussed the fundamental connection between information behaviour and information literacy. Analysis of the literature revealed that many studies focus only on information behaviour, simply discussing the implications of information behaviour for information literacy, or considering information literacy as an outside factor that affected information behaviour. Some studies did refer to a potential relationship between certain patterns of information behaviour and information literacy skills. However, they did not discuss how certain aspects of information behaviour is connected to degrees of information literacy skills. Thus, a solid connection between information behaviour and information literacy skills assessment could provide a new direction for information science research.

2.7 Summary of Information Needs, Seeking and Use

In accordance with Wilson's definition of information behaviour (i.e., information needs, seeking, and use), I have analysed each element of information behaviour separately. The main points from the literature could be summarised as follows. Information needs have been seen to originate from cognitive gaps in which individuals could not make sense of their situation without seeking information. The needs changed after individuals' interaction with information and became clearer. Information seeking has been seen to have a dynamic nature rather than as a static process depending on the information encountered. Finally, individuals have been found to employ information for their intended purposes (e.g., conformation, enlightenment, and problem understanding) as a result of the previous steps in the process. As a result of information use, users' perspectives and understanding of their situation changed. Information needs, seeking, and use thus were not separated but rather interconnected.

These three elements have also been seen to be influenced by internal factors within individuals (e.g., cognitive, demographic, and psychological) and external factors outside of individuals (e.g., cultural, educational, and social). These factors were keys to characterise the nature of their information behaviour. Figure 1 illustrates a summary of the preceding literature review:

Figure 1. Context and information behaviour



Given its place in the reviewed literature, Wilson's conceptual model from 1996 was especially useful for my research to frame the relationship between various factors and information behaviour. The model also provided a structure for relationships among information needs, seeking and use (while other studies focused only on one element). In his model, Wilson (1997) suggested a range of preventive and supportive factors that occurred during information behaviour. A single factor or a combination of several factors might have had a significant impact on the effectiveness and efficiency of students' information behaviour during their academic tasks. Wilson claimed that those variables potentially appeared in any step of information behaviour.

Information needs arose in a person under a specific role and environment. An information need was first initiated by motivation or stress to overcome a situation

(activation mechanism). Before seeking information, various elements may have intervened in information seeking. For example, personal characteristics including cognitive, affective, educational, and demographic elements decided how people sought information. Economic elements such as personal value of time and cost also affected information behaviour. Geographical and cultural factors decided how people behaved in a certain environment. Interpersonal barriers may have been created when users sought information in person or needed to communicate with others. Accessibility, credibility, and preferred information channels were important for information seeking.

Next was the second activating mechanism from risk/reward theory and social learning theory whose core was self-efficacy. The higher the risk, the more people tended to conduct active searches. Also, a person's strength of conviction may be considered as an important element, as this provided motivation to cope with a situation by acquiring information. Finally, four modes of information seeking behaviour—passive attention, passive and active search, and ongoing searching—were initiated. Ellis's and Kuhlthau's information seeking behaviour models, as discussed earlier, could fit in active search behaviour to supplement the process. After information seeking, information was processed and used and integrated into the individual's knowledge.

Examinations of information behaviour studies revealed that the studies often did not have strong ties with the concept of information literacy. This implied that merging the two concepts together could add another layer to information behaviour research.

2.8 Information Literacy Standards and Skills Assessment

2.8.1 Information literacy standards

In order to determine whether students' information behaviour was information literate or not, information literacy standards have functioned as frameworks for skills

assessment of students' information behaviour. The Association of College and Research Libraries' (ACRL, 2004) *Information Literacy Competency Standards for Higher Education* consists of five standards and 22 performance indicators with outcomes for each indicator. If becoming information literate is the final destination for students, the standards provides a framework for where students are trying to go, how they get there, and whether they reach the destination (Grassian & Kaplowitz, 2009).

ACRL's standards have not been updated since their creation, but there have been versions modified for specific study areas such as psychology, political science, journalism, anthropology and sociology, and science and technology (ACRL, 2011). Survey results from 664 US colleges and universities showed that the standards were widely distributed and used in US academic libraries (ALA, 2003). In addition, some studies have used the standards as a framework for designing instruction (e.g., Baron & Strout-Dapaz, 2001; Emmett & Emde, 2007; Neely, 2006). These facts implied that the present study's results were built on widely-accepted and utilised standards, and that other researchers would also be able to replicate this study.

In relation to the research process, the standards have explained that information literate students understood that conducting research was a non-linear process and changed overtime. Thus, using information behaviour models for analysis added an additional layer to analyse students' information behaviour during their academic writing.

Other information literacy concepts also framed this research. In the United Kingdom, the Society of College, National and University Libraries (SCONUL, 1999) created the *Seven Pillars of Information Literacy Model*. In the model, basic library skills and basic information technology skills formed a foundation for information literacy. Built on two foundations, seven pillars (i.e., skills) showed an iterative process of how

information users developed information literacy skills. Novice users started from some of the pillars and expert users reached the seventh level skills. This model depicted the progress of information literacy skills from novice to expert and is useful for understanding the skills development process. The updated version of the model emphasised the circular rather than linear nature of developing information literacy skills. Skills in the Seven Pillars can be separately or simultaneously developed (SCONUL, 2011).

In Australia and New Zealand, the Council of Australian University Librarians (2001) modified ACRL's standards to better fit the context of Australian and New Zealand universities. Information management and organisation in standard four and recognition of information literacy for lifelong learning in standard seven were added to the original standards. In addition to the standards, outcomes in each standard were addressed. The Australian and New Zealand Institute for Information Literacy (ANZIIL, 2004) also revised the Australian and New Zealand standards. The lifelong learning element in standard seven in the previous edition became one of four overarching principles, so the document consisted of six standards.

Despite the prevalent use of these standards among many practitioners, some scholars have criticised that there are limitations when using standards blindly. In particular, simply using these standards as "shopping lists of desired behaviours" was not sufficient to evaluate students' information literacy skills development (Webber & Johnston, 2000, p. 388). A few researchers argue that it is important to look into the discourse and context of how information literacy practice has been understood and taught. For example, Lloyd's multiple studies (2005, 2006, 2010a, 2010b) claim the importance of social aspects of information literacy because the competencies and skills

of information literacy practice are economically, historically, politically, and socially reflected within a specific context. In addition, Mackey and Jacobson (2011) claim that treating information literacy as *metaliteracy* is necessary to go beyond simply skill-based approaches. Within the collaborative nature of the current online environment in producing and sharing content, information literacy needs to be an overarching concept containing many literacies such as cyber, digital (including information communication technology), media, and visual literacy, and information fluency. Kapitzke's (2003) *hyperliteracy* and Tuominen, Savolainen, and Talja's (2005) *sociotechnical practice* further emphasise the importance of including contextual and technological aspects in information literacy rather than just a set of skills.

How students perceived their information literacy skills added another layer to this research. Bruce's (1997) phenomenographic approach identified seven faces (categories) of information literacy which focused on people's experience of information literacy. Each face consisted of three circles including information technology, information use, and elements that were unique to each category. The central circle and outer circle changed across each face. Bruce claimed that those who taught and learned information literacy needed to consider not only skills acquisition but also people's understanding and experience of information literacy.

These previous studies imply that it is important to look at information literacy skills as not simply a check list. The qualitative approach used in this study takes an alternative views toward studying information literacy skills.

2.8.2 Information literacy assessment

Overall guidelines

Information literacy standards were frameworks for assessing students' information literacy skills. However, the standards themselves did not specify how skills should be assessed. Since different researchers have taken different approaches for skills assessment, it was necessary to investigate literature on information literacy skills assessment for this research. Several monographs functioned as guides for selecting assessment methods. For example, Neely (2006) illustrated how ACRL's information literacy standards could be used as a guideline to assess students' information literacy skills. She provided examples of assessment questions to gauge students' experience and skills in accordance with the performance indicators and outcomes under each ACRL standard. This book was useful to understand what kinds of survey questions could be asked to assess information literacy skills, but it did not provide other methods to evaluate students' overall skills from the beginning to the end of their research process. Grassian and Kaplowitz (2009) provided an overview of different assessment methods with pros and cons, but Radcliff, Jensen, Salem Jr., Burhanna, and Gedeon (2007) provided a more concrete guide for selecting assessment tools. The cross-tabulation between assessment domain (affective, behavioural, and cognitive) and assessment setting (classroom, programme, and institutional) assisted librarians in selecting different assessment approaches more easily. Approaches included: 1) informal assessment, 2) classroom assessment techniques, 3) surveys, 4) interviewing, 5) focus groups, 6) knowledge tests, 7) concept maps, 8) performance assessments, and 9) portfolios.

However, as Walsh (2009) pointed out, it was useful to have an overview of assessment methods, but it was also important to know which methods were currently

used in practice in order to decide which approaches to take for this research. Walsh searched for peer-reviewed articles related to information literacy skills assessment using four databases: 1) CINAHL (Cumulative Index to Nursing and Allied Health Literature), 2) ERIC (Education Resources Information Center), 3) LISA (Library and Information Science Abstracts), and 4) LISTA (Library, Information Science & Technology Abstracts). Within a selection of 91 articles, he analysed the types of methods being used in the library and information studies field, their popularity, and their reliability and validity. Among nine types of assessment methods, multiple choice questionnaires and quizzes/tests were the most common methods for assessing information literacy skills, found in 80% of the literature.

2.8.3 Information literacy skills assessment using quantitative methods

Standardised fixed-choice questionnaires have been designed to measure students' information literacy skills longitudinally and cross-institutionally (O'Connor, Radcliff, & Gedeon, 2002). Project SAILS (Standardized Assessment of Information Literacy Skills) developed by Kent State University is an example of large scale assessment. Students' skills are tested by 45 questions based on eight skill sets adopted from ACRL's information literacy standards and general objectives for information literacy instruction: 1) *developing a research strategy*, 2) *selecting finding tools*, 3) *searching*, 4) *using finding tool features*, 5) *retrieving sources*, 6) *evaluating sources*, 7) *documenting sources*, and 8) *understanding economic, legal, and social issues* (Kent State University, 2012). James Madison University also created an information literacy test with 60 multiple-choice questions based on ACRL's standards. This test was designed to be used by other institutions, and its validity and reliability have been examined multiple times (Cameron, Wise, & Lottridge, 2007). Similarly, undergraduate students across Quebec universities

had their information literacy skills assessed using 20 questions in five essential categories of skills for successful information searching using key themes from ACRL's standards (Mittermeyer & Quirion, 2003; Mittermeyer, 2005). In smaller-scale studies, Knight (2002) and Noe and Bishop (2005) assessed students' library knowledge through pre-and post-library instruction surveys with multiple-choice questions in order to investigate the effectiveness of library instruction. The studies illustrated that ACRL's information literacy standards were useful to measure and compare students' skills across institutions, among a large number of students, and in pre- and post-test settings. However, as Walsh (2009) argued, significant time and commitment were necessary to develop a high-quality instrument. Most importantly, questionnaire-based assessment tended to neglect the context of students' school curriculum and could not assess their information literacy skills in real life situations (Dunn, 2002; Oakleaf, 2008). These tests tended not to be "valid for testing higher-level cognitive skills such as analysis, synthesis, and evaluation, or to determine process learning and the acquisition of concepts" (Grassian & Kaplowitz, 2001, p. 281).

In order to overcome the deficiencies of fixed-question approaches, students' skills have been assessed by problem- and scenario-based rather than multiple choice instruments (Somerville, Smith, & Macklin, 2008). Educational Testing Services (ETS, 2012) developed the scenario-based *iSkills* test which assesses students' problem solving skills based on seven ICT (information and communication technology) literacy proficiencies: 1) defining information needs, 2) accessing information, 3) evaluating the quality of the content, 4) organising information, 5) synthesising information, 6) creating new information from resources, and 7) communicating with others using appropriate formats. Although students gave positive feedback, the test has not been welcomed in the

library community due to the test's strong focus on technology rather than print media (Neely, 2006). Also, some students thought that the content of the test and the interface itself were confusing because of differences between the software and what they usually used for their academic work (Asaravala, 2005). As a part of a multi-phase study, Dunn (2002) surveyed 3,309 students at California State University in accordance with the university's core information competency skills, which were similar to the ACRL's standards. Students answered telephone survey questions based on scenarios that were similar to their daily tasks. Similarly, Emde and Emmett (2007) assessed students' skills using information-needs scenarios which were close to students' real situations. Students conducted searches based on the scenario and the researchers scored their behaviour.

Overall, although quantitative methods were popular for assessing students' information literacy skills as analysed by Walsh, the reviewed literature showed that these approaches had limitations in assessing students' higher-order skills, which are important elements of information literacy. In order to overcome the limitations, scenario-based approaches have attempted to assess students' information literacy skills in an environment similar to that in which they conducted their research, but gaps still existed between artificial and real settings.

2.8.4 Information literacy skills assessment using qualitative methods

Other studies have assessed students' information literacy skills in qualitative ways. Seamans (2002) investigated how students locate, evaluate, and use information based on the ACRL standards' outcomes and performance indicators. In her study, email exchanges and personal interviews elicited rich details about students' experiences and information literacy skills.

Other studies have assessed the information literacy skills of students from a specific country using focus groups (Ishimura, 2007; Morrissey & Given, 2006). Although these studies were successful in eliciting students' experience in depth, they were based on students' self-assessment. There were potential gaps between what students described and their actual skills. Focus group methodology was effective to stimulate discuss among participants, but discrepancy of data was an issue in students' skills assessment. Most importantly, interviews did not reveal students' processes in depth.

In order to understand students' research process, it was necessary to investigate their effort, procedure, and achievement during their research tasks. Nutefall (2004) used a paper trail approach in which students reflected on their research process as a part of their assignment for a credit-based information literacy course. Students wrote two to four pages describing and critically reflecting on their research process. For example, students would write about the selected topic, places and types of information sought, selected search terms, and what worked and did not work. Then they would suggest reasons why their process was not successful and how they could change it. Since this assignment constituted a higher weight in their grade than other information literacy assignments, students commited to the exercise. Similarly, McGuinness and Brien (2007) used reflective research journals to assess students' information literacy skills. Students kept the journal for ten weeks as a guide to complete essay assignments. Students recorded goals for each week, activities they accomplished, what they read, problems encountered during the research process, and reflection on how the process could be improved. When appropriate, they could attach appendices for supporting their activities, for example, concept maps for their search strategies. This type of phenomenological approach

captured students' research skills and provided valuable insights into student learning (MacMillan, 2009).

Scharf, Elliot, Huey, Briller, and Joshi (2007) applied a writing portfolio approach together with five assessment variables based on ACRL's information literacy standards. Students' products were rated using a six-point Likert scale, and their writing portfolios was assessed according to five variables: 1) applying a citation style, which revealed students' abilities to locate information easily; 2) using a variety of sources, which indicated independent research beyond course syllabi; 3) using reliable sources, which indicated recognition of accuracy and authority of content; 4) integrating obtained sources to build their argument; and 5) overall information literacy performance. The study suggested what kind of skills needed to be examined and how the skills could be assessed.

Other studies were aimed at improving students' information literacy skills rather than assessing skills. Snavely and Wright (2003) required honour thesis students to create a portfolio recording their research process. They re-executed the process after reflecting on their evolution and created a revised portfolio to assist in writing their thesis. This method was effective in tracking students' process and progress for the benefit of both faculty and students. Sonley, Turner, Myer, and Cotton (2007) used a structured (rather than flexible) portfolio format to develop students' skills. Using a predetermined template such as a step-by-step process provided by instructors may have limited students' creativity. However, it allowed instructors to more easily to assess students' evidence of their research and give feedback on the process. On the other hand, as Scales and Lindsay (2005) demonstrated, students' own perspectives on information literacy could be investigated. Many studies have been framed by applying specific criteria (i.e., ACRL's

standards) to students' work, and new insights into information literacy could be generated by looking into themes emerging from students' papers.

Although there have been variations in their names (i.e., reflective journal, writing portfolio, and paper trail), these "portfolio" approaches were useful to track students' research process and students' reflection on it, both of which would be applicable to this dissertation. However, the approach required a significant time commitment from both students and researchers. Thus, it was difficult for researchers to recruit and assess a significant number of students unless the assessment was part of required courses.

2.8.5 Summary

Information literacy standards provide guidelines to assess students' skills, and there have been various approaches to actualise the assessment. Although quantitative approaches were effective for large-scale studies, they tended not to assess higher-order skills. Although they did not allow for generalisation, qualitative approaches offered opportunities to obtain a complete picture of individual students' information literacy skills. The existing qualitative literature provided several approaches that might be relevant for this study, such as portfolios, paper trails, and reflective research journals.

2.9 Information Literacy and Information Behaviour of International Students

2.9.1 Information behaviour and international students

The definition of international students has varied among studies in library and information science and education. For example, terms such as non-domestic students (Varga-Atkins & Ashcroft, 2004), English as a second language (ESL) students (e.g., Conteh-Morgan, 2001), and students as the same categorisation in the Open Doors report published by Institute of International Education in the United States (e.g., Baron & Strout-Dapaz, 2001) were commonly used to describe international students. In the North

American context, students from Canada would be categorised as international students in the United States, and vice versa, even though they shared similar culture and the same language compared to other regions (e.g., Asia and Africa). Students with different culture and language (i.e., non-native English speaking) tended to have more difficulties adjusting to North American academic environments. These elements were necessary to define international students in this study.

Fister (1992) found that at least some students had high abilities in conducting research, which entailed formulating a research focus, employing effective research strategies, and writing research papers, but this was not necessarily the norm. Jacobson and Mark (2000) found that many students, regardless of origin, did not know "how to focus their topic, where . . . to search, and how to evaluate and use the information they retrieve" (p. 256). In contrast to domestic students and native English-speaking students, international students had more difficulties in accessing information due to their unique background.

Linguistic and cultural differences in academe and in general were commonly observed barriers to information access in the relevant literature (e.g., Goudy & Moushey, 1984; Liu, 1993; Macdonald & Sarkodie-Mensah, 1988; Natowitz, 1995; Wang & Frank, 2002; Wayman, 1984; Zhang, 2006). Since my study investigated the information behaviour of international students, it was useful to identify the effect of those differences on their information behaviour.

Information needs

Formulating information needs are closely connected to students' strategy building for their research. However, differences in academic culture across countries has been found to affect the formulation of needs for their research tasks. In some countries,

libraries may not have existed. Even if libraries existed, students did not necessarily have access to books and journals due to limitations of library collection. Since materials may not have been freely accessible, the students had to pay money to borrow them or asked someone to retrieve books from closed stacks (Greenfield, Johnston, & Williams, 1986; Wayman, 1984). Libraries were sometimes regarded as a place for studying rather than researching (Hendricks, 1991). As outlined, the differences in library environments between students' home countries and North America gave students less opportunity to conduct their own research work.

In addition to the differences in libraries, lecture and recitation have been reported as common teaching methods in many countries (Greenfield et al., 1986; Macdonald & Sarkodie-Mensah, 1988). Students were often required only to recall and memorise information from lectures because the professor was regarded as the sole relevant source of knowledge (Kumar & Suresh, 2000; Sarkodie-Mensah, 1998). In Japan, Hendricks (1991) asserted that Japanese society discouraged originality and creativity; Japanese students just followed tasks teachers assigned and were not required to show creativity or imagination. Often, written exams determined their grades without any research tasks. This very structured academic environment did not allow students to do independent research which was often required in the North American educational setting. As a result, students did not know "where or how to begin research project" (Ball & Mahony, 1987, p. 162). These facts implied that international students had difficulties identifying information needs for their research tasks.

In addition to the differences in library experience and education, lack of English ability caused difficulties in deciphering assignment instructions and requirements (Baron & Strout-Dapaz, 2001; Hughes, 2005). In some cases, limited English skills led students

to select topics which were familiar or interesting so that they could reduce the work load during the writing process (Ishimura et al., 2008). Understanding of assignment requirements was necessary to identify information needs for assignment tasks, but limited English language skills and differences in academic environment may have hindered international students articulating the needs.

Information seeking

In terms of information seeking behaviour, many researchers have discussed students' difficulties with finding information. Often, terminology in academic libraries was "a third language" for ESL students because library jargon went beyond their understanding of the present states of language development (Kamhi-Stein & Stein, 1999, p. 174). Although academic libraries were places to look for information, it was not necessarily easy to find needed information. International students often lacked experience using North American libraries, which tended to have different systems from their home countries. For example, they may not have been familiar with reference tools (e.g., indexes, abstracts, and reference books), reference services, open stacks, online catalogues and databases, and the Library of Congress (LC) classification system (M. B. Allen, 1993; Goudy & Moushey, 1984; Koehler & Swanson, 1988; Liu, 1993; Macdonald & Sarkodie-Mensah, 1988). Due to those differences, accessing an academic library could be emotionally challenging for the students. International students had higher library anxiety than native English-speaking students (Jiao & Onwuegbuzie, 2001; Onwuegbuzie & Jiao, 1997).

Those elements caused international students frustration with using libraries, and they were intrigued by being able to find information from easily accessible sources. For example, Jeong (2004) claimed that limited English skills prevented students from

obtaining information and caused reliance on ethnic information channels. Another research study showed that students tended to value information from class lectures, assigned readings, and faculty. They tended to find key resources and authors using a chaining approach in order to locate information (Morrissey & Given, 2006).

The most significant impact on international students' information seeking behaviour was the internet. Compared to early research, students in a 2004 study showed high computer literacy skills and familiarity with the internet (Jackson, 2005). Computer skills were no longer significant barriers to the students, who sought information on the internet. Liao, Finn, and Lu (2007) found that approximately 50% of international students initiated the search process from the internet. Similarly, Song (2004) found that they tended to use web search engines more than domestic students.

On the other hand, it has been suggested that international students may not have difficulties in finding information from libraries. In one study (Varga-Atkins & Ashcroft, 2004), international students felt less frustrated in finding information and needed assistance less frequently than UK students. Overall, international students' feelings toward research and the library was more positive than UK students because of their motivation for success.

Focusing on information searching behaviour, DiMartino, Ferns, and Swacker (1995) asserted that although there was no difference in the prevalence of Boolean operator use among students, international students had more difficulties searching databases because of limited English vocabulary. In particular, the students tended to use only singular form of search terms and had difficulties expanding their search using synonyms and alternative terms, which limited effectiveness. Thus, international students'

database searching strategies were often “trial and error” rather than “systematic planning” (Hughes, 2005, p. 171).

Similar to difficulties regarding information needs, students’ unfamiliarity with North American library systems and insufficiency of language skills created barriers to seeking information and changed their behaviour compared to domestic students. However, as Varga-Atkins and Ashcroft found, the skills gaps between international students and domestic students may not have been significant. It was necessary in this dissertation to confirm how international students conducted information seeking and how effective the process was.

Information use

Even after finding appropriate materials, international students often have been observed to have difficulties using information. In particular, three areas of difficulty were common: using information by generating their own ideas, respecting intellectual honesty, and presenting results. As in the case of information needs, in some societies, originality and creativity are discouraged and students simply memorise and recall information (Ball & Mahony, 1987; Hendricks, 1991; Macdonald & Sarkodie-Mensah, 1988). Many international students thought that “creativity and analysis are risky and non-approved activities,” and they tended to find, synthesise, and report what others said in their assignments (Badke, 2002, p. 63). Those facts illustrated that the cognitive process of international students’ information use tended to be limited to reporting what experts said.

Proper use of information is crucial in North American academic institutions, but international students have had difficulties understanding academic rules such as plagiarism and copyright due to cultural differences (Badke, 2002; Baron & Strout-

Dapaz, 2001; Feldman, 1989; Kumar & Suresh, 2000; Wayman, 1984). Wayman (1984) asserted that international students were not familiar with plagiarism and may have unintentionally plagiarised in their papers. Feldman (1989) wrote that international students had to show their understanding of experts' ideas and "restate or synthesize those ideas coherently" (p. 161) in their home country, which could conflict with the concept of plagiarism in North America.

Presenting their knowledge and ideas is the final step to accomplish students' academic writing tasks using information. Cheng, Myles, and Curtis (2004) asserted that academic writing was one of the most challenging skills for international students. In particular, some students did not know how to write academic papers due to their limited English language skills. As a result, the papers produced by those students tended to have many errors and annoyed faculty members (Roberts & Cimasko, 2008).

Organisation of the paper could also be confusing. For example, it was sometimes assumed that students would use inductive arguments for Japanese writing and deductive for English. English rhetorical patterns are more direct and linear than the Japanese style (Shi & Beckett, 2009). But, Kubota (1998) found that students used a variety of rhetorical styles in both languages. Students who had good writing skills in Japanese were able to produce well-organised English essays. Students' cultural backgrounds may not have always determined their writing styles and abilities (Stapleton, 2002).

Information use is an important process for students to accomplish their tasks. However, the literature revealed that differences in academic culture and language prevented them from effectively using information. This implied that it was necessary to investigate how international students used information and how they might become adept at doing so.

2.9.2 Cultural differences and information behaviour

Cultural differences could potentially affect the information behaviour of international students. Perrucci and Hu (1995) asserted that factors such as frequent social contact with North American students, having exposure to North American culture, North American students' positive attitude toward international students' home countries, and non-discriminatory environments were keys for international students' satisfaction with the educational experience. But exposure to a different culture often caused negative emotions. For example, when students were exposed to different cultures, they experienced culture shock (Greenfield et al., 1986; Sarkodie-Mensah, 1998), anxiety, loneliness, stress, and depression (Sarkodie-Mensah, 1998; Lin & Yi, 1997, as cited in Wang & Frank, 2002). International students may have been marginalised because of their status. Their situation was described by the phrase, "we respect diversity, but you're not really one of us" (Lee & Rice, 2007, p. 396). Under this circumstance, students may have felt pressure in their social life which may have caused success or failure of their information behaviour.

2.9.3 Information literacy for international students

In order to improve international students' information literacy skills, more than 20 years of research has provided various approaches. Since librarians could potentially help students accomplish tasks, it has been essential for them to communicate effectively with international students. For example, using simple words and slow speed speech would be helpful to fill communication gaps (Wayman, 1984). In order to do so, in-service training programmes for librarians may be beneficial for improving communication skills (Ball & Mahony, 1987; Greenfield et al., 1986).

In being sensitive to students' potential limitations on language skills and overcoming the barriers, it has been suggested that libraries could provide multi-language library orientations (Liestman & Wu, 1990), multilingual library guides and bilingual library tours (Hensley & Love, 2011; Liu, 1993), multilingual virtual tours (Downing & Klein, 2001), and bilingual library instruction for Spanish-speaking students (Bosch & Molteni, 2011). More specifically, it was been argued, instruction sessions need to be tailored for particular ethnic groups to be more effective in tackling differences in language and culture among students (Downing & Klein, 2001; Gilton, 2005; Mu, 2007).

Collaborative instruction among librarians, ESL teachers, and faculty members was one of the most commonly observed approaches to help international students overcome linguistic barriers effectively. Some studies argued that ESL teachers were better than librarians because they could effectively deliver information literacy instruction to students with limited English skills (Bagnole & Miller, 2003; Conteh-Morgan, 2001, 2002; Feldman, 1989; Hurley, Hegarty, & Bolger, 2006; Kamhi-Stein & Stein, 1999; Ormondroyd, 1989). However, this could distract from the purpose of library instruction to the students if librarians could not provide it.

Other types of collaboration among campus communities for outreach to international students could be seen in the literature as well. Academic libraries needed to build connections and cooperation among campus units, for example, international student office, administration unit, and student affairs unit through formal and informal campus networks (Natowitz, 1995; Sarkodie-Mensah, 1998; Wang & Frank, 2002).

In order to provide effective information literacy instruction, Baron and Strout-Dapaz (2001) synthesised and supplemented past recommendations with the ACRL's information literacy standards. They interpreted the five standards from international

students' context which was focused on communication and educational and cultural adjustment.

2.9.4 Summary

Analysis of the literature showed that the information needs, seeking, and use of international students have been affected by students' cultural, educational, and linguistic backgrounds, especially insofar as they are different from North America. This implied that the degree of their information literacy was also decided by those differences. There may have been commonalities among individuals in terms of the various external contexts that affected their behaviour. However, each individual of course had internal differences. Investigating how each individual behaved and why they did so would give insight into understanding the information behaviour and information literacy of international students.

Another important point was that some recent studies reassembled recommendations that drew only from past literature (e.g., Gilton, 2005; Mu, 2007). It was necessary to move beyond the past recommendations and generate new knowledge for serving this population, because it was clear from the literature that services continue to be inadequate. Finally, studies on international students and academic libraries were summarised in Table 2 (see pp. 65-65). Three relevant categories for this study were user studies, skills assessment, and comparative studies. User studies focused on international students themselves as opposed to focusing on courses. Skills assessment research focused on evaluation of international students' skills. Comparative studies tended to examine international students in contrast with domestic students. If studies contained some aspect of empirical evidence (e.g., surveys), the papers were categorised as empirical.

Analysis of the literature revealed two problem areas. First, many studies were based on librarians' self-reflection rather than empirical research. Librarians' opinions may or may not have been accurate, as there was no external evidence to support their understanding. Second, some studies could not put forth a convincing argument because the research was not theoretically grounded even if it was empirically based. For example, some studies used the term information seeking behaviour even though they neither defined the term nor referred to any literature in the field of information science. Some authors claimed that their approaches to improving information literacy skills were successful even though readers could not tell how evaluation was conducted. Thus, it was seen as necessary to develop well-researched studies about international students in the field of library and information studies. This was consistent with findings in Curry and Copeman's (2005) study which confirmed that most studies on international students were based on librarians' anecdotes rather than empirical research.

Table 2. Types of articles about international students and academic libraries

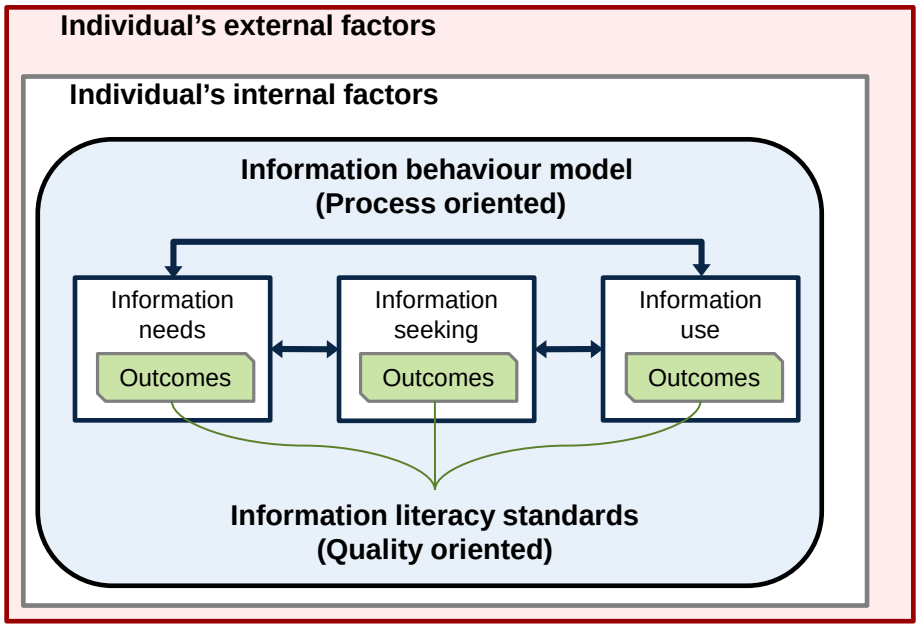
	Types of articles									
	Theoretical	Literature review	Librarians' reflection	Descriptive	Sample course plan	Course evaluation	User study	Skills assessment	Comparative study	Empirical
Allen (1993)							✓			✓
Amsberry (2008)	✓	✓								
Amsberry (2009)	✓	✓								
Amsberry (2010)	✓	✓								
Badke (2002)		✓	✓							
Bagnole & Miller (2003)				✓	✓					
Ball & Mahony (1987)		✓	✓							
Baron & Strout-Dapaz (2001)		✓	✓							
Conteh-Morgan (2001)	✓	✓								
Conteh-Morgan (2002)	✓	✓			✓					
Curry & Copeman				✓			✓			✓
DiMartino, Ferns, & Swacker (1995)				✓			✓	✓	✓	✓
Downing & Klein (2001)			✓	✓			✓			
Feldman (1989)			✓	✓	✓	✓				✓
Gilton (2005)		✓	✓							
Goudy & Moushey (1984)							✓			
Greenfield, Johnston, & Williams (1986)		✓	✓							
Hall (1991)		✓	✓							
Hendricks (1991)			✓							
Hughes (2005)							✓	✓		✓
Hurley, Hegarty, & Bolger (2006)			✓		✓					✓
Ishimura, Howard, & Moukdad (2008)							✓	✓		✓
Jackson (2004)			✓				✓			✓
Jackson and Sullivan (2011) [Book]			✓	✓	✓		✓	✓		
Kamhi-Stein & Stein (1999)			✓	✓	✓					✓
Koehler & Swanson (1988)				✓	✓	✓				✓
Kumar & Suresh (2000)		✓	✓							

Liao, Finn, & Lu (2007)							✓		✓	✓
Liestman & Wu (1990)				✓		✓				✓
Liu (1993)							✓			✓
Macdonald & Sarkodie-Mensah (1988)			✓							
Morrissey & Given (2006)							✓	✓		✓
Mu (2007)		✓	✓							
Natowitz (1995)		✓								
Onwuegbuzie & Jiao (1997)							✓		✓	✓
Ormondroyd (1989)			✓	✓	✓	✓				✓
Sarkodie-Mensah (1998)		✓	✓							
Song (2001)							✓		✓	✓
Song (2005)							✓		✓	✓
Varga-Atkins & Ashcroft (2004)							✓	✓	✓	✓
Wang & Frank (2002)		✓	✓							
Wayman (1984)		✓	✓							
Yi (2007)							✓			✓
Zhang (2006)		✓	✓							

2.10 Conclusion

So far I have reviewed and discussed literature on information behaviour research, information literacy standards and skills assessment, and the information behaviour of international students. These major areas were consolidated and presented as a research framework for this study (see Figure 2).

Figure 2. Research framework



Information behaviour models were suitable to reveal the complex nature of students' academic writing process. In particular, Wilson's (1997) information behaviour model, as a macro framework, elucidated an overview of the iterative process during research tasks. As Wilson noted, Kuhlthau's model of linear steps with affective aspects and Ellis's models of information seeking behaviour's iterative steps supplemented Wilson's model by incorporating more details of the process.

Taken as a whole, the reviewed literature demonstrated that information behaviour was affected by various internal (e.g., cognitive, demographic, and psychological) and external factors (e.g., cultural, educational, and social). The effect was manifested in each

task or in the entire process of information behaviour. Analysis of the effects of the factor on information behaviour shed light on how the factors shaped information behaviour.

Finally, past studies did not clearly show how certain elements of information behaviour were associated with degrees of information literacy skills. Information literacy standards were a useful framework to describe the extent to which their behaviour could be called information literate. The conceptual connections between information behaviour and ACRL's information literacy outcomes are summarised in Appendix A (see p. 258). The connections were important to identify the relationship for my study.

In sum, in relation to the first research question (i.e., What is the student's information behaviour during an academic writing task?), past information behaviour studies provided a useful framework to understand the iterative nature of information behaviour during students' academic writing tasks.

Various factors discussed in the past studies gave clues to which what kind of factors could potentially affect information behaviour with regard to the second research question (i.e., What factors are involved in information behaviour during an academic writing task?)

Finally, information literacy standards were useful guidelines to judge how certain information behaviour was information literate with regard to the third research question (i.e., What information literacy skills are present in the student's information behaviour?).

3 METHODOLOGY

3.1 Research Questions (RQs)

The overall objective of this study was to understand the nature of Japanese students' information behaviour, alongside Canadian students. Information behaviour that was carried out in the context of academic writing tasks was specifically examined. The study was guided by three research questions:

RQ1. What is the student's information behaviour during an academic writing task?

RQ2. What factors are involved in information behaviour during an academic writing task?

RQ3. What information literacy skills are present in the student's information behaviour?

3.2 Introduction

Qualitative approaches have been common in library and information studies (e.g., Ellis, 1989; Kuhlthau, 2004), but it is important here to explain the methodology selected for the study. According to Maykut and Morehouse (1994), a benefit of using a qualitative approach is that the researcher is able to understand "a situation as it is constructed by the participants" (p. 18). They further claimed that this type of research approach captures what people say and do, which generates understanding of how they interpret their world. The first research question of this study aimed to investigate what students did during academic writing tasks by finding patterns of information behaviour. The second research question was targeted to interpret the reasons, feelings, and motivations in relation to their information behaviour. Finally, the third research question dealt with assessing students' information behaviour based on information literacy standards, which includes interpretation of the information behaviour. In sum, this study

involved discovering information behaviour patterns, reasons behind the patterns, and skills assessment. Qualitative inquiry enabled me to investigate these research questions.

3.3 Data Collection

3.3.1 Study site

McGill University and Concordia University located in Montreal, Quebec, were selected as research sites because of the diverse nature of the student population and high concentration of international students. There were approximately 6,400 international students at McGill and 4,200 at Concordia University when the study began (Concordia University, 2008; McGill University, 2008a, 2008b).

3.3.2 Participants in the study

This study focused on investigating students' assignment completion process. Undergraduate students who were taking 300 or 400 level courses (i.e., U2 or U3 students) were selected as participants in this study because they tended to have research assignments. The focus of the study, which was built on previous examinations of Japanese students' information literacy skills, was to investigate students from linguistic and cultural environments that are different from Canada (Ishimura et al., 2008). Given the study's qualitative approach, then, communication abilities were essential for capturing students' voices and experiences authentically. Therefore, Japanese students in Canadian universities were selected as a manageable group of the larger population of international students. During the study's data collection period, the total number of Japanese undergraduate students was 49 at McGill (McGill University, 2008a, 2008b) and 13 at Concordia (K. Collins, personal communication, February 25, 2010).

Due to the small population, Japanese students from any discipline were included in the study as long as they were required to conduct research for their assignments. In order

to compare Japanese students' information behaviour, Canadian students were the other group of participants in the study. To recruit Canadian participants effectively, departments with large populations of undergraduate students who were likely to have research assignments were specifically targeted. The recruitment procedure is detailed in the following section (see Section 3.3.3, p. 72).

Japanese students

Since this research focused on Japanese students studying in Canada, it is necessary to clarify the definition of international students. First, students who do not have permanent residency status or citizenship in Canada must hold a Study Permit to study in academic institutions for more than six months (Citizenship and Immigration Canada, 2011). Japanese students in this study were defined as students who have a Study Permit.

Second, the purpose of the study was to learn about students who were primarily educated in Japan, because students who have stayed in English-speaking countries for a long time may be less likely to experience difficulties in the North American education system. Participants in the study were 1) born in Japan and 2) had completed compulsory education in the Japanese educational system. Participants had resided in Canada or the United States between six months to seven years. Their first language was Japanese.

Canadian students

McGill University and Concordia University define *Canadian students* as citizens or permanent residents of Canada. However, this categorisation was not sufficient to distinguish them from international students. That is, if their parents were immigrants who became permanent residents of Canada, students would have been granted legal status as Canadians, even if they did not speak English as their first language nor have been educated in Canada. Thus, in this study, Canadian students were defined as students

who 1) were born in Canada, 2) used English as their first language (to minimise language factors, Canadians using French as their first language were not included), and 3) were primarily educated in Canada (a parallel definition to that of the Japanese students).

3.3.3 Recruitment procedure

Prior to conducting the research, approval was obtained from the Research Ethics Board at McGill University. Purposeful sampling (Patton, 2002), based on the criteria outlined in the section 3.3.2, was used for selecting participants. I did not have direct access to a list of international students at McGill University, so recruitment initially was conducted through the Office of International Student Services, the Japanese Students' Association, and an online social network site called mixi which has very high use among Japanese people. It was very challenging to recruit students only at McGill University, and so I expanded my efforts through the International Students Office at Concordia University. Recruitment e-mails with a description of the study were sent to Japanese students (see Appendix B, p. 264 and Appendix C, p. 265). Interested students were asked to contact me directly, after which I sent them a confirmation e-mail.

A pilot study was conducted with the first three Japanese students who responded to the recruitment message. The purpose of the pilot study was to evaluate the appropriateness of the data gathering methods, i.e., to check the research project portfolio (see p. 78), clarity of the interview questions (see p. 81, and Appendix E, F, and G, pp. 267-269), test the flowchart tool (see p. 84), and review the interviewer's performance. The data collected through this process was included in the final study, as I did not encounter any concerns with methodology.

Canadian and Japanese students were recruited simultaneously, so the disciplinary makeup of the groups could not be made parallel. Three Japanese students participated in Fall 2009, two Japanese and eight Canadian students in Winter 2010, and three Japanese students in Fall 2010. In order to recruit Canadian students, first, I contacted administrative coordinators in the departments of Education, History, and Political Science, which had large enrolments, were representative of the social sciences, and were likely to have writing assignments. A recruitment e-mail was forwarded to students on my behalf (see Appendix D, p. 266). In addition, I also contacted undergraduate student societies in these departments, namely the Education Undergraduate Society, History Students' Association, and Political Science Students' Association, and representatives were asked to forward my recruitment emails. Interested students contacted me directly and I sent them a confirmation e-mail.

Using snowball sampling outlined below, additional potential participants were identified. Those who showed interest in participating in the research were asked to send information about the study to other potential participants that they might know. As Seidman (2006) suggests, instead of setting a specific number of participants, the recruitment process continued until the point at which I did not see any new theoretical categories from data analysis (i.e., data saturation). This occurred after the third round of data collection.

The purpose of the research was explained in the recruitment e-mails. At the beginning of the interview, I explained to each participant the purpose of the study and obtained written consent for their participation, for audio recording, and for substantial quotation (see Appendix H, p. 270). Participants were informed about their rights and were able to withdraw from participating in this research at any time. In order to ensure

participants' privacy in the recordings and related documents, an ID number was attached to each student rather than their names. Data collected in paper form was stored in locked cabinets in the School of Information Studies. The electronic data was stored on my personal computer with password encryption and was not accessible to anyone else. Audio recordings were destroyed once the research was complete. In presenting the research results, personal identities were not used to secure participants' anonymity, and the ID numbers were used for the purpose of analysis and reporting results.

3.3.4 Participants

In total, eight Japanese and eight Canadian students participated in the study. Additionally, two Japanese and four Canadian students were recruited but dropped out during data collection. Participants' demographic details are described in Table 3.

Table 3. List of participants

	ID	Gender	Selected paper discipline	Length of time in North America	Exchange student
Japanese students	J1	Female	Psychology	5 years	-
	J2	Male	Economics	6 months	Yes
	J3	Female	Political Science	5 years	-
	J4	Female	Marketing	6 months	Yes
	J5	Female	Religious Studies	6 months	Yes
	J6	Female	Political Science	11 months	Yes
	J7	Female	Political Science	7 years	Yes
	J8	Female	Botany	1 year	-
Canadian students	C1	Female	English literature	-	-
	C2	Male	History	-	-
	C3	Female	History	-	-
	C4	Male	History	-	-
	C5	Female	Political Science	-	-
	C6	Female	Linguistics	-	-
	C7	Female	History	-	-
	C8	Male	History	-	-

Students reported on research activities in various classes that were not necessarily associated with their discipline or major; the discipline of the class selected for discussion

in the study is listed in the table. Due to the small population size, the Japanese student group had more variety in their subject area than the Canadian group. Most of the Japanese participants were relative newcomers to North America: five out of eight participants had been studying in Canada for less than one year. The majority were exchange students who were enrolled in Japanese universities and were spending only one year in Canada. Although more female students participated in the Japanese student group, this proportion was consistent with the overall population in Canadian universities (Statistics Canada, 2012).

3.3.5 Data gathering

There were three methods of data collection in this study: 1) research project portfolios to collect evidence of activity related to participants' assignments, 2) semi-structured in-depth interviews, and 3) flowcharts that depicted a visual representation of students' writing process with diagrams.

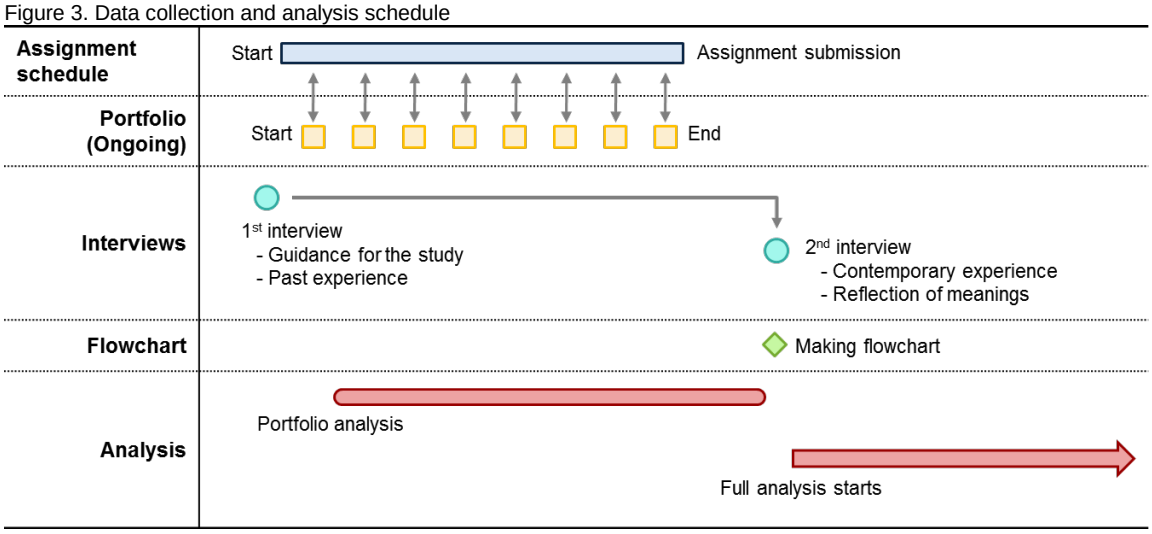
Table 4 summarises the relationship among the three data collection methods used in the study, the nature of the collected data, and corresponding research questions. Details of each data collection method are discussed in the following sections.

Table 4. Data collection methods, collected data, and research questions

Data collection methods	Collected data	Corresponding research questions
Research portfolio	▪ Records of students activities ▪ Snapshots of activities ▪ Self-reflection ▪ Final products	▪ Information behaviour during an academic writing task (RQ1) ▪ Factors affecting information behaviour (RQ2) ▪ Information literacy skills (RQ3)
Semi-structured interviews	▪ Detailed lived experience during information behaviour	▪ Information behaviour during an academic writing task (RQ1) ▪ Factors affecting information behaviour (RQ2) ▪ Information literacy skills (RQ3)
Flowcharts	▪ Research process charts	▪ Information behaviour an academic writing task (RQ1)

Due to the nature of this research, data collection and analysis were closely tied with students' assignment schedules. In order to avoid influencing students' behaviour during the data collection process, my communication with students was carefully worded to prevent leading or judgemental questions. For example, I focused on what they did and why rather than asking if they had considered another potential source. Figure 3 shows the overall schedule.

Figure 3. Data collection and analysis schedule



First, students were given portfolio instructions and participated in the first interview focusing on their background and past experience. They started keeping their research portfolios as they initiated their assignments. The portfolio creation ended at the completion of their assignments. I initiated analysis of the portfolios as I obtained data from participants so that I could become familiar with their information behaviour. The second interview asked about their current experience and reflections on their information behaviour. Students illustrated flowcharts of their assignment completion process during the interview as well. Since they may not have been familiar with the concept of flowcharts, brief guidance on how to depict their research process was provided through

verbal instructions and by showing sample shapes. Finally, all collected data was analysed and presented.

Since two different populations participated in this study, use of two languages was important for data collection and analysis. All interview questions were first formulated in English and then translated for Japanese participants in this study. Japanese was used for data collection because the complete experience of non-native English speaking participants might not have been revealed when using English (Marschan-Piekkari & Reis, 2004). Also, as Cortazzi, Pilcher, and Jin (2011) argued, using participants' first language could bring forth different aspects of the experience, which could not be discovered in interviews in English, because of a greater richness of expression and ease with the communication norms of the language. Thus, in this study, using Japanese during the interviews and interactions enabled me authentically to elicit what participants wanted to express because language and culture were connected naturally to participants' thought.

Since two languages were used for data collection, transcriptions and data analysis were also conducted in the original language in this study. As Irvine, Roberts, and Bradbury-Jones (2008) suggested, this approach was important to maintain validity of the research results. Coding in this study was conducted in English to maintain consistency. In presenting the results, substantial quotes were translated into English. Previous studies have suggested that multiple translators or back-translation can increase validity (Irvine et al., 2008; Temple & Young, 2004), but in this case, I am bilingual and could do the translation myself. It would not be feasible to have additional translation verification in the context of a doctoral study, but I contacted participants to make sure my translation was accurate.

Research project portfolio

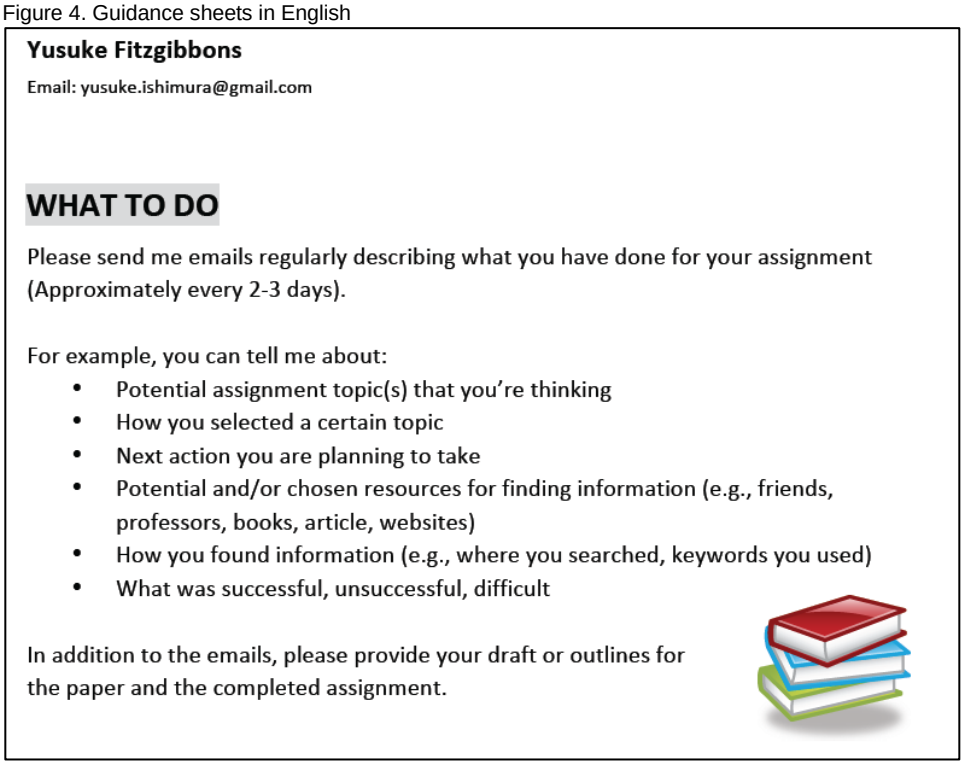
Research project portfolios were used to capture information behaviour, factors intervening information behaviour, and levels of students' information literacy skills (i.e., RQ1, RQ2, and RQ3). Arter and Spandel (1992) defined portfolios as "a purposeful collection of student work that tells the story of the student's effort, progress, or achievement in (a) given area(s)" (p. 36). Portfolios were often used to improve students' learning experiences, although this was not the primary purpose of the study. Portfolios were also a feasible method to capture a complete picture of students' information behaviour and abilities during their selected research projects. In particular, the approach was useful to investigate students' higher-order skills, work process and strategies toward the goal, problem-solving skills in real settings, and reflection on their performance during the tasks (Salvia, Ysseldyke, & Bolt, 2007). Beyond the education field, this approach is present in the field of library and information studies to assess students' information literacy skills (e.g., Nutefall, 2004; Scharf et al., 2007).

In order to maximise the effectiveness of this approach, Stiggins (2008) asserted that it was important to collect materials that would tell a particular story. For the purpose of this study, documenting evidence of students' information behaviour and its quality during the writing assignment project was essential. Students' portfolios included all activities related to their research tasks from the beginning of the research process to its completion. Through ongoing communication by email (including sending attachments), textual data related to students' information behaviour were collected. In addition to textual data, students were invited to include "photos, letters, rough drafts, schedules, lists (such as of books read), and other evidence" showing the process of their information

behaviour (Stiggins, 2008, p. 313). Items that could not be sent through email were collected when students met with me.

Given the potentially complex nature of portfolios, small guidance sheets were provided to each participant so that they could understand what to do. Figure 4 and Figure 5 show the English and Japanese version of the sheets, which offered examples of types of evidence as guidance.

Figure 4. Guidance sheets in English



Yusuke Fitzgibbons

Email: yusuke.ishimura@gmail.com

WHAT TO DO

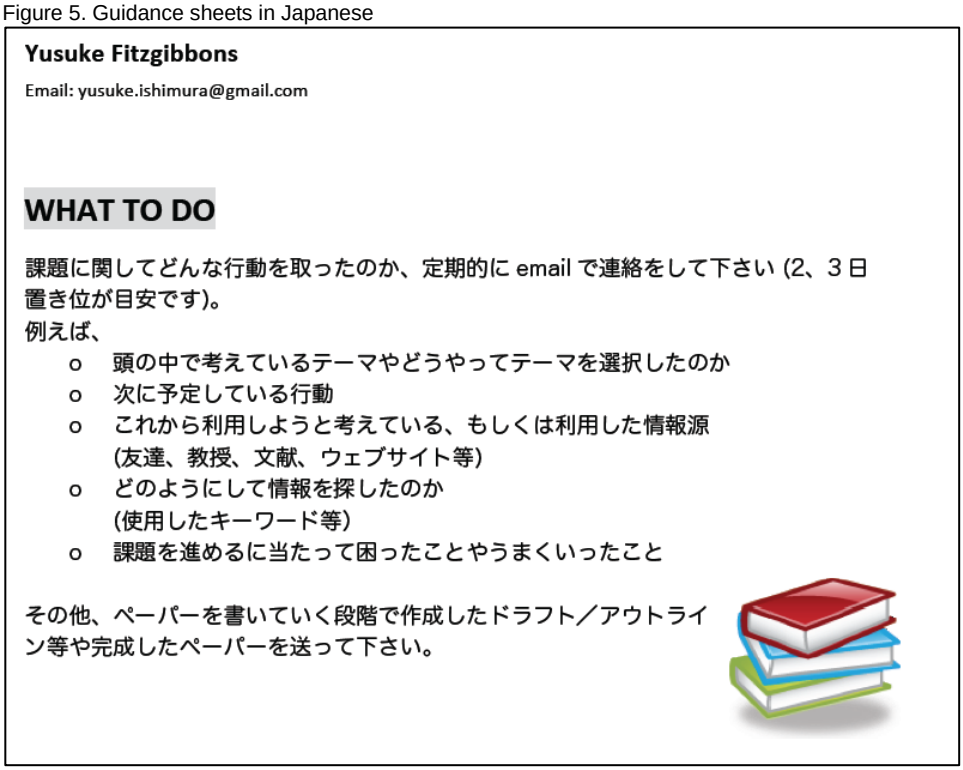
Please send me emails regularly describing what you have done for your assignment (Approximately every 2-3 days).

For example, you can tell me about:

- Potential assignment topic(s) that you're thinking
- How you selected a certain topic
- Next action you are planning to take
- Potential and/or chosen resources for finding information (e.g., friends, professors, books, article, websites)
- How you found information (e.g., where you searched, keywords you used)
- What was successful, unsuccessful, difficult

In addition to the emails, please provide your draft or outlines for the paper and the completed assignment.

Figure 5. Guidance sheets in Japanese



Literature in the social sciences has suggested other important points to consider in using this approach. For example, the portfolios required a significant time commitment on the part of students (Radcliff et al., 2007; Reynolds, Livingston, & Willson, 2006; Walker, 1985). Due to the time commitment, portfolios have been used as a part of credit-based information literacy courses or class assignments for students to record their information behaviour in detail rather than simply for data collection (e.g., Lonka et al., 2001; Snavely & Wright, 2003). In voluntary studies, Walker (1985) claimed that participants would face challenges in keeping a record without structured guidance. Thus, in this study, regular active communication between the researcher and participants was essential to ensuring that students collected evidence.

Self-reflection was required in making portfolios, but some participants may have had difficulties with being analytical and self-critical (Stiggins, 2008). In this study, therefore, participants were given questions to prompt their reflection during

communication with me. Examples were: why did you decide to choose this paper topic, when did you learn how to search for information, and why did you select these articles?

Finally, in keeping with Arter and Spandel's (1992) claim that clear and sound criteria for performance judgement was important for portfolio interpretation, information literacy standards were used as evaluation criteria in this study. Harada and Yoshida (2005) demonstrated the viability of this approach, using information literacy standards and performance indicators to evaluate students' skills, matching the specific criteria with the objectives of information literacy instruction sessions. However, in this study, specific instruction objectives were not relevant to evaluating the totality of participants' information behaviour. Their skills were assessed using the entire set of ACRL's information literacy competency standards. The assessment procedure is discussed in more detail in the analysis section (see Section 3.4.2, p. 86).

To compensate for the time commitment, I provided participants with research guidance consultations after the completion of the study, based on the portfolios they created. Since some participants were very interested in improving their research skills, the opportunity for a consultation helped motivate them to record their information behaviour.

In-depth individual interviews

Portfolios focused on how students behaved and to what extent they were information literate during their research process. As the next step, individual interviews were conducted to investigate the factors affecting students' information behaviour (RQ2). Also, the interviews supplemented data that was not obtained through the portfolios regarding information behaviour (RQ1) and information literacy skills (RQ3). Interviews

could obtain information about “facts, beliefs about facts, feelings and motives, standards of action, present and past behaviours, conscious reasons” (Silverman, 2001, p. 88).

Among various approaches, a phenomenological approach was selected for this research. According to Adams and Van Manen’s (2008) explanation, phenomenology was developed and expanded from the work of philosopher Edmund Husserl, which dealt with the nature of consciousness and how people experience phenomena within it. The approach of phenomenology has been used by practitioners in health and social science since the 1990s as it facilitated “more ethically and experientially sensitive epistemologies and ontologies of practice” in comparison with traditional professional methods of data collection (p. 615).

Creswell (2013) claimed that although there have been different philosophies behind phenomenology throughout its development, the commonality among them is the focus on lived experience and explanations of that experience. He continued, “a phenomenology ends with a descriptive passage that discusses the essence of the experience for individuals incorporating ‘what’ they have experienced and ‘how’ they experienced it” (p. 79). In this study, an investigation of how participants experienced the information behaviour process was especially important to uncovering intervening factors affecting the behaviour (RQ2).

In designing the phenomenological interviews, this study used Seidman’s (2006) three-step interview approach. Seidman asserted that a one-shot interview was not sufficient enough to understand people’s experience and the context behind it because their “behaviour becomes meaningful and understandable when placed in the context of their lives and the lives of those around them” (pp. 16-17). The first step in his model was about life history, the second was current experience, and reflection of the experience was

third. Although he recommended using three-step interviews to investigate participants' lived experience, he mentioned that the interview structure and process could still be effective if altered. Considering the fact that students often had tight schedules for their schoolwork, three individual interviews were not realistic. In this study, the three themes for the interview were retained, but the second (current experience) and third steps (reflection of the experience) of the interviews were integrated into one. Before starting the portfolio and after its completion, two individual in-depth interviews with each participant were conducted.

The first interview was focused on life history to establish the context of the students' experience. Japanese participants were asked to describe why they decided to come to Canada for study and their experience with academic work before studying at Concordia University or McGill University. Canadian students were asked to describe their choice to come to McGill, their selection of a particular study area, and their research experience before coming to McGill in high school or CEGEP (post-secondary university preparation/vocational college in Quebec).

This process reconstructed their past experience in various situations and put their experience into the context of their life history (related to academics). The interview guide was semi-structured, which enabled me to add or modify questions based on each participant's responses (see Appendix E, p. 267).

The second interview focused on the details of current experiences during research tasks. First, participants were asked about what they did during research tasks (i.e., details of their experience). Also, they reconstructed the process of completing an assignment. Like the first interview, this was also semi-structured (see Appendix F, p. 268). Core questions were listed with potential probes. But when necessary, I prompted participants

with questions based on what they recorded in the portfolios. Also, I asked participants to offer more details about their experience during the interviews.

Then, the interviews moved to the final area of focus: students' reflections on the experience. Students were asked to reflect on their information behaviour based on the past and current experience that they had described. In particular, the goal was to reveal how factors interacted to shape their information behaviour by exploring past and present experiences. Since the nature of the interview was a reflection on their experience during academic tasks, the interview questions changed based on individual students' responses and experience, and the exact interview questions could not be determined beforehand. Examples of questions are listed in Appendix G (see p. 269).

Interviews were conducted by appointment in my office in the School of Information Studies at McGill University. Interviews lasted an average of 40 minutes depending on the individual. At the end of each interview, feedback from participants was obtained as follows: I summarised important points and participants corrected or changed this summary to ensure that I did not miss important points and that my interpretation was correct. All interviews were recorded using voice recorders, transcribed, and analysed. Substantial quotations in Japanese were translated for inclusion in presenting the results.

Flowchart of information behaviour

Visualisation is a technique for understanding people's information behaviour (i.e., RQ1). Flow charts were used by Kuhlthau (2004) and flat concept maps were introduced by Radcliff, et al. (2007). Both have similar characteristics and were useful techniques to depict students' information behaviour. This study used flowcharts as a method of data collection. By mapping and diagramming their process, I was able to see each student's research process, all important events, strategies, and decision-making points in the

research steps that participants followed. Making sophisticated flowcharts was not the purpose of this research; rather, the content was more important that the actual form. Students created flowcharts with my assistance at the end of the second interview. By doing so, I was able to understand students' information behaviour visually and triangulate the results of the portfolio and interview analysis. The flowcharts were compared with data from portfolios and interviews. If necessary, I added supplemental information to the flowchart.

3.4 Data Analysis

The implementation of the study was largely affected by participants' assignment schedule. If each student's entire research process was analysed before moving to the next individual, it would only be possible to track one participant per academic term. Thus, different individuals in different stages of the process were analysed simultaneously while the research was in progress. For example, while one student recorded a research portfolio, another student was interviewed. After completing data collection for each individual, each participant's information behaviour was analysed and consolidated according to the three sources. Finally, differences and similarities across individuals were identified.

3.4.1 Flowchart analysis

Each participant created handwritten flowcharts. The charts were very useful to help me to comprehend the overall picture of the process. First, these charts were transferred to digital formats using Microsoft Visio. Second, since the charts were very simplified, I added more detailed information into the charts from portfolio and interview data (e.g., search keywords). During this step, by comparing the charts and collected data from portfolios and interviews, I made sure that the charts were consistent with the data.

If needed, flowcharts were amended to supplement missing elements or to accommodate potentially contradictory facts. Then, the charts from each participant were summarised and compared to reveal similarities and differences in terms of their information behaviour (RQ1). Explanations of differences were developed.

3.4.2 Research portfolio and interview data analysis

The purpose of research portfolios and interview analysis was to investigate information behaviour (RQ1), factors intervening the information behaviour (RQ2), and information literacy skills (RQ3). In order to do so, as recommended by Parry (2004), interview data analysis was conducted using the constant comparison approach (Charmaz, 2011; Glaser & Strauss, 1967). The analytic process introduced by Maykut and Morehouse (1994) was used with a three-step procedure as described below with the aid of Atlas.ti (a qualitative data analysis software programme).

Preparation for analysis

Before analysis, all data collected from portfolios (e.g., email transactions, outlines, and keywords for database searching) and interview scripts from each participant were transferred to Atlas.ti and maintained separately according to each participant. All of the data was analysed as a whole. Collected data from each participant was read carefully and units of meaning in the transcription were identified. Each unit was highlighted and codes (i.e., data segments) were created. Codes were named to represent the meaning of the unit (e.g., “forming ideas to identify potential information sources”). After the data was prepared, the discovery process was initiated. All data was reviewed again and “recurring concepts, phrases, topics, patterns, and themes grounded in” the data were investigated (Maykut & Morehouse, 1994, p. 133). All ideas were recorded as *memos* in Atlas.ti.

First step

Memos created in the previous step were reviewed and then overlapping concepts and themes were merged together. From the revised notes, key concepts were identified and code families (i.e., provisional categories) named after the concept were created (e.g., “finding a focus”). The codes from the analysis preparation were reviewed and grouped under larger provisional categories according to themes. Thus, for example, the family called “forming ideas to identify potential information sources” was filed under “finding a focus” (a code family). When another code potentially fitting the same category was found (e.g., “making sure information is available”), it was compared with the existing data in the category. If it did not fit, the discovery sheet was reviewed and another code family was identified. When the new category fit the data, a new code family (e.g., “locating information”) was created and the data placed under the new category. When the data did not fit any code families, second code families were created and the data was placed under these. The data under the second family was compared with existing categories to determine if they fit together. This process was continued until six to eight codes in the code families existed. As Maykut and Morehouse suggested, when data fits under multiple code families, data was placed under all relevant categories. Although this approach made it challenging to refine the categories, it was ultimately effective because information behaviour categories could be allowed to overlap.

Second step

Propositional statements or rules for inclusion, which explain the meaning of the data under the category, were created (Lincoln & Guba, 1985). Maykut and Morehouse (1994) asserted that this step creates “a statement that reflects the collective meaning contained in the cards [codes] within each category” (p. 140). Information regarding the

inclusion rule was attached to the category. For example, any codes related to focus-finding behaviour for assigned tasks were categorised under “finding a focus.” Each code was read again and examined as to whether the code was appropriate under the inclusion rule. Codes were placed under the appropriate family or treated as outliers, which did not belong to any. If necessary, categories were modified. This continued until all codes were placed under code families. All data was checked to verify similarities in the same family, differences among families, and non-ambiguity of codes.

Third step

In this phase, relationships and patterns across categories created during the previous step were examined. Propositional statements that have relationships to each other or stood alone were examined. For example, “finding a focus” was a category in which participants identified their starting points. “Locating information” was a category in which participants actually looked for information. Although these seemed different, locating information was viewed as a part of identifying starting points. As preparation for the final analysis, all data was summarised based on patterns and relationships that I found with regard to the research questions, especially regarding information behaviour and intervening factors.

The extent to which participants’ information behaviour could be considered “information literate” was identified using outcomes outlined in ACRL’s information literacy standards. Using a summary checklist (see Table 11, p. 197), I marked the checkbox as to whether behaviours described in outcomes of information literacy standards were observed in portfolios or articulated during interviews. My observations of their information literacy skills were added to personal research notes and compared with

each other to document why certain behaviour was considered information literate or not. Details of assessment methods are explained in the result section (see Section 4.3, p. 180).

3.4.3 Summarising data

In this phase, each individual's information behaviour, intervening factors, and information literacy skills were summarised for inclusion in the results section of this dissertation. In the previous steps, hierarchical relationships were formed within code families for information behaviour and intervening factors. Once again, in the summarising stage, the families were examined and consolidated to eliminate duplication. Descriptions of each family were recorded in the dissertation. This stage entailed analysis of patterns in the data—that is, what kind of information behaviour took place and in what kind of situations. In this way, I could construct descriptions of the context of participants' information behaviour and information literacy using the categories. Memos and flowcharts were used to check the reliability of my interpretation of the interview content for data triangulation.

In addition, participants' information behaviour was discussed in relation to intervening factors and information literacy skills. By looking at specific factors and information literacy skills, I developed explanations of how certain behaviour was shaped by the factors and skills. Through a process of inference, I analysed the code families to discover connections. In other words, I asked, "when a particular information behaviour occurred, what factors were associated with it?" For example, I could infer that the intervening factor "assignment characteristics" shaped "brainstorming ideas" in "finding a focus," behaviour because these categories co-occurred. Similarly, information literacy standards 1.1 and 1.2 were associated with the behaviour. The relationships among the three aspects were uncovered and summarised.

At this stage, differences and similarities between Japanese and Canadian students were also sought. Although this study took a qualitative approach, quotation counts from the "codes-primary-documents-tables" option in Atlas.ti were useful to see the overview of distribution differences. By using this function, the frequency of each code was listed in tables according to the primary documents (i.e., the textual evidence from each participant) so that I could see which codes were observed according to student group. This was conducted for each theme identified in the previous step, and I analysed the differences between the two groups. For example, the code family "finding a focus" had codes such as "brainstorming ideas" and "forming ideas to identify potential information sources." Occurrences per group were counted according to these codes, and the numbers served to highlight important areas in which differences were observed. The code counts were summarised and reported in tables and integrated in the final analysis (see Table 8, p. 137, Table 9, p. 177, and Table 10, p. 180).

4 RESULTS

Based on the evidence that participants provided (portfolios, interview data, and flowcharts), the following sections present an overview of each participant's research process. As preparation for the explaining the processes in depth, each participant's task is summarised in Table 5 and Table 6, because their process was closely associated with the tasks assigned by teachers. The assignment descriptions are summarised using the original wording provided by instructors, and therefore there is some variation in their terminology and how they describe concepts and ideas.

Table 5. Assignment descriptions for Japanese participants

	Level	Assignment topic	Tasks as described by instructors
J1	300 level psychology	Identifying how a specific gene mediated certain behaviour	▪ Paper of 5 to 7 pages with at least 10 references ▪ Suggested sources of information: PubMed, Mouse Genome Informatics, and Online Mendelian Inheritance in Man ▪ Sources should be journal articles including review papers ▪ Any citation style acceptable as long as consistent
J2	300 level economics	Climate change and its impact on the economy	▪ Paper of a maximum 10 pages ▪ 24 potential topics provided for the assignment ▪ A 1-page proposal required (topic selected, approaches to the topic, and potential sources to consult) ▪ Meeting with the professor to discuss the proposal content
J3	300 level political science	Major wars and their causes between major powers after 1900	▪ Paper of 12 to 14 pages with citations formatted in the Chicago style ▪ Broad suggestions for how to investigate topics ▪ Need to have a clear thesis statement ▪ Analytical argument is necessary; not descriptive ▪ Broad themes for the paper provided in original syllabus ▪ 13 concrete potential topics provided by teacher later in the term
J4	400 level marketing	Analysis of a marketing campaign's effectiveness in appealing to the target audience and contributing to the companies' market share or sales	▪ Paper of a maximum of 5 pages ▪ Five specific points to be addressed in the paper: 1) goals of the campaign, 2) its originality, 3) its relevance to consumers, 4) its clarity of communication, and 5) success of the campaign ▪ A list of trade and academic journals, books, various organisations' websites, and a link to databases for marketing research ▪ Direct quotes should be less than 25% of paper
J5	300 level religious studies	Creating a Wikipedia entry for a selected social justice organisation in Montreal	▪ Sources to be used: 1) at least 1 academic source, 2) 1 to 3 internet sources, and 3) at least 1 popular culture source (e.g., newspaper, magazine article, or brochure). ▪ Components to include in the entry: a historical overview of the organisation, current organisational structure, mission statement, and links to resources. ▪ Assignment included various steps: the first draft, peer feedback, the final draft, instructor's feedback, and the final submission
J6	400 level political science	Particular political theories to support or contradict to former communist countries' transformations in terms of actual countries' experience	▪ Paper of 10 to 15 pages ▪ At least 1 course reading and at least 5 outside sources regarding specific countries

J7	300 level political science	Discuss the causes of major wars after 1900, focused on theories that explain the causes of major wars after World War I.	▪ Paper of 7 to 8 pages ▪ 12 suggested potential topics
J8	300 level botany	Effectiveness/ineffectiveness of Echinacea for cold prevention or as a remedy	▪ Paper of a maximum of 3 pages, single spaced ▪ A persuasive essay written for an educated public or university students ▪ Multiple sources of evidence and provide information on the effectiveness and ineffectiveness of Echinacea ▪ Both scientific and anecdotal evidence could be used ▪ Terms such as “cold,” “flu,” and “Echinacea” had to be clearly defined ▪ At least 6 references formatted in APA style ▪ A detailed grading scheme was provided

Table 6. Assignment descriptions for Canadian participants

	Level	**Assignment topic**	**Tasks as described by instructors**
C1	300 level English literature	Same-sex love in Renaissance period literature	▪ Paper of approximately 2,500 words ▪ 9 suggested potential topics ▪ Recommended to be familiar with the cultural context of the topics and read secondary sources to understand that scholars have different opinions ▪ Interpretive rather than descriptive papers ▪ MLA citation style required
C2	200 level history	History of Eastern Europe during the 20th century, particularly cultural diversity, social and political systems, and conflict	▪ 2 short papers (4 to 5 pages) or 1 long paper (8 to 10 pages) ▪ Advanced students can write a longer paper with permission from the instructor ▪ A research proposal should be submitted before actual writing of a long paper
C3	300 level history	Environmental history, investigating the history of a plant, a disease, or an animal in North America, with the selected topic closely defined	▪ Paper of 8 to 10 pages with Chicago style ▪ Looking at primary sources in addition to secondary sources ▪ Required to cite at least 5 sources and 1 source from the course readings ▪ 3-step time table provided for writing a final paper: 1) select a topic, 2) make sure information is available, and 3) submit 1 to 2 page proposal ▪ Direct quotations and paraphrases incorporated appropriately
C4	300 level history	History of different viewpoints and experiences of multiple countries during the Cold War in North America, Europe, Asia, and Middle East	▪ Paper of a maximum of 12 pages (3,000 words) ▪ At least 5 secondary sources and primary sources ▪ More than 100 potential topics provided ▪ The structure was to consist of 1) a title, 2) an introduction with a thesis statement or research questions, 3) body of the argument and conclusions, 4) footnotes, and 5) a bibliography ▪ Emphasised the importance of analysing historical evidence and avoiding analysis of theories ▪ More than 1/3 of students’ time on the assignment should be on the actual writing (as opposed to research and reading) ▪ Quotations from primary and secondary sources could make up no more than 20% of the students’ final paper
C5	300 level political science	Specific examples of conflicts that illustrate causes of wars and strategies used to carry out wars and achieve peace	▪ Paper of a maximum 12 pages including bibliography ▪ Provide footnotes for cited materials
C6	300 level linguistics	Language variation and change from the perspective of sociolinguistics	▪ Paper of 10 to 15 pages ▪ Critical review of articles or books on 7 topics listed in the assignment guidelines ▪ Resources from the McGill library should be used, such as books and academic journals found through databases ▪ Citations formatted in the “standard” citation style for linguistics

C7	400 level history	How culture has affected intellectual activities and vice versa in the United States since 1865	▪ 15 page paper ▪ Citations in the Chicago style ▪ General themes provided such as pragmatism, feminism, communism, and environmentalism from which students could select the most interesting topic for them ▪ Primary sources should be used in addition to secondary sources ▪ Analytical rather than descriptive papers
C8	300 level history	Canadian and American relationships from various perspectives such as cultural, economic, and military	▪ Paper of 2,500 to 3,000 words ▪ 35 suggested topics with sources cited in footnotes on the assignment sheet ▪ Footnotes and bibliography in "proper academic style"

From the data collected, this study identified seven categories of information behaviour, which describe what steps students carried out during their writing tasks in authentic settings. In many cases, the categories did not perfectly mesh with elements of information behaviour (information needs, seeking, and use) as detailed in the theoretical framework. The students' process did not have clear distinctions with regard to these elements and was disorganised. This knowledge obtained about their process contributes to a more accurate understanding of students' information behaviour.

Seven associated factors explained why students exhibited certain information behaviour. In addition, intervening factors affecting information behaviour answered the question of why Japanese and Canadian students sometimes behaved differently. In the past studies, international students' behaviour was often discussed in association with cultural and language influences. In contrast, this study provided more comprehensive perspectives to understand why students behave in certain ways.

Information literacy skill assessments connected participants' information behaviour to the ACRL standards. This study discovered that information literacy skills were associated with information behaviour, the nature of which was explained by the intervening factors. In order to improve students' information literacy skills, this study identified that it is important to consider the process, factors, and skills holistically. This finding is examined in depth in the Discussion section.

The following sections present details of participants' information behaviour, factors, and information literacy skills.

4.1 Elements of Information Behaviour

This section presents the results of the first research question: What is the student's information behaviour during an academic writing task? Details of the students' process are illustrated in Appendix I (see p. 271).

Through the analysis of sixteen students' individual information behaviour, seven categories of behaviour are identified in this study: 1) finding a focus, 2) locating information, 3) information selection, 4) information organisation/extraction, 5) information analysis, 6) writing/editing, and 7) citing sources. The following section describes *what* information behaviour students exhibited rather than *why* they chose particular steps. A table at the end of this section provides a breakdown of these seven categories according to Japanese and Canadian groups (see Table 8, p. 137). The reasons behind their actions will be discussed in section 4.2 (see p. 138).

4.1.1 Finding a focus

Students are often required to write research papers on any topic related to the course content. The first, but important, step for essay writing therefore is finding a focus. There were different ways that students did so. For example, some selected topics from class material that they were interested in investigating more in-depth. The focus-finding process took the form of writing topic sentences, brainstorming ideas, or creating paper proposals. Not every participant found the focus of their paper at the beginning of the process; some found it much later.

Brainstorming ideas

At this stage, when seeking to find a focus, brainstorming of potential topics was a common approach regardless of group. Some students simply started listing keywords that represented basic ideas for potential topics that fit the scope of assignment guidelines, course readings, and classroom content. Although there were different approaches, many participants went through mental brainstorming processes in which they generated keywords rather than forming ideas in full sentences. For example, C3 listed these:

- historiography of conservation
- Utah
- John Muir
- Parrots (Southern USA)

When participants were brainstorming, there were different ways to come up with ideas. In some cases, students combined multiple methods rather than only one element. An example is seeking connections to existing knowledge.

Within the brainstorming category, most Canadian students, in contrast to Japanese students, tended to develop their focus from their personal interest based on course content such as lectures and readings. Often their topic selection was connected to something that piqued their interest in course readings or lectures.

> [J5] In the list [of organisations], the professor categorised organisations by their activities. Since I am interested in religious conversation [among different groups], I selected one from the list.

> [C5] Well, it was supposed to be something we had discussed in the class . . . I am more interested in structure of the peace, so I am actually toward that . . .

> [C6] Something I thought of. Different thing for this paper is that it started with something that I had personal connection to . . .

On the other hand, a few Japanese students reported selecting topics which are familiar to them through previous academic work. They tended to start their process from what they already knew rather than starting from scratch. Their decision-making in terms

of topic selection and use of resources was based on their existing knowledge, which, as several participants commented, simply was easier.

> [J3] At the beginning, I decided on a paper topic. Since other classes were very busy, I thought I wanted to pick a topic that I am familiar with. If it's related to Japan, I thought I could expand on what I learned in junior high or high school history classes.

> [J4] Since I am afraid of choosing companies that I don't know, I picked some that are well known. From these, I selected ones whose ads I've seen or I am familiar with. So it's not like I definitely have to pick this [Johnson & Johnson]. But I selected it because I felt it would be doable.

A few students considered their professors' specialisation when deciding the direction of their papers, hoping that this would lead to additional help from the instructor. For example, a Canadian student hoped the instructor would guide him to relevant sources, but this did not play out as he expected.

Forming ideas to identify potential information sources

As described in the previous section, students brainstormed ideas for potential topics in different ways. In some cases, it was difficult to find the focus of their papers without background knowledge. Thus, they sought out background information to become familiar with potential topics before making a final selection. Most participants from both groups felt that they did not have enough background knowledge about the potential topics. Thus, they initiated quick information searches on the internet and skimmed course readings to supplement background knowledge.

Students' starting points varied; however, the common goal among them was to have a vague idea for their direction at the beginning. To this end, one participant started by searching the library catalogue. His goal of this action was to find, as he put it, a *guide book* which provides a comprehensive overview of the topic and clues to other resources.

> [C2] The best strategy, I've always found, is to find 1 book, at least. Papers are really good, they're various focused and everything, but if you have 1 book that has something to do with your topic, it gives you this big background . . . Yeah, just read the big bulk of it

> and from there, that gives you all the issues and things you were looking for. And theoretically, it would give you the articles, where he [the author] went, too.

In this study, many participants conducted internet searches and browsed web pages. Some students simply searched specific websites while others went to Wikipedia to obtain initial ideas about the focus of their paper. They found that Wikipedia provided useful overviews of their various subjects.

> [C4] . . . I have been interested in the Sandinistas and so that actually started with a major Wikipedia search . . . I read the entire thing and then I realised this is quite confusing but also I am saying, oh that is not very exciting or that's not what I was hoping for.

> [C5] . . . I thought about a couple of ideas and went to the internet and did some preliminary, went to the Wikipedia. Just get basic information and then I was able to narrow my interest . . .

Although searching Wikipedia was effective to obtain overviews of topics, it does not cover the different types of information that students were seeking. Some students browsed websites so that they get familiar with certain topics in general. One participant looked at websites such as blogs and a website created by professors at another university to obtain background information to select topics.

> [J6] . . . I searched in Japanese once [with Google]. I didn't know what to do . . . Then, when I put "socialism" and "open economy" [in a search box], results about China appeared, with so much in Japanese. I wanted to know about generalisations. . . [I looked at] websites written by some professor. Like that. But not only academic things, I looked through things like blogs because it's easier to read at the beginning.

> [C3] . . . I really wasn't interested in anything, and he told us we could go outside the class material. So I pretty much Googled stuff, and I ended up finding… What did I Google? I Googled, because the topic was on the environmental history of an event, an animal, plants, or anything. So I Googled *extinct animal species in North America*. And I ended up finding a list. And I went through the list to see which ones where kind of interesting to me, because I knew I wanted to focus on an animal. That was my main thing . . .

Many students started pursuing their ideas with sources that were close at hand. Professors assigned readings for their courses, which is useful for students to have an overview to start their research.

> [C4] In this case, I have a course pack reading, I realised just in the course pack there happened to be a good overview. . .
>
> [J6] . . . I thought that I definitely should pick at least 2 [readings] used in class rather than using outsides sources much from the beginning. I thought this would [help me not to] lose direction.

Checking availability of information

Checking information availability was a key for some students to ensure their topics were *doable*, especially among most Canadians. Students recognised the logic that if relevant information is not available, they cannot write a paper. Before selecting topics, they made sure that the information that they would need existed, a simple but important step during the *finding focus* stage. Two examples showed that students searched the WorldCat Local discovery layer of the library catalogue, databases, and Google Scholar to see whether information existed on their topics.

> [C3] And then I went to the WorldCat library search engine, and then I typed in stuff, basically as if I was gonna find sources for each of the topics, and then I saw if there's enough for each. If there wasn't, I would eliminate it right away, even if I thought it was interesting because it would be too hard. And there were ones I just thought I wasn't interested in and I eliminated those. And then I was left with one that I was interested in and there was enough sources.
>
> [C5] I then did a quick search on Google Scholar and the CSA database to see what kinds of materials were available for each topic. Finding a significant amount of literature on preventive diplomacy, and considering its versatility as a paper topic (being relevant to many different case studies), I chose preventive diplomacy as the topic of my paper. I have not started researching the topic.

Narrowing the focus

Even if students were able to select a general topic, it did not mean that their choice had a manageable scope for the assignment at hand. Many students gradually narrowed down topics by reviewing potential sources. This often happened after reviewing information from a preliminary search. For example, after an initial information review, one participant narrowed down his topic from socialism in general to the relationship between nationalities and socialist parties in Poland.

> [C2] . . . the topic of nationality is what I'm interested in, so choosing socialism was to narrow it down. I chose to focus on the parties for two reasons: a) In light of Poland's later relationship with the USSR, the history of socialism seems to be the most relevant facet of the nationality/ethnicity issue, and b) the stance of the other parties in Poland is very obvious . . .

Strategies for finding a focus were not necessarily accompanied with an information search. Since thinking about topics alone can be very frustrating, another student narrowed down her focus after a discussion with the professor.

> [C7] . . . I don't have an argument or thesis statement [at the beginning of research stage]. I don't really start with an argument, you know. Anyway, I like the guy [theorist] who's probably right, you know, he was in opposition of WWI and its involvement and he is interesting . . . [I talked to the professor] to pick a more narrow slice of it . . .

Although it is good to have clear ideas, narrowing the focus too much may not be good for the students' paper writing. A few students did not lock down their topics at the beginning of research process for fear of missing an important direction to take. Thus, some students intentionally kept possibilities open for changing their focus.

> [C3] . . . Before I do my research, I don't think about the thesis right away because I find that eliminates a lot of parts in what I am reading. So I kind of think of potential thesis statements, I guess. But I try not to do that too much because I find it makes me too narrow-minded in my reading. So I try to keep it a bit open.

> [J1] Sometimes, I felt I should change topics after reading various papers. In that case, the theme was not easily taken apart or I feel that I started [my paper] with a huge topic.

Although Canadian students as a group did not articulate a thesis statement at the exploratory stage, three Canadian students reported thinking of potential statements. None of the Japanese students mentioned developing a thesis statement at this stage.

Changing the focus

In some cases, students' initial choice of a focused topic did not prove to be viable in the way that they had framed it, making it necessary for them to change directions during the process. A few participants from both groups described having to change their focus. The example below shows that a student realised that her initial idea did not satisfy

the assignment requirements. Thus, she was thinking of changing her direction during her process.

> [J4] . . . I started finding actual advertisements . . . I had a specific idea. When I started looking for it, I realised it was 2007 or 2008. So it was on the edge . . . I found a different one in 2009, but I felt I cannot make an argument and I started thinking about what I should do instead.

Sometimes, a change in focus did not originate from the student. Professors gave guidance for changing topics in a certain way. For example, one student followed the professor's advice and changed her topic accordingly.

> [C6] I went to talk to my professor. And then he suggested different ways I could go but then after I did even more research, I still wasn't sure so then I went to talk to him again, to narrow down my ideas and to actually kind of change directions a little bit. And then I guess I did more research after that, and then it came time to writing the paper.

Writing a proposal

In contrast with the preceding categories, this section refers to the formal process of drafting proposals. Only C2 and C3 were asked to write a proposal. They were required to write and submit proposals at the beginning of their paper writing process. Having this step was really helpful for them to plan their course of action.

> [C2] . . . So that [writing proposals] is just a matter of picking a topic. It helps you immensely. You don't end up wasting time, basically. It's a way of focusing your own thoughts and then getting that kind of input from the professor to help you not waste time, looking, going down one way streets and stuff.

Others

Participants in this study demonstrated other interesting ways to find a focus for their writing. For example, C8 somewhat jokingly said he selected a topic because he thought it would lengthen his paper if he chose to write about historical figures with long names:

> [C8] I picked that one because Diefenbaker-Eisenhower were both very long words. If I wrote that a paper that uses the names a lot it makes [my paper] longer.

Another example shows that C1 purposefully selected a topic that had not been covered in the class; she said that this was because she did not enjoy the course content. Also, she mentioned that she was hoping that the professor would not notice errors if the subject was not discussed in the course.

> [C1] I chose the one that was least related to course materials. So I took one we hadn't covered in class. Everything else has been covered in the class . . . So it was based on what was new and different because the class stuff was kind of boring or some of it was very technical.

Another student said that she chose a topic that had not been covered because she wanted to avoid discussing contradictory opinions in her paper:

> [J7] Less research has been conducted on this topic. I don't have to do much research to understand the concept of chain ganging, don't I? It's not widely accepted, so I thought I could avoid having to explain contradictions on the topic . . .

While some participants could find the focus for their essays without any problem, other expressed frustration. They found that they had to keep moving even if they did not have a clear idea in order to meet the deadline. For example, J6 decided to look for information on two different possible topics at the same time.

> [J6] I couldn't decide [my side, for or against the theory] so I separated the papers as belonging to either side. If you ask me why I finally decided to argue "against," why did I? I intuitively thought that side is easier to write about.

4.1.2 Locating information

It was necessary for students to find and incorporate outside information for the assignments they selected for this study. This category discusses where and how students found information. In terms of tools, students found information via Google, Wikipedia, library catalogues, databases, and course readings. When they searched for information, they applied various techniques such as Boolean search operators, limiters, and subject vocabulary.

Searching the web

Google products were very popular among both groups of students; eight Japanese and six Canadian participants used them in this study. However, use of individual products such as Google Search, Scholar, Books, and Image was slightly different. Six Japanese and two Canadian participants used Google Search. As mentioned in section 4.1.1 (see p. 97), J6 and C3 used Google Search to obtain general overviews of their potential topics or background information. While the previous category focuses on obtaining information in order to select a topic, this category refers to information gathering for the topics that students' ultimately selected. One participant used Google to supplement her knowledge about her selected topic. She described the types of information she looked for with Google:

> [J8] . . . Basically, I searched Google and looked at the hits one by one. This is for background information, not for references, to deepen basic understanding. I used Google. So this is like rumour-level information. Like an advertisement from a supplement company. I searched for general information on Google. This is not approved as references for my paper . . .

Google Books can be an effective tool for finding specific pieces of information. Google Books was used only by two Canadians. In some cases, it is hard for students to find books in libraries or information within physical books, but the search engine allows users to identify books that mention a particular person or idea as well as the specific location within the work.

> [C1] . . . So I had to use actual books which I am not good at using . . . but what I discovered is that Google Books has a lot of previews. If you are looking up something really specific, so I would put Samurai into the search, and then it would pull up books that had that word in it . . . So I didn't have to look through this whole book. It did it for me which I thought was *really* helpful. So Google Books: excellent! Made real books much more functional.

> [C4] . . . it's kind of getting easier when you search right on Google. In the books, I mean like Google Books. Cool.

Google Scholar saw almost equal use by a few participants from both groups. Some participants used Google Scholar to find academic sources, but various other strategies were mentioned. One reason for using Scholar is the perceived credibility of sources compared to the regular Google Search. Although it is not clear how Google Scholar is indexed, students expressed that Google Scholar was helpful to find academic sources.

> [C7] I just like Google, it would probably be good for Jon Stewart. I used Scholar because . . . with someone like him, if you just Google, you will get tons of stuff that I don't necessarily want . . .

> [J7] . . . I searched both Google and Google Scholar. But I think how many scholars truly say something, like credible research, anyone can write about chain ganging. So even if I do ordinary research and find something, I cannot tell who wrote it. So, I used Scholar, just in case.

Some students used Google as a last resort for finding information. One student started by searching an article database licensed by the library, but when she could not retrieve any results, she decided to use Google Scholar as an alternative.

> [J5] There was a requirement that academic sources should be used. I was a bit concerned about it. So I just searched the name of the organisation by limiting to academic sources in a database. But I cannot find any. So I searched Google Scholar.

Searching Google Scholar was seen to be faster and more convenient. One student found that searching databases was a bit complicated. In particular, she used it at the early stage of her research process.

> [C5] I started with Google Scholar mostly because I didn't have to connect to the McGill VPN, so it was a matter of convenience.

Finally, one student could not find the exact date of a historical event. The purpose of using Google Scholar was to find very specific information to add more details.

> [C8] What I mean by that is like I would say "OK he had a visit to Washington, so when was that visit exactly?" Then I would look it up, and it was May of 1958 . . . . I got a bunch from the Canadian archives and they cited the Canadian Encyclopedia and the Ottawa Citizen. I got a few little titbits from Google—they have like Google Scholar, I think it's called? And they just had records of old newspapers, like the Ottawa Citizen . . .

All examples described above demonstrate that students used Google Scholar differently according to their intention. However, one student expressed that there was no important difference in searching Google Scholar and the library catalogue. According to her, the same type of information is retrieved.

> [C6] Oh, I usually start off with the library website, the McGill library website, and of course, the internet, Google searches. Sometimes I go into Google Scholar but usually Google Scholar will find articles and books that are already in the library catalogue.

The final Google product mentioned was Image Search for an assignment that required students to provide images of an advertisement (J4).

Searching in article databases

Participants in each group reported using article databases other than Google Scholar. Regardless of group, some students used multiple databases while others used a single database. Also, they differentiated one database from another depending on their purposes. For example, one student used ProQuest specifically to search for newspaper articles.

> [J5] I was not sure how much detail I should write in the article. I decided to search [in ProQuest] for past events, events organised by the organisation. I searched for the name of events which the organisation held and found a couple of newspaper articles . . .

Another participant explained that he used JSTOR to find book reviews and EBSCOHost to search for articles, showing that he searched multiple databases for different purposes.

> [C2] JSTOR is sort of like a crutch. It's used for book reviews mainly, because it's easy to find book reviews by just clicking on the authors, so that's a very easy, intuitive thing to do. Also, "this item is cited in these articles" really helps. Again, I wouldn't call it the best place to go to, just because it's very limited I think. It doesn't have very much stuff on it. But it does have the occasional interesting article, which is good. And then the EBSCOhost, it is huge. Abstract searching is great. I love that.

Some students immediately went to specific databases with which they were familiar. Other participants went to libraries' resource guide web pages to select databases.

> [C3] Here, I go to humanities, because there are database lists. Usually I study US history. And there are a lot of newspaper databases that I go to also. A lot of times, I just like

> open up each one, search, and see if I can find anything. Unless it's very specific, like within a certain time period and I have to use the earlier ones.

> [J8] . . . on the previous page for searching databases, I click a box called Health Science. If you click the box, various categories will show up. I kind clicked health science general, health promotion, and medicine. I think the name of the database is Agricola. I used a database like MEDLINE, too.

Searching in the library catalogue

Participants' information seeking behaviour encompassed the range of Google products and various journal databases. In addition, most Canadian students frequently mentioned library catalogues, while only two Japanese mentioned them. For a few students, this was their main tool, for a variety of different reasons. One student mentioned that it was the only place she knew of to find information.

> [J3] First of all, I just went to the library catalogue and entered random keywords in the website. And then I randomly read what I found . . .

Interestingly, another example shows that even though the participant was aware of databases, he preferred the catalogue's interface and its convenience.

> [C8] . . . I don't really look at article databases as much. You know, I just don't look there because the library is easier to look for books.

Another participant explained that she used the catalogue to find a few books selectively rather than many articles.

> [C7] . . . So I looked up Jon Stewart at McGill Library because you're not gonna find a ton of books on him but there were a few. So that was kind of my basis, and I primarily looked at that . . . So kind of having that plus a few books from the library, that was enough . . .

Several participants also used a library catalogue to locate known items from an article's bibliography or a course syllabus.

> [C5] Looking for articles on preventive diplomacy on the CSA database, I came across a book review for three books about preventive diplomacy. I found these three books in the McGill catalogue and took them out. In two of these books were chapters on the UN mission to Macedonia . . .

Searching a catalogue did not always entail searching with keywords in a search box. Instead of searching for specific books or keywords, just a few Canadian students used

the *browse shelves* feature to view a virtual shelf list to find more books on their topics. In this sense, the catalogue was found to be a way to browse books virtually or physically.

> [C2] . . . I could use "search the shelves" or "browse the shelves" on the McGill website, but it's really slow for me because I have to look through each one. This one, I actually looked for a whole row of shelves and they just sort of jumped out.

> [C7] And also too, if you go the shelf, like browse the shelf of a good book that you find to see what else… I ended up stumbling upon a book, I think, just because I went to look for a book, the book I wanted to find was not there, but another really good one was.

Finding sources can be physical as well. Students found sources in other libraries through library catalogues and visits to other universities. One student visited a library with a Polish collection and looked for books.

> [C6] And if McGill doesn't have it (McGill usually does have everything, a wide library collection), if they don't have it, for instance, if it's only available at UQAM or U de M, I go there.

> [C2] Actually, I went to the Polish library. It is a very interesting building and a librarian forced himself to help me, forced me to accept help. It was when I was there, looking for some of the books, that I found sources.

In contrast, although they recognised the possibility of finding information outside of McGill, other students simply limited themselves to searching the collection through the McGill catalogue for its convenience.

> [C1] That was what I did once, I had restricted it to the dates that I needed, then it was whatever was useful. But I ended up looking most of them up, because the library didn't have whatever it was that they [another author] had used. So I was restricted by what the [McGill] library has. I end up using things that maybe weren't as good as they could have been—there are better books in existence—but if I don't have to access to them, they're useless to me.

> [C7] . . . And then, yeah, I mean I usually always start with what McGill has because that's easiest. I mean I know what Interlibrary [sic] is and all these other things, but I find it's just much easier to see what's there from a base starting point. So it's like what's easily accessible on the internet and what can I get at McGill and go from there . . .

Although some students seemed comfortable searching the catalogue, others had difficulties or just gave up when the results did not match what they expected to find. It seems that this tendency occurred among Japanese students since only two of them used a catalogue and conducted only simple keyword searches.

> [J4] I searched the library's database [catalogue], there is a place to find management books on the library website. So I entered UNIQLO [a company name], but I cannot find anything useful. I briefly looked at it and I thought "it's useless" and gave up on finding more.

Looking for information in Wikipedia

As discussed in the section 4.1.1 (See p. 97), Wikipedia was reportedly used only by three Canadian and one Japanese students. In both groups, the purpose was to obtain an overview of their selected topics. No participants mentioned using any other *reference* resources (e.g., encyclopaedias, handbooks, or bibliographies).

Purposeful selection of search tactics

This category describes *how* participants located information using the tools described above (i.e., web searches, catalogues, and databases). This behaviour is categorised as a part of Wilson's information search process, which is a subset of information seeking behaviour. Six students from each group demonstrated search tactics beyond simple keyword searches. Techniques used included: identification of synonyms for initial keywords, narrowing concepts based on results retrieved, phrase searching, and use of limiters (e.g., date, document type, and subject). However, the use of these tactics was more dependent on individuals' past experience; it cannot be attributed to differences between the groups.

A few students effectively used functions for limiting search results in databases to make the results more manageable. For example, two students explained that they limited their search results by year so that they could reduce the amount of irrelevant hits.

> [J5] . . . the organisation was established in 2003, so I only searched for articles published after 2003. Also, I know the time of the event [held by the organisation], so I included the year and date in the search conditions.

> [C2] Basically putting her [name] with my other keywords to get papers having to do with her, which ended up being an even better narrowing-down strategy, just because a lot of the papers that would deal with nationalities, Poland, everything else, socialism inevitably

> have to mention Rosa Luxemburg. How like pervasive she was. So that also started getting rid of 1945 things because she was dead by then . . .

Another participant limited her search to retrieve only review papers with the goal of obtaining a general overview of the topic.

> [J1] To make an outline, I searched [PubMed] using *oprm1 pain polymorphism*. I read a review about 3 other review papers to get an overview.

Similarly, another student purposefully used an advanced search function rather than the *basic* option to search by field. In particular, she limited the search by format.

> [C6] I usually go to advanced. And I usually, I have never used basic. Usually, I start off by doing things, not click anything here, but if I am looking for an author, obviously, I can look here. And then if I am looking for a journal title, I can click the type of material and go to the e-journal . . .

The potential effectiveness of this approach was further alluded to by another participant. C2 expressed frustration when he retrieved many articles written in Polish, which he cannot read; evidently he did not notice the option to limit by language.

When students formulated their search strings, some students demonstrated techniques for increasing the effectiveness. As an example, a few students used phrase search operators:

> [J5] In addition to the organisation's website, I used Google Scholar and the database ProQuest. I searched using "Montreal Dialogue Group", "Fun-da-Mental", "Peace Concert" which are names of events the organisation held.

> [J7] I used it [double quotation marks]. Um, I used or didn't use them sometimes... But if I don't use them, search results show up in scattered contexts, don't they?

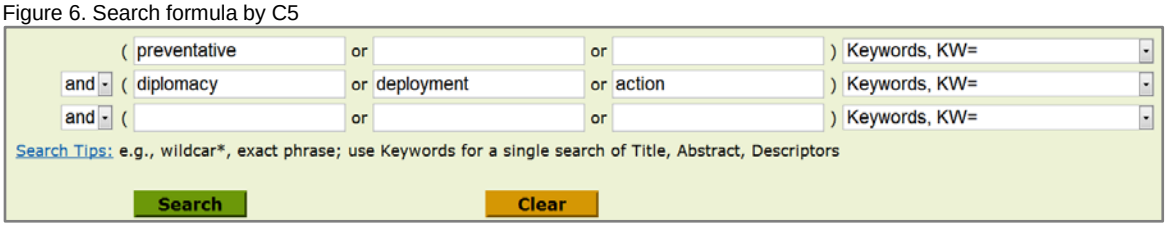
Some students often used single keywords at the beginning of their process because they did not have a clear focus yet. But when they developed clearer ideas, they started adding more terms. Also, they realised that using single keywords retrieved too many hits. Therefore, they limited the search results by adding terms.

> [C3] I think I did both [use one keyword or multiple]. I would start with like "environmental history." And then I would realise, OK it gives me way too much stuff, or maybe I would find something kind of interesting. And then I narrow down. I would pick a place, maybe, like Western US. It would be more words, but it would be more specific . . . And then if there was something specific I wanted to talk about, like *about* my topic, like with Rocky

> Mountain locusts, I searched about pesticides also, because it was something else I wanted to talk about. And just other different branching.
>
> [J4] At the beginning, I just used only Uniqlo and heattech. But more than ten thousand results show up. So I added keywords and limited my search. If I put too many, I usually put about 4 keywords. If it doesn't get any hits at all, I add or subtract keywords.

In addition to simply adding keywords, other students also tried to use synonyms to find more information. This was because they realised that changing terms (especially to equivalent terms) enabled them to retrieve different results. C5 clearly understood the effectiveness of this approach due to library workshops that she had attended. Her search formula was shown in the blow:

Figure 6. Search formula by C5

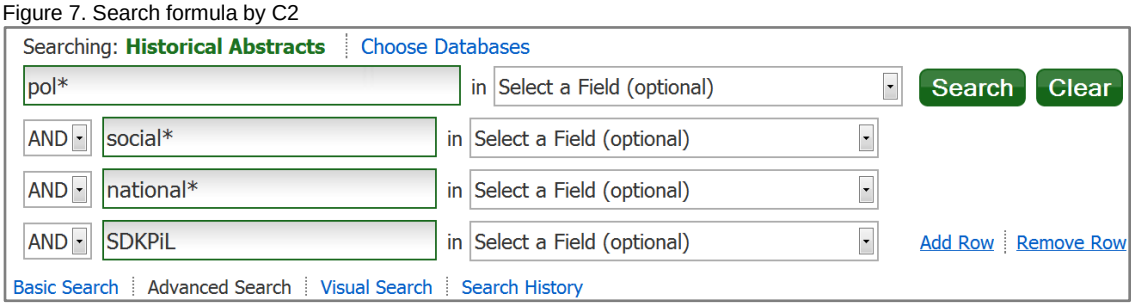


Two other participants (J4 and J8) described intuitively recognising that synonyms made a difference in the search results retrieved. J4 noticed slight differences in search results using *advertising* versus *advertisement*. J8 tested *effectivity* versus *effectiveness*. Interestingly, this type of searching was used when searching multiple databases as well. Participant C3 mentioned that she used exactly the same keywords for each database that she tries. She used keywords such as: *Locust, Locusts, Rocky Mountain Locust, Locusts 1800s, Pesticides, Locust and Pesticides, and Pests*.

Very few participants demonstrated advanced search techniques in this study, and those who did had knowledge of techniques from library sessions or previous experience. Only two Canadian participants demonstrated advanced search techniques such as Boolean operators, and only one mentioned using truncation. As described above, participant C5 used both Boolean operators and tried equivalent terms. C2 combined

Boolean operators, truncation, and searches for synonyms. Figure 7 shows a sample of his search.

Figure 7. Search formula by C2



Notably, though, the participant did not recognise that the string *pol**, referring to *Poland* and related roots, would retrieve many false hits.

The final search competency mentioned by students was related to spelling; correct spelling is often crucial as automatic spelling correctors have limited effectiveness. One participant did not notice a spelling mistake and wasted two hours in searching without success before noticing the error (i.e., *Luxemborg* versus *Luxemburg*). To prevent errors, another participant mentioned that she was very careful in entering keywords in search boxes in databases.

> [C3] And then I make sure I was typing it in because when I am typing in longer keywords, I like to make sure I am typing properly so that I can get what I wanted. Sometimes it doesn't recognise what you're typing in.

In the section 4.1.2 (See p. 105), a few students mentioned that they physically browsed book shelves. Related to this, two students demonstrated using search techniques in the library catalogue that mimicked browsing behaviour. They used a function to search by LC Subject Headings in the library's catalogue to find resources that were similar to what they already found.

> [C2] I really liked doing subjects. So I found I could search Poland and then go look through the subject lines because I think the classic catalogue comes up with about 10 that would be like Poland.

> [C3] I think first I did broad words, like broad ideas. And then in the library catalogue, whenever you click on something, there's the related keywords. So then you will have more specific stuff and that kind of led me to think further into the topic.

Searching for specific information

In contrast to searching and gathering information on a broad level as described above, search tasks could be very specific and very focused in order to fill small gaps when writing papers. Three Japanese and five Canadian participants described searching for very specific information at the later stages of the research process in order to collect additional information, which aimed to improve the quality of the paper's content. For example, C5 described:

> [C5] Yeah, going back to the NGO, when I was writing it, I didn't think I was going to talk about the role of NGOs, but then it ended up that I did. So I had some information on it, but I really needed some more specific stuff. So I went back and looked at a couple of the websites of the NGOs that had been in Macedonia at the time.

Searching for specific information could also have a confirmational purpose. In order to confirm the date of a specific event, for example, C8 conducted a search in Google (See section 4.1.1, p. 96). Another student searched within PDF documents to confirm what he had already written.

> [C4] . . . I really like the fact that you can search your whole computer for those keywords and they'll show up in the documents. Because then also when I was writing, I'm like, "which [one]?" I had 2 different sets of notes or whatever. And you find it there or even it does show up in the PDF. Really specific needs, and it works really well. So that's something that's kind of cool about this searching into data.

Citation chaining

In addition to searching for information with catalogues, databases, or Google, students successfully located other materials using references found in particular sources. This occurred at any stage of the search process. Almost all Canadians performed citation chaining to locate other materials, while only a few Japanese participants did so. Two of them (i.e., C7 and C8) were simply double-checking their resources by chaining rather than identifying new material, but overall, it seems that Canadian students more than

Japanese considered chaining as an important part of the entire research process. For example, since she learned how to find sources in the past, one participant expressed that course readings became a good starting point to locate relevant sources.

> [C1] . . . as they teach you in school, . . . if you know you find a really good citation you want to use, you can look at the back and find where they found that and then go find that book. So I used the four books that the teacher put on reserve, and then I used the books that those books had used, and then I think there were two or three more. I had like 15 sources I believe.

As opposed to participant C1, C2 undertook the process of locating *seminal* sources by himself. He first found a book that seemed to be core to his subject area, and then he located resources used in the book.

> [C2] First of all, I looked through my bibliography because I had 1 really good book. And another is all right. And I found 2, 3 sources more with the sort of argument that he made using sources that I wouldn't look up and checked them and used them as well in my paper.

In addition to books and articles, Wikipedia was also seen as a place to look at references that others had already collected.

> [C5] To start my research, I went to Wikipedia to get a general overview and see what kinds of references they used . . . the Wikipedia article referenced the "Agenda for Peace" drafted by the UN secretary general and a book by Michael Lund on preventive diplomacy. I then looked for it and found the "Agenda for Peace" document through Google Scholar, and found the Michael Lund book in the McGill catalogue.

Lack of information

In some cases, students were not able to find much information on their topics during the various information seeking stages. When this happened, a few students came to think that information did not exist rather than reviewing the effectiveness of their strategies. They then *compromised* with what they had found so far.

> [C1] I tried a couple of times, I generically searched on the library catalogue and nothing came up so I wasn't gonna go killing myself to find information that probably didn't exist or just such a small section, because when I think journals I usually think research-based. And there wasn't any research being done, this was just historical information so that would be more in books. So I stuck with what I had.

4.1.3 Information selection

This category explains how participants selected certain resources over others. When they found potentially useful sources for their papers, they did not necessarily use them all. Their selection behaviours included physical actions such as utilising tables of contents and abstracts for initial selection. They also applied criteria such as content coverage, keywords used in materials, and fit with their existing paper outline.

Utilising book features

Most Canadian students utilised book features such as titles and other metadata, tables of contents, and indices to decide which titles should be examined more closely. Since not many Japanese students used books for their tasks, only one instance of using the book's structure was observed among Japanese participants. These participants first looked at titles and tables of contents (if available) in library catalogue records to decide which books to locate physically. Often, as participant C2 described, they made a list of books based on what they found in catalogue search results.

> [C6] . . . Usually, the table of contents if it's good, if it's online in the catalogue. Obviously I look through it because you can only tell by the title, right, on the computer . . .

> [C2] I look at the title and the table of contents if it is available. If it is in a particularly relevant category, then I include it regardless of title.

When they found potential books to use or if the library catalogue did not provide detailed information, they went to the shelves and examined books physically to evaluate their relevance. They typically examined tables of contents, introductions, indices, and a few random pages.

> [C2] Once I have a list of even slightly possible options, I go to the shelf and begin quickly looking at introductions, prefaces, table of contents, or the first few pages to decide if it is worth investigating and actually reading in depth . . .

> [C3] There were books right away at the beginning that I knew I wanted to read the whole thing so I put those aside. And there were some where I was not really sure, so I would flip through the table of contents. I would take notes to which chapters were interesting,

> which ones I should read. And then I would go to the back to see if in any other chapters, there were references to specific words in the index. Just to make sure.
>
> [J3] I looked at the index and searched for the places indicated if I think a certain place looks good. Like I flip and skim through. But, I don't have time to read everything. I looked at keywords.

Looking at abstracts

Some participants in both groups read abstracts to judge the relevance of journal articles, although a few more Japanese did so. These students also described skimming the articles' main text if an abstract was not provided.

> [J2] Google Scholar shows titles of papers, doesn't it? So I can tell which papers are clearly different . . . And, there is a bit of information on below. I skimmed it . . . Often, the abstract is on the first page. I skim it to decide if this would be OK or not good.
>
> [C3] Yeah, I look at abstracts. And newspaper articles, I just take all of them because I don't have time to read through all of them . . .

Some students skimmed abstracts from the search results pages, but others opened search results as new browser tabs. This is because some databases do not provide abstracts on the search results pages.

> [C2] If I was going really fast, I actually don't even read the abstract right away. I would think, "select that one," "that looks interesting," "that one, too." And then I would fill up this whole thing with 10 separate tabs and just quickly skim through them. That would help me find what I was after.
>
> [J6] . . . I just read only 3 or 4 lines and just open up tabs. If I found titles that might be relevant, I open them as tabs and read the summary. If I think it's not relevant, I close it.
>
> [J8] Yes, I got search results. But it was challenging to select articles. Articles show up anyway but I don't know which one to read. So I opened up everything and looked at only the first page . . .

Matching sources with various criteria

When students found potential sources, they evaluated the relevance of the sources using various criteria such as connection to their paper outline and topic, specific keywords used in the documents, number of times the item was cited, fit with the assignment guidelines, and content coverage. Some students used only one or two criteria, while others evaluated the information on multiple levels. These criteria could be best

attributed to individual rather than group differences.

First, a few students simply selected information based on its appropriateness in the context of their paper outlines. This approach was observed among four Japanese students and was not observed among Canadian students.

> [J1] Since I could summarise important points very simply after reading review papers, I proceeded with writing by following an outline. For this time, I found articles that match with each topic. So I was not off from the initial plan.

> [J6] So far I selected information based on my outline. But if I think it would be useful even if a bit, I set it aside any way. Then I deleted at the end . . .

Another criterion was relevance to the topic that they intended to address. For example, like some of the other students, one participant said that he kept questions in his head and selected only information that helped approach the answers.

> [C4] . . . I asked myself 5 questions that I thought would be of interest to my essay . . . I started to seek what factors influenced Mao. Were they this, this, this. And then I kind of had these basic questions in my head. And then as I am reading them, I try to take notes down relevant to these questions, that I hope will build the essay.

The third criterion was the presence of keywords within documents or search results lists in library catalogues or databases. Three Japanese students demonstrated this while only one Canadian student did so. When particular terms were present, students assumed that the document would be highly relevant to their papers.

> [J4] . . . If terms that I was looking for match with results when searching for information, I found them with CTRL+F. For example, it clearly mentioned sales. If I was looking at advertisements, for me, I wanted articles similarly describing advertisements that push versatility. I was just trying to collect what I was thinking of.

> [J1] I look at the title, and then if I find the terms *genetic mutation*, *gene analysis*, etc. I open it.

> [C3] . . . And books, because I looked them up in the library catalogue. I looked at keywords to see if they're relevant to my topic, and I would take those.

The fourth element involved the coverage of specific ideas in a given document, which was only observed in one student from each group. In particular, students had

clearer ideas of their topics in the later stages of information seeking. Thus, they were looking for very focused information.

> [J8] . . . I printed out articles and read them to see whether they did meta-analysis and how many matrices in clinical tests were used. I thought that "more is better" in clinical tests and tried to see the numbers.

> [C2] I think it came up because I searched a table of contents and there was a specific chapter on her [Rosa Luxemburg] on the issue of nationality. That was incredibly helpful . . .

A Canadian student explained thinking that if an article was cited many times, it was an important work and therefore worth using in her own work. She checked the cited count for articles in Google Scholar during her search process. However, the relevance to her paper content was ultimately more important than citation count.

> [C6] . . . like in Google Scholar, they can show you how many people cited it . . . It can help you, definitely, when you're choosing what sources to use . . . but . . . I needed something that's more relevant. I don't think I would prioritise the number of citations over what is relevant . . .

Finally, one student in each group made sure that the sources they found satisfied what professors specified in their course outlines. One participant simply tried to find information that matched the guidelines.

> [J4] The course outline gives broad ideas of what to do. There are 5 points. So I thought it's good if I can find answers to these. When I found most of them, I tried to start writing and if I found that I needed more, I would search again.

A Canadian student described the need to understand *hidden* requirements from professors as well. She had the perception that instructors did not expect students were to create new theories or models. Thus, she selected anything concrete and relevant to her topic.

> [C1] . . . And my paper was mostly citations, it was mostly stuff that was specific, either directly quoted or paraphrased and cited . . . The point of the paper wasn't to come up with something new, to think about something new. It's just to regurgitate other people's information. Most of my paper was what other people had said.

Finally, two Canadian students described the desire to avoid missing important

information for their papers. For example, one student felt anxiety over potentially missing information and looked over her paper again to make sure that she included a seemingly comprehensive list of sources.

> [C3] . . . when you're really researching for your specific topic, you want to make sure you find every possible topic and all the sources you can. So I don't like to skip over it, and just like skim over it. And I feel like I am a bit obsessive-compulsive, so I feel I have to go back and check.

4.1.4 Information extraction and organisation

After finding sources, students extracted ideas and specific passages, organising them for later use in their papers. Actions related to this included making research notes, creating a paper structure, using sticky notes, and highlighting. Some individuals used more than one technique.

Using sticky notes

Three Canadian participants used sticky notes as a simple way to mark important passages in books and articles and to organise information. One student used a colour-coding scheme to highlight important points in books so that she could identify information by theme or relevance when writing her paper.

> [C1] What I did was I stuck little arrow sticky notes on anything I wanted to use directly . . . I had different coloured sticky notes, like blue meant monks and…pink was military culture and so they were colour coded . . . I lumped it together based on the colour coded post-its which were my points of interest based on that . . .

Another participant used sticky notes to identify important sentences to *extract* for his paper.

> [C2] Actually, the thing I found worked really well was these little sticky note things, I get the little tiny ones that are brightly coloured. So just stick that in. And then if there was something interesting, I should bear that in mind and put it down . . . So I mean, at the point, I would mark on the little sticky note or write it down in my newly-created sources and do that, or in my paper proposal document, I would write that down . . .

Highlighting documents while reading

Highlighting passages on printed documents was another way to mark information in preparation for taking research notes. Two students in each group used a highlighter to mark up text as they were reading

> [C3] . . . I printed out, and then I highlighted everything and assigned paragraph numbers to each idea for quotes.

> [C6] When I research, I do most of my organising online, but as you can see I *do* do a lot of notes by hand, mostly because I don't have a laptop and I actually prefer how I write things down and highlight things. I make photocopies of the articles and books that obviously I want a personal copy of so I can write in them . . .

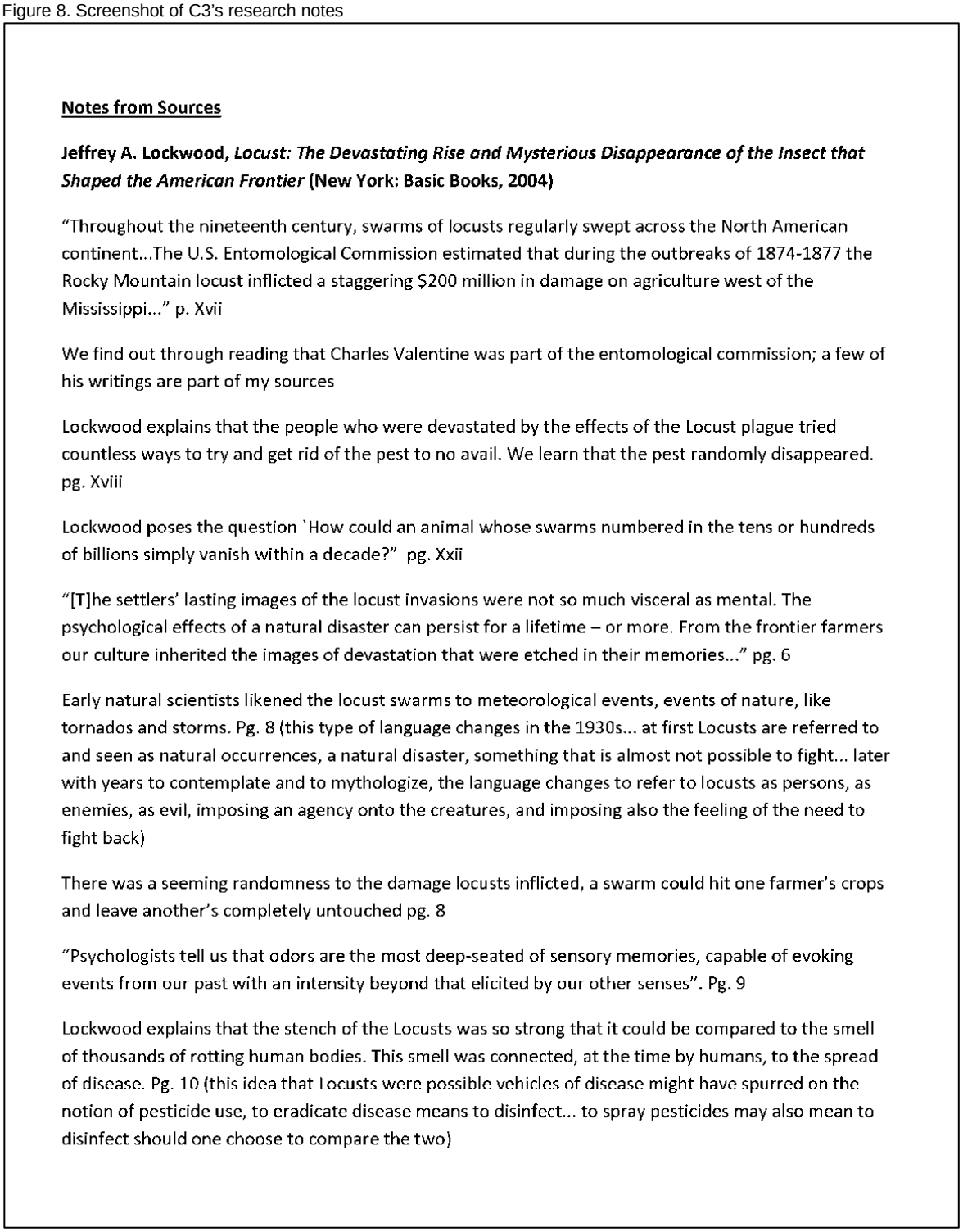
Making research notes

Many participants in this study showed more advanced organisation techniques when taking notes while gathering and reading information. Most students extracted ideas and passages as they found them and copied them to their research notes immediately. Research notes were either handwritten or in digital form (i.e., Microsoft Word documents). During the note-taking phase, students were simply focused on finding potentially useful information and keeping it for later use. Some students noted exact quotations, while others paraphrased their readings. In addition, citation information was always attached so that the source could be located and cited later. In some cases, students also included analysis of sources at the same time, which implies that organisation and analysis can be simultaneous. Making research notes as analysis behaviour is discussed in the following section (see Section 4.1.5, p. 125).

All Canadian students often created detailed research notes while reading, but only two Japanese students did so. In this study, although there were some similarities, each participant's approach to taking notes was different. C3 described details of her experience with making notes in Word (see Figure 8):

> [C3] I used to do it with note cards, which took kind of long. I would label each note card. But this semester, I tried something different on the computer . . . I read through the whole book, and each time I see something interesting, I take a quote of it, and then I note the page number, or I paraphrase and say like, "OK this chapter talks about so and so," and note the page number, and I have the heading. Like with the bibliographical information. So I make sure that I keep track of everything.

Figure 8. Screenshot of C3's research notes



Notes from Sources

Jeffrey A. Lockwood, *Locust: The Devastating Rise and Mysterious Disappearance of the Insect that Shaped the American Frontier* (New York: Basic Books, 2004)

"Throughout the nineteenth century, swarms of locusts regularly swept across the North American continent...The U.S. Entomological Commission estimated that during the outbreaks of 1874-1877 the Rocky Mountain locust inflicted a staggering $200 million in damage on agriculture west of the Mississippi..." p. Xvii

We find out through reading that Charles Valentine was part of the entomological commission; a few of his writings are part of my sources

Lockwood explains that the people who were devastated by the effects of the Locust plague tried countless ways to try and get rid of the pest to no avail. We learn that the pest randomly disappeared. pg. Xviii

Lockwood poses the question `How could an animal whose swarms numbered in the tens or hundreds of billions simply vanish within a decade?" pg. Xxii

"[T]he settlers' lasting images of the locust invasions were not so much visceral as mental. The psychological effects of a natural disaster can persist for a lifetime – or more. From the frontier farmers our culture inherited the images of devastation that were etched in their memories..." pg. 6

Early natural scientists likened the locust swarms to meteorological events, events of nature, like tornados and storms. Pg. 8 (this type of language changes in the 1930s... at first Locusts are referred to and seen as natural occurrences, a natural disaster, something that is almost not possible to fight... later with years to contemplate and to mythologize, the language changes to refer to locusts as persons, as enemies, as evil, imposing an agency onto the creatures, and imposing also the feeling of the need to fight back)

There was a seeming randomness to the damage locusts inflicted, a swarm could hit one farmer's crops and leave another's completely untouched pg. 8

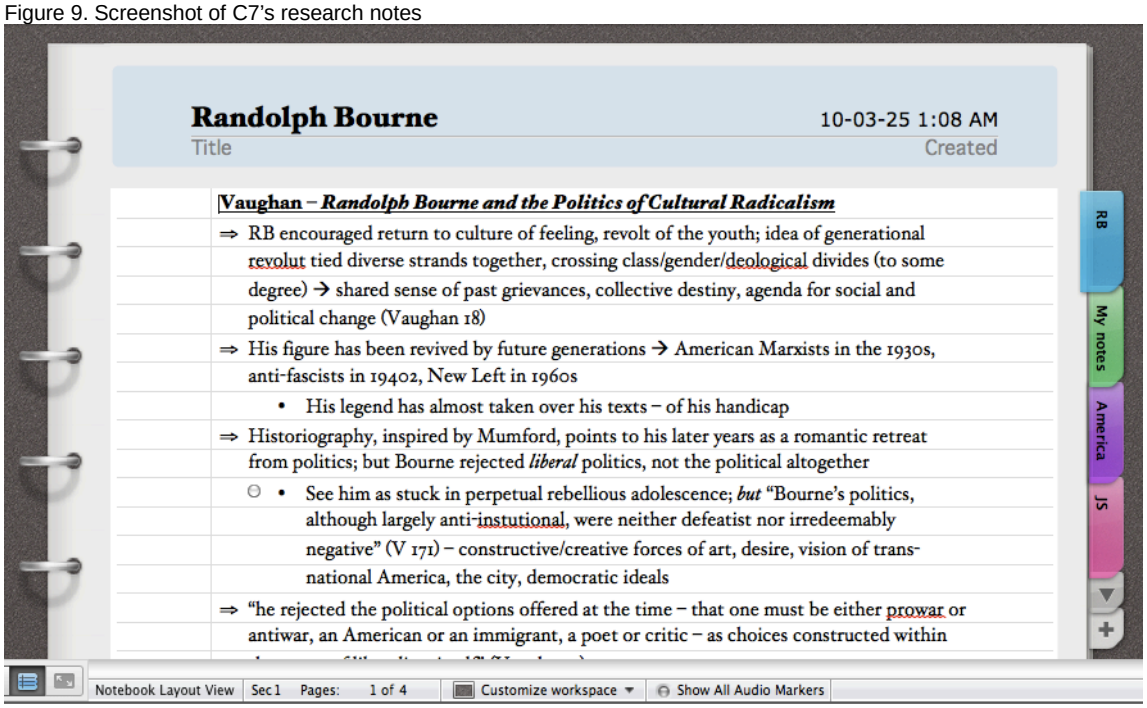
"Psychologists tell us that odors are the most deep-seated of sensory memories, capable of evoking events from our past with an intensity beyond that elicited by our other senses". Pg. 9

Lockwood explains that the stench of the Locusts was so strong that it could be compared to the smell of thousands of rotting human bodies. This smell was connected, at the time by humans, to the spread of disease. Pg. 10 (this idea that Locusts were possible vehicles of disease might have spurred on the notion of pesticide use, to eradicate disease means to disinfect... to spray pesticides may also mean to disinfect should one choose to compare the two)

While other students simply typed, one student used a function available in Word for Macintosh, adding labels to categorise her notes (see Figure 9).

> [C7] When I do my notes, I make headings by book, and when I transfer it for writing on the computer, then I try, I do a combination, like sometimes I end up typing just by the author or sometimes I end up… like for this, OK this is specifically related to war. Or this is, you know, related to political dissent or something. And try to fit it. But a lot of it, I end up typing all at once and then kind of moving stuff.

Figure 9. Screenshot of C7's research notes



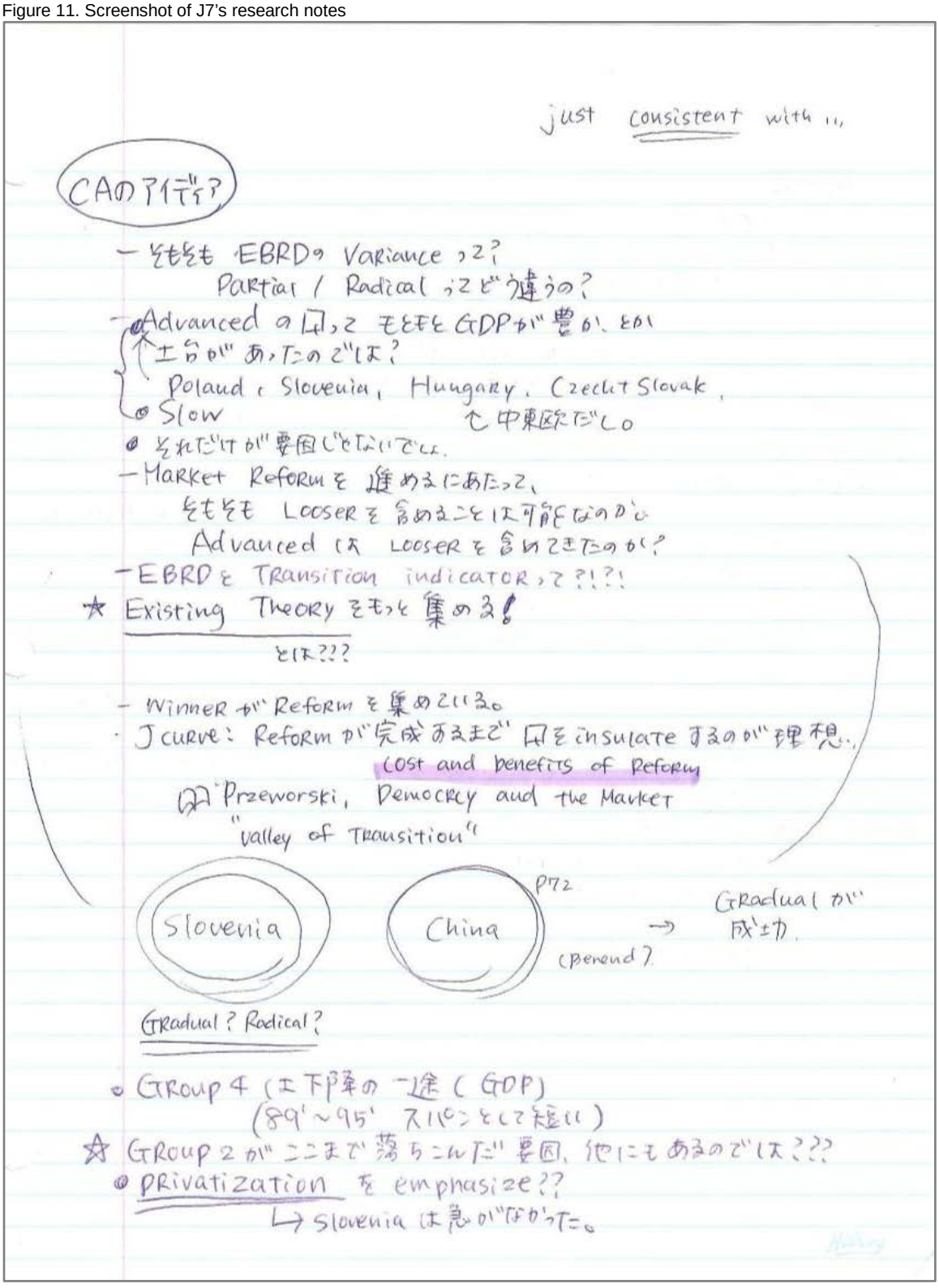
In taking notes, C6 separated files by information type, such as bibliography, quotes, and summaries rather than keeping a single file. She created three files named: 1) bibliography, 2) word-by-word (i.e., in which she copied and pasted the content of articles), and 3) summary of each (i.e., summary charts of each article, for later analysis). Figure 10 is a screenshot from C6's *summary of each* file.

Figure 10. Screenshot of C4's research notes

ARTICLE	SUMMARY HYPOTHESIS	ARGUMENTS METHODOLOGY	COMPARISONS
HONK KONG Johnson (1994)	177 diglossia without bilingualism towards trilingualism history background 178 official languages ordinance ***CHINES is undefined LANGUAGE PLANNING HAS BEEN REACTIVE HK identity – see themselves as modern not western 179 cantonese, other dialects Cantonese is ubiquitous MIXING AND SWITCHING 60% ☺ mixing is often stigmatized as undesirable, but it is a feature of the speech of the young, the (English) educated, and the upwardly	Nice overview Talks about all the languages Legal education BAD It is kinda old	178 HK identity – see themselves as modern not western LIKE SING, Q 179 'high' variety of Chinese → formal LIKE Q French formally, SING English formally

Interestingly, while some students preferred electronic notes, other students wrote by hand. In particular, J6 said that she preferred writing because she was able to process the information at a slower pace than if she was typing. She took notes in Japanese and English (see Figure 11).

Figure 11. Screenshot of J7's research notes



Although taking notes seemed to be effective for organising information, there were drawbacks described as well. If students were focusing too much on the process, there was the possibility that they were distracted from writing the final product. C4 described how he was spending too much time on making notes.

> [C4] But for the most part, I think that was one of my mistakes. I did make so much of my notes electronically that I had to escape using their words without breaking their ideas. But that's me, I think it's more organic if you have things written down and then start drafting from this. That was a lesson I learned from other friends. But I kind of blame myself for that, for trying to do too much electronically . . .

Creating paper structure

After making research notes, most Canadian and half of Japanese participants initiated organising information to structure the paper, which often became a paper outline. This step could be simple organisation of information, such as inserting information under certain headings. This could also be associated with information selection from sources found, generating ideas for papers, and writing as well. Making the outline was a way of organising information from participants' research notes and structuring the paper. One participant explained his process as follows:

> [C4] . . . OK, and then when I made my actual outline, all I did was think about how I was gonna organise my topics. Basically, I made a skeleton and from there, actually just kind of copied and pasted, just copied from document to document all the stuff I had . . .

Other examples illustrated how participants created the structure of their papers differently. C1 organised chronologically because she explained a historical event. C3 created a paper outline based on thesis statements identified. Finally, J7 explained that information searching and making the structure simultaneously occurred.

> [C1] Well I did it chronologically. The legend is that it was a specific monk who went to China found the Chinese were doing this and came back and said hey, this is a great idea. And then started it in his monastic community. So the history of it, I started at the beginning, I started chronologically.

> [C3] I write sample thesis statements, and then I do the first argument, potential first argument, and then I write anything that I can say like points, with bullets, and then the second argument, different points, like potential sources that I can use for each argument.

> [J7] I was doing research at the same time as creating an outline. Around this stage, I was doing both simultaneously.

Although participants created structures, it was not a fixed form. Often, they modified the structure until the final submission. C8 described reorganising sentences to make sure the outline had a good flow.

> [C8] Re-thinking the outline . . . So I usually say this is OK, but I should add certain sentences and take out sentences here.

During the review process, a few students printed out their notes. At this point, they had clear ideas about their papers. Simply, this made it easier to review their notes and organise paragraphs.

> [C3] Well, it was printed out, I think . . . And then I had each heading, each bibliography part for the title of the book highlighted, and I read through all of it . . . I would read through it and would assign numbers to each paragraph in my essay, like potential paragraphs. And then I would assign numbers to each piece of information. So there would be a paragraph of information, like a quote from a source, and I would say, "OK this is good for paragraph 3 in my essay."

When this behaviour was examined in-depth, differences between the two groups were observed, particularly in terms of its effect on the information extraction. Japanese students tended to create a paper structure during the earliest stages of their process and sought out information to fit with this. In contrast, Canadian students created outlines at the later stages, especially after information seeking and taking research notes. Their information organization and extraction behaviour was therefore guided by a preliminary thesis statement or goal rather than the overall paper structure.

4.1.5 Information analysis

In this category, participants analysed information they obtained to use it for their papers. This refers to more in-depth analysis rather than relevance judgement. In many cases, this step simultaneously happened during the stage discussed in the previous section, namely *information extraction and organisation* (see Section 4.1.4, p. 117).

Making research notes

As mentioned in the Section 4.1.4 (see p. 119), students created research notes to organise information selected for future use. In some cases, it is difficult to separate this behaviour from other categories. At any rate, in this category, all Canadian students added analysis to their notes beyond simply extracting information from sources while only two Japanese did so. For example, two students described that quotations, source information, and ideas were stored together in their notes.

> [C3] On Thursday I made a list of all my current sources in a Word document . . . after each source title I'll be inputting the quotations, points, notes and thoughts about that source, with page numbers, so that I can easily refer back when I'm writing the essay.

> [C6] When I create Word files, it doesn't have to sound . . . like I don't have to worry about making it sound presentable, like fancy, if you will. I can just put all my thoughts down. And then go back. When I go back, I feel like when I do make these planning files, I sort out what I want to do. It's basically my entire paper and then when I actually come down to writing it, I just put everything into words and then cite it. That's the actual essay work done.

Even though adding analysis sounds easy, it was challenging for some students. C7 emphasised that it is important to analyse information obtained because she thought that the professor had more knowledge than the students. Thus, she integrated both her description and analysis in her notes in the end.

> [C7] I mean, I'm both [descriptive and analytical when I am making notes]. I think when I am copying from say just Jon Stewart, like doing *America: The Book*, it's just what he said. Sometimes if I think of a note . . . Like I put this here because it's another quote that I found that's directly about this. This is mostly like just what he says. But my notes, there's a section where I put kind of what I think about stuff. And because I try a little to separate it from the sources, but I think in the end, it ends up being very integrated.

Creating a structure for information analysis

Creating an outline was part of the information analysis process, which went beyond simply making a *skeleton* of their papers by organising information. Although both groups demonstrated this, the approach differed amongst seven Canadian and five Japanese students. For a few Japanese students, the process was iterative. They began

with an outline, which guided their information seeking efforts, but then modified it after analysing the information they found. Canadian students created a paper structure after information analysis (i.e., reading and note-taking). Thus, when the Canadians reached the point of drafting the paper's structure, they tended to have a clear idea of what they intended to write.

Reading deeply

Selecting sources did not guarantee that students analysed them immediately. Only three Japanese students described doing *deep reading* during the information seeking phase; they found a document, read it thoroughly, and then moved to the next item. For example, J1 described:

> [J1] At this stage, I started reading what I found. I really start reading papers. At this stage, I decided most of the sources that will be in my reference lists.

Data analysis

Only one instance of this was observed among all participants, but J2 analysed raw data rather than analysing textual sources. He created a hypothesis to answer, obtained data, and made an argument.

> [J2] I made a hypothesis, like a hypothesis of what will happen. But "hypothesis" does not mean that I wrote sentences. I was thinking in my head about what will happen. For example, I looked at relationships between gas prices and consumption at the beginning. At that time, I anticipated that consumption will drop if price increases, but the result of the analysis was different . . . Then I read and quoted reports that support the result. I repeated the process like that to make the results meaningful.

4.1.6 Writing and editing

The final major step of participants' assignment process was writing. There were different approaches to write papers. Some participants kept research notes and started writing based on the notes. Others' writing process took a more on-going basis. Some students created outlines first and then started writing based on the outlines. A few others

wrote section-by-section. The writing process was also iterative, as editing was an important procedure to brush up the quality of their writing.

Filling in information

Some students described a processing of filling in *extracted* information during the writing stage, but the approach to this behaviour differed across the two groups. For the Canadian group, five participants simply filled in information based on the outline created in previous steps. They had already completed analysing information, created research notes (often consisting of paraphrases/summarises), and formed clear ideas and arguments. Thus, they did not have major trouble transferring their summary to an essay form.

> [C3] It's like, by this time, you have so much information in your head, you could probably write the essay without even looking at the sources because you remember everything, but you have it there so you can be like, "OK I am talking about this, what would I have on this part of the topic in my notes?" And have everything numbered so you can go back very easily.

> [C5] . . . when I create the outline, I just throw all of the research notes that I have unless this is completely irrelevant. You know, it doesn't fit under one of the categories. And then you know as I write, a lot of stuff was cut out.

> [C6] Yes. I guess I already I did charts summarising the two Quebec articles that I wanted to use. So that's good. So I basically, transpose what I did in point form into sentences and then make them coherent.

In contrast, for three Japanese participants, their notes consisted more of verbatim quotations. They tended to transfer all potentially useful information into their own papers before completing the analysis stage. Thus, they required more time to polish their writing before submitting the final product.

> [J8] I was thinking about which sentences would be useful for my outline. . . I then transfer all information that I think potentially will be useful into Word and edit them afterword.

Reading and writing at the same time

After thinking through potential arguments in his head, a Canadian participant

finally initiated writing process. Before this step, he has already completed an outline for the paper with his ideas while he was reading journal articles and books. When he reached the point at which he saw no need for reading any more, he started writing with his argument.

> [C2] I mean there was a little bit of writing going on at the same time [as reading] . . . So like, it would come to a point where I'd have found more or less everything I wanted on a certain area . . . So OK I got all that . . . and now I need to formulate my argument using specifics and citing things. So then I would go back through everything . . . So I did that, I formulated the argument, and once the argument was in my head and once I had the page numbers, I just start writing it and citing it . . .

Writing section-by-section

Almost half of the participants wrote section-by-section rather than from beginning to end. They then accumulated sections of writing that could be connected finally into a single paper. These Canadian students often determined which sections to work on by reading their research notes, which they had already organised by theme. The Japanese participants tended to fill in extracted information (e.g., quotations and paraphrases) section-by-section into a draft outline throughout the information seeking phase. It is interesting that one participant described her process as disorganised because she spent a significant amount of time on writing.

> [C7] . . . Basically like I don't start with "this is what I'll introduce my paper with." I start taking sections that I want to work on. Take the section of the outline and just start writing paragraphs. Just like even if it's not great writing or whatever, just start writing. Basically that's a big chunk of the process . . . And usually it's kind of repetitive because when I get ideas, I just start writing it. Then it's just not really organised at all.

Another student's approach was more structured. She wrote her paper by section-by-section, but she followed the assignment guidelines, which specified required elements.

> [J4] I didn't write an outline, I started writing without it. First, I started from the introduction. Generally speaking, the format of the paper was on the assignment outline. Like first, you should write about the background of companies. Also, I was told in class that the first page is about the motivation as to why I selected a certain company. I had such guidelines in class. The 2nd and 3rd pages were the content of advertisements and the connection to our class. Then, the 4th page is about what competitors are doing and other advertisements. If companies did TV advertisements, I identified relationships between

> the printouts from class. Finally, I was told that the 5th page was the conclusion. So I wrote the paper by following the guidelines.

Two students expressed that this approach meant that it took a long time to finish writing. C8 also shared the opinion expressed by C7 about a piecemeal approach. Although he realised that it took time, the approach worked well for him in the past and he did not see a necessity to change.

> [C8] . . . I write my paper kind of in sections so then when it comes to the editing part, it makes it a little harder because I wrote different parts at different times . . . I write different depending on the state of mind I'm in. It sounds weird, but I write one thing in one way and then write another way the next day. So editing takes longer because things are in different places. But I think it's been working in the past, well, 8 years I've been writing papers . . .

Editing and tweaking

Roughly the same number of students in each group described a process of editing after finishing the main writing stage. It was rare for participants not to review their writing before submission. Those who had employed the *filling* approach described above (i.e., slotting paraphrases or quotations into an outline) required extensive time to trim papers into their final form. Other students initiated a more minor editing process. Some students spent a fair amount of time on editing their papers because they first put all information into their papers and then cut down and changed the order of the sections.

> [C8] . . . I change like, I go back and forth a bunch of times when I'm editing, changing certain phrases but not really the structure of what I wrote about . . . When I am writing, I don't usually change a whole thing. I mean sometimes some of the writing is very crappy and I just cut it out and write a new one. But I hardly ever change the whole structure.

> [C1] Once it was all there, written, I just went through it and cut stuff out . . . I kept the whole thing out of the paper, so it was like I cut a ton out from what I had originally put in. My paper was probably 4 or 5 times as long as it should have been when I first wrote it. Because all I wanted was to have all the information written instead of in my head. And then from there, I just cut.

> [J1] . . . I first enter information in my paper and will edit to delete unnecessary parts.

Interestingly, a few students actually printed out their work during this process. Since they were reading their papers from a computer screen, they sometimes could not see the flow of the papers. Printing out really helped them to see quality of their papers.

> [C7] Yeah, because I've been staring at a computer screen for so long, so it's so hard, and you're scrolling and it just all looks the same. So to have it on paper I find, you know, "OK I don't need any of this"... so then if I have the sheets laid out—well, like "this paragraph on page 8" and then like "this paragraph on page 2," so like they need to go together. So I can see that better when it's laid out.

Although the editing process could make participants' papers tighter and improve the quality of the content, one student expressed her worries of changing the original intention of her paper. In particular, her assignment had a strict page limit. She had to edit her paper extensively.

> [C1] . . . I wrote my thesis once my paper was probably about half written. I realised where I was going, I guess, with my point. And then it got changed again when I finished, when the whole paper was written because the word limit I think was 5000 words? Whatever it was, it was very strict and we were absolutely not allowed to go over it. So I ended up chopping a bunch out which again changed the point of my paper.

There was a possibility that students wanted to go back to the previous versions of their writing during the editing process. Two students saved different versions of their documents so that they could easily go back and forth between editions when necessary.

> [C1] Well, from what I first wrote, I saved that version and then saved a different version that had been cut down, because that way later on if I decide, "oh I shouldn't have taken that out." Or I took out too much and that doesn't make sense anymore, then I was able to put some of it back in. So there was draft one, draft two, and the final.

> [C7] . . . I usually make a new copy of this and then I save a full one just in case I need to go back. But I make a new one and just when I'm done with it, I delete it. Like once it's in an essay body, I delete from there so I kind of almost try to go like how fast can you get this on paper, like more in essay format rather than outline format . . .

Adding supplemental information

This is a supplemental rather than major writing process. Only two Canadian students mentioned seeking out supplemental information during the writing stage. As discussed, C8 added data related to an event (see Section 4.1.2, p. 103) and C5 added

more details about NGOs (see Section 4.1.2, p. 111). Thus, writing was an *organic* process for them.

Making an argument

For some students, their writing process was guided by the goal of making a clear argument in their paper. In particular, four Canadian students explicitly pointed out that having a good argument was a key for smooth writing, so this behaviour can be categorised as a part of the writing process. They therefore targeted their decisions related to structure and evidence toward this goal. For example, a Canadian student expressed:

> [C3] Yeah, that time was fast. It's pretty, pretty easy. That's the least difficult part unless you realise, at that point, your argument is bad, like the thesis is awful, that's bad, but when you feel like you have a good argument and feel like you have all the sources, it's easy.

My examination of her paper confirmed that it was indeed logically argued, as this excerpt shows:

> The Rocky Mountain locust was the mysterious and feared creature of the late nineteenth century that wreaked havoc upon the lives of American settlers of the frontier. It held an un-relentless grip on the memories of many Americans. Its mythical representation aided in changing American attitudes about pests and pest management.

In contrast, although ostensibly every writing assignment considered in this study required some type of argumentative approach, it seemed that Japanese students did not recognise this point; only one Japanese mentioned this as a part of his or her thought process. She expressed her opinion about writing a thesis statement:

> [J7] . . . While I am writing, for example, this is the outline. So the beginning is about chain ganging and application of its theory to the Cold War. So I divided it into 2 parts. After gathering information, I wrote what I wanted to say smoothly. But, during the process, I really had trouble with how I could make an argument and changed my mind frequently.

The quality of the argument clarified the focus of their assignment tasks, needed information, and how they wrote the paper. The above quotations from two participants illustrate this point very well.

Others

The desire to write simply was expressed only by one Japanese student. He described that writing was not hard. However, he also claimed that it was better to keep his expressions very simple so that he could avoid potential confusion on the part of the teacher originating from his writing skills.

> [J2] It's not hard to write a paper. I can write if I have inspiration. But, my grammar was not great at the same time. But a professor does not care about it much, like if the content was good, anything is OK . . . So what I paid attention to was trying not to use complicated expressions and I felt that I could prevent misunderstandings by arranging simple things with short sentences and short paragraphs.

One Canadian student explained that writing the introduction was the most important step, and he allocated a lot of time to the task because it comes first in the paper.

> [C8] Write the introduction. Because I usually write an introduction and then take a day, look back at the introduction, and then start writing the rest of the paper. Because what I have been taught basically since I've been in school is that in your introduction you talk about your topics. So the introduction for me is really, really important because the rest of paper is what I'm gonna write about . . .

4.1.7 Citing sources

The final category of writing and editing behaviour involved citing sources. All participants demonstrated a high awareness of plagiarism and academic integrity. To avoid potential problems with plagiarism, students adopted different approaches such as adding bibliographic information immediately during the writing process. Some participants utilised citation manuals and citation management technologies to cite sources to satisfy their teachers' requirements.

Adding bibliographic information into notes

One common behaviour among many participants regardless of group was recording bibliographic information (e.g., author names and page numbers) immediately while making notes or transferring passages to their draft papers (see Figure 8, p. 119; Figure 9, p. 120; Figure 10, p. 121; and Figure 11, p. 122). Six students from each group

demonstrated this behaviour. This action allowed them to easily refer back to sources later and minimised the need to look up citation information at the later stages of writing.

> [J1] I was very careful about plagiarism because I was told about it so many times. In the first place, all the information for my assignment was obtained from reading articles except when explaining my personal opinion. So I put citations at the beginning so that I can go back to the original article especially when I get confused while I am reading my paper later.

> [C3] Always I do it right away [insert all bibliographic information]. I don't like to have to go back. It's really annoying. Definitely.

Since they recorded bibliographic information as they were going, the only thing these students had to do was simply copy the information when writing.

> [J6] I just extract the information from JSTOR about the articles. When I copied out the sentences into my notes, I put page numbers with parentheses. And when I decided to use them, I left the pages numbers there.

> [C5] Yeah, in the research, like in the notes, it's just in-text, so it's just at the end of the research notes, author and page number. And then I'm using Chicago style, so it's not exactly copy and paste, but you know, I just made them into footnotes when I'm writing.

> [C6] . . . I keep a separate bibliography file. And I always put it back in. So it's not like I write the bibliography at the end. I just keep it in as new books and things come up and then at the end, I copy and paste it into my paper.

Consulting style manuals

Five Canadian students reported consulting a style manual for citation formatting, while this was not common among Japanese students. They did not use the same sources. For example, C1 consulted a print version of the MLA style manual to check the most up-to-date information. C2 looked at the Chicago style manual online to which the library subscribed. C3 used a Kindle-format book on how to write research papers, and J7 used an online style guide created by an academic library.

> [C1] Yeah, I looked at a couple of things. I looked online at a a couple of different sites, but they had different information, and I knew the teacher was really strict about using the most current version, and I know it changes all the time . . . So I just used the handbook.

> [C2] Yeah, I searched *Chicago manual style*. This is also only available through McGill VPN . . .

> [C3] Actually I have a style book on my Kindle . . . I have the manual here and search what kind of citation I am doing and there's also a lot of information about papers too.

> [J7] I searched Google to find a citation guide. I searched using keywords like *Chicago style references*. And then results will show up for example, "how to do Chicago style" . . . I believed I looked at something called Purdue something.

Using technology for formatting citations

Some participants used citation generators or citation management software. An example of a very simple approach was to download reference information from PubMed. This information was used to create reference lists.

> [J1] So far one thing I know how to do is downloading references at the same time as papers from PubMed.

J2 and J5 students described that they used more advanced technologies. They understood that they had to follow specific citation styles (e.g., APA). Using web services such as BibMe and KnightCite to generate a bibliography was helpful for them to format references. They simply entered the required information (e.g., author, title, and journal titles) into a template and the site formatted citations for them.

Finally, only one Canadian student mentioned that he used bibliographic management software. Although he acknowledged that he knew that he could import bibliographic information from catalogues or databases, he typed in the data by himself. He typed in-text citations as well. However, he generated his reference list using the software program EndNote.

> [C4] . . . I used EndNote's programme. That automated things, but I don't download the sources which I know would be a lot faster sometimes. I like, you know, type it into the thing, type it into the thing . . . I write all my references at the bottom by myself because I know what goes in what order. But in terms of the bibliography, I already have it at the end. So …slip! Put it right in.

However, not all students were in favour of technologies, in particular EndNote. C6 was not fully convinced of the programme's utility. In particular, she thought that it may deprive her of flexibility in her preferred way of making citation by using it.

> [C6] Yes. I know about the bibliography software. I don't know, I don't prefer to do that. I prefer to do it by hand if you will, by myself, because it is formatted the way I want it. And then sometimes, I don't know, it takes more time but I think it's worth it. And then usually, I have to copy and paste, if I am doing a citation, a Chicago citation, you have to copy and paste it into your footnotes, and fix the punctuation stuff. I think it's easier.

Citing sources by types

Only one instance was observed, but a Canadian student grouped the same types of materials in her bibliography rather than using the standard alphabetical listing. She thought that this was a better way to show the teacher that she satisfied the assignment requirements.

> [C3] I like that it [categorises books and newspapers]. I don't know if I was supposed to do that, but I like it. I found it very organised because professors know, like, "OK she has 5 books" instead of looking through the whole list. Because sometimes I have professors, he asked for, I think a minimum of 4 books. So I want to make sure that I show I have sources.

4.1.8 Summary

The correspondence between the information behaviour categories identified in this study and the conceptual framework (Wilson, 1997) is summarised in Table 7. The categories of 1) locating information, 2) information extraction and organisation, and 3) writing and editing correspond with more than one category of the theoretical framework, since the lines between the elements of the process can be unclear.

Table 7. Conceptual framework and categories of information behaviour identified

Categories of conceptual framework	**Categories identified in this study**
Information needs	Finding a focus
Information needs Information seeking	Locating information
Information seeking	Information selection
Information seeking Information use	Information extraction and organisation
Information use	Information analysis
Information seeking Information use	Writing and editing
Information use	Citing sources

Table 8 summarises the differences between the two populations regarding elements of information behaviour. Items that are underlined indicate where the difference in the number of occurrences is three or more. Differences between the two groups were observed in the following elements: 1) narrowing a focus by creating a thesis statement, 2) searching the web using Google Search, 3) searching in the library catalogue, 4) citation chaining, 5) utilising book features, 6) matching sources with pre-prepared paper outlines, 7) using sticky notes, 8) making research notes (for information extraction & organisation and information analysis), 9) reading deeply, 10) making an argument, and 11) consulting style manuals.

Table 8. Summary of information behaviour identified by group

1) Finding a focus	JPN	CAN	2) Locating information	JPN	CAN
▪ Brainstorming ideas	6	6	▪ Searching the web	8	6
o Personal interest	3	5	o Google Search	6	2
o Previous knowledge	3	1	o Google Scholar	4	3
o Instructors' specialisation	1	2	o Google Books	0	2
▪ Forming ideas to identify potential information sources	6	6	▪ Searching article databases	4	4
▪ Checking information availability	3	5	▪ Searching in the library catalogue	2	6
▪ Narrowing the focus	4	6	▪ Looking for information in Wikipedia	1	3
o Thesis statement	0	3	▪ Purposeful selection of search tactics	6	6
▪ Changing the focus	2	1	▪ Searching for specific information	3	5
▪ Writing a proposal	0	2	▪ Citation chaining	4	7
			▪ Lack of information	2	1
3) Information selection	**JPN**	**CAN**	**4) Information extraction & organisation**	**JPN**	**CAN**
▪ Utilising book features	1	6	▪ Using sticky notes	0	3
▪ Looking at abstracts	5	3	▪ Highlighting documents while reading	2	2
▪ Matching sources with various criteria (Individual rather groups)			▪ Making research notes	2	8
o Pre-prepared paper outlines	4	0	▪ Creating paper structure	5	7
o Fit with research questions	0	2			
o Connection to assignment guideline	1	1			
o Keywords in the document	3	1			
o Times cited	0	1			
o Content coverage	1	1			
o Comprehensiveness	0	2			
5) Information analysis	**JPN**	**CAN**	**6) Writing & editing**	**JPN**	**CAN**
▪ Making research notes	2	8	▪ Filling in information	5	3
▪ Creating a structure for information analysis	5	7	▪ Reading and writing at the same time	0	1
▪ Reading deeply	3	0	▪ Editing and tweaking	4	5
▪ Data analysis	1	0	▪ Adding supplemental information	0	2
			▪ Making an argument	1	4
			▪ Using simple expressions	1	0
			▪ Importance of the introduction	0	1
			▪ Writing section by section	3	4
7) Citing sources	**JPN**	**CAN**			
▪ Adding bibliographic information into notes	6	6			
▪ Consulting style manuals	1	5			
▪ Using technology for formatting citations	3	1			
▪ Citing sources by types	0	1			

4.2 Factors Affecting Information Behaviour

The previous section focused on *how* participants behaved during their research process. The following section analyses *why* students exhibited particular information behaviour with regard to the second research question: what factors are involved in information behaviour during an academic writing task?

Data from the sixteen participants revealed seven factors that intervened in their information behaviour during academic tasks: 1) assignment characteristics, 2) help from others, 3) past experience, 4) affective aspects, 5) personalisation of behaviour, 6) time management, and 7) academic expectations. A summary table provides a breakdown of these seven factors according to the two groups (see Table 10, p. 180).

4.2.1 Assignment characteristics

This category refers to the relationships between students' information behaviour and the assignment guidelines specified by instructors (see Table 5 and Table 6, pp. 91-92). The nature of the guidance influenced students' information behaviour during assignment tasks.

Suggested assignment topics

Slightly more Japanese participants had assignment topics suggested by instructors. Even though potential topics were listed on the syllabus, one Canadian student selected her own. However, only one Canadian and three Japanese students commented that it was easier if paper topics were explicitly assigned. Most Canadian students' topics were not pre-assigned but many did not mention difficulties related to proceeding with their tasks.

Some Japanese students expressed a preference for having paper topics assigned by teachers. In particular, if instructors provided very detailed topic suggestions, it was easier for students to find their path to completing assignments. For example, J1described

that it was easier to find a focus because the assigned topic was relatively detailed. I examined this instructor's guidelines closely and found that they were consistent with the student's impressions of specificity. J1 was required to investigate how a specific gene mediates certain behaviour:

> The role of gene OPRM1 (assigned to each student) in the mediation of X

Another participant agreed that she preferred having assigned topics, but in the case of the assignment examined in this study, she had to choose her own focus. The student said:

> [J3] Yes, the free topics were too big. Since it's really broad, many classmates had difficulties in finding topics. I think it is easier if topics are assigned by the teacher.

However, not every student preferred having pre-assigned paper topics because this limited their flexibility in finding topics by themselves. One student described that she does not like detailed assignment topics:

> [J7] I think it will be harder if topics are limited . . . If I could select a broader topic, it will be easier because I could use information with which I am familiar and the parts I understand for the argument . . .

Assignment guidelines

Overall, students commented that detailed assignment guidelines made it easier to complete their assignments, most especially if they laid out steps for the required tasks. For example, one professor specified four steps for the process in his syllabus: 1) select a topic, 2) determine that sources are available at the university library (or nearby), 3) write a one- to two-page prospectus, and 4) complete the final paper. The student found it beneficial to have this path laid out:

> [C3] I knew with the Rocky mountain locusts, we had to do the proposal for my teacher. So I think it helps me think of questions. . . I think of potential thesis statements, I guess . . . I just kind of look for stuff that's interesting in the sources and that's potentially like something I can argue or talk about and analyse.

In another example, the instructor specified that five elements should be included in students' papers: 1) description of Echinacea, 2) definition of cold and flu, 3) scientific

evidence to support effectiveness or ineffectiveness of treatment, 4) non-scientific or anecdotal evidence of its effectiveness, and 5) conclusion of its effectiveness. According to the participant, these elements helped her to understand what to include in her paper:

> [J8] The professor told me what she expected for students' papers. I think it was not so hard because I simply had to find answers to satisfy the expectations . . .

Many students, especially Japanese, mentioned that the nature of the guidelines (i.e., detailed versus concise) affected how they proceeded with their assignment tasks. Five Japanese and two Canadian students expressed their preference in this regard. For example, J5 mentioned how she was able to understand what kind of sources to look for in this situation comparison to her experience in a Japanese university:

> [J5] Yes, it's easy to understand what to do because the professor mostly explained what to do for this assignment. In Japan, faculty did not specify what kind of sources I had to use. So I just searched the internet and found a book from the library and submitted a book review. But, when I came here, the instructor told me I had to use academic sources, popular sources, newspapers, and this journal. I think this is the difference between Japan and Canada.

Although clear guidelines may help students move forward with their assignments, as J8 described, the clear guidelines could be challenging as well when they presented a set of hurdles that had to be overcome; they had no flexibility in *making do* with whatever they could find.

As a part of assignment guidelines, three Canadians mentioned that writing paper proposals helped them understand what to do with regard to completing assignments. No Japanese participants mentioned proposals as part of their research process, but this distribution was because teachers did not require them to do so in the current study.

Likewise, vague guidance from teachers led to confusion. For example, J7 was unsure about how many sources to cite because the teacher did not specify the number.

C8 also expressed that he was not sure what the teacher expected. The student was writing about the friendship between the Canadian Prime Minister Diefenbaker and the US president Eisenhower, which was a suggested topic for the assignment. However, the student was not sure what the term *friendship* meant and could not obtain *clues* from course lectures, as this topic was not addressed. Thus, he was not sure what to write.

Disciplinary differences

The nature of the assignment varied depending on students' disciplines. In particular, when one student was taking a course outside of her discipline, she felt that she was not able to use her pre-existing knowledge and was confused by different requirements. As a result, she did not know what to do for her paper.

> [C1] Umm, I guess . . . there is no structure, I am used to writing a paper on a very specific topic and this is all the work that has been done on it. But this was kind of, it's just open ended. I can go anywhere with the topic and can go any direction I wanted, I could use any materials . . . I would much rather be told what to do, how to do it, and then go do it . . .

4.2.2 Help from others

This category is about how people who have relationships with the students affected their information behaviour during their assignment tasks. In particular, this category relates to students': 1) understanding of academic expectations, 2) approaches to research, 3) citation practices, and 4) improvement of writing quality.

Help from librarians

Only two students from each group described how librarians' help influenced their information behaviour particularly in citing information and searching databases. For example, C1 was required to use MLA style for her paper, with which she was not familiar. Since she learned about style manuals in high school, she went to the library and

asked a librarian for a MLA style manual. Another student sought help from a librarian on how to use a database, which she had learned about during a library orientation:

> [J5] I went to a library workshop first. So I became aware of [an EBSCO database] at the workshop. But, I really did not know how to use it at that time. After having actual assignments, I actually asked a librarian for help with how to use it. It was during the last term.

Simple observation of a librarian's behaviour could be a learning moment for students' research process. One student observed how a librarian conducted a search in the library catalogue and tried to learn from what she did.

> [C2] . . . Like it's just because this [WorldCat catalogue] is nice. It looks good . . . The minute I stopped doing my general lazy searches, I went back to the classic catalogue, doing the subject thing … and I talked to another librarian about it, and I saw her going to the classic catalogue immediately I asked her about this. Like, "do you not like that [WorldCat]?" Just like, "No. I hate it" . . . She ended up being the history librarian, too. So I'm like "OK. Thank you."

However, overall, this factor was not a widely observed and it was very rare for participants to ask for help during their assignment tasks. One participant's comment suggested why students did not fully recognise the role of librarians.

> [C4] It's a terrible mentality we have because you know, you can see on the library website, like they are trying to give you help, they are trying to put themselves out to be as helpful as possible. So I ask a librarian but it's like, there's still this mentality like they're not for us.

Help from peers

Influence from peers was a factor that was particularly observed among all Japanese students. They mentioned that assistance from Canadian peers affected their actions, particularly with regard to finding information. For example, one Japanese participant described a lack of understanding of specific academic expectations in Canada. He was focusing on a need to conduct analysis of raw data rather than reviewing and analysing literature. However, a friend helped him to recognise that he had misunderstood the purpose of a class assignment:

> [J2] I thought that analysing data and finding sources was tricky. But then it was almost the last minute when I realised that I have to find outside sources [e.g., journal articles]. I thought "Seriously?" when my friend told me that "I used 30 sources." . . . Yes, it was huge pressure for me. I thought something was wrong because I hadn't used any single source (laugh).

Assistance from peers can be indirect as well. One Japanese student observed and imitated Canadian students' behaviour, looking to them as role models. She thought that since many of her peers searched the library's catalogue to find materials, she should as well. But she did not have confidence as to why this behaviour was appropriate. She expressed how she looked for information:

> [J3] My approach is trial and error. Like, first, I look for information in the library catalogue, then go to a website and enter keywords and read the information found . . . Well, everyone is using the catalogue, I thought the catalogue is the best place to search (laugh) . . . I am curious about how other students do research . . ., but I don't ask much because I have too many things to do and cannot think about others. I think many students enter something in the catalogue for their research.

Similar to J3, participant J6 was influenced by observing Canadian's behaviour and came to think that she should find information on the internet rather than the library catalogue.

> [J4] I didn't use the internet for research in Japan. But I think, in particular, people in the Faculty of Management use the internet extensively. So I was looking at it and started using it . . . In Japan, I went to the library and asked librarians questions . . .

Assistance from peers was not limited to Japanese participants. Only three Canadian students described interactions with other Canadians that influenced their behaviour. One student commented that his friends influenced the development of his current style of finding information. Since his roommate was also very keen to improve his research skills, he and his friend influenced each other.

> [C4] . . . I am consciously thinking about how to better research because I have my roommate . . . He has a strong interest in being a librarian . . . he is very conscious about this programme and the process . . .

A few students learned how to use citation generator websites to help them format their reference lists at the recommendation of friends. They expressed understanding of the need to cite information with an appropriate citation style. However, this did not

necessarily mean that they conceptually understood what to do with the generator. The following were sample citations from J2's paper. These citations contained the basic elements, but he seemed to lack recognition of the bibliographic units (e.g., capitalisation, extra subtitle, accidental abbreviation for corporate author).

> Barett, S. (2009). The Coming Global Climate-Technology Revolution. *Journal of Economic Perspectives, 23,* 53-75
>
> Boothe, H.S., Dahlby, P., Smith, B.& Rosen, R.S. (1999). *Public Finance in Canada : First Canadian Edition*. Toronto: Mcgraw-Hill Ryerson, Limited.
>
> Office of Transportation and Air Quality, C. a. (2007). Light-Duty Automotive Technology and Fuel Economy Trends:1995 through 2007 . *EPA420, September 2007*, 1-86.
>
> Prius Official Site. (n.d.). Toyota. Retrieved November 11, 2009, from http://toyota.jp/prius/

The final element of assistance from peers was editing. A few participants asked their peers to proofread their papers before submission. This is especially important for non-native speakers of English to improve the quality of their papers.

> [J7] I usually ask my friend to proofread my papers . . . . I think usually 10% of my papers were changed. I guess it depends. If it's really serious applications, he completely rewrites the content in some places. If it's more casual, he does not change the content and fixes English grammar.

When students did not have an informal network for proofreading, other sources of help were sought. J5 mentioned that native English-speaking volunteers at the university's writing centre were important to satisfy students' needs for writing assistance. However, the time available for a consultation was only 30 minutes, which was not enough for her. However, the participant also mentioned that since her assignment incorporated a peer-editing exercise, she had opportunities to check her writing, particularly grammar and the citation style. This peer-review was for all students, not just non-native speakers of English. C5 asked her roommate to read her paper with the goal of polishing the writing:

> [C5] I asked my roommate to check that [my writing] because she is a Poli Sci major. It's just nice to have advice . . . More towards structure. So you know whether this paragraph was too long or whether if it flowed nicely, made sense.

Interestingly, it seems that disciplinary differences influenced this peer-reviewed process. C1 claimed that larger class sizes and unfamiliarity with classmates made it difficult to obtain help from peers in English literature compared to classes in the Faculty of Education.

> [C1] . . . There was no editing really [for this assignment] . . . So usually I would do more of an editing process [for education papers]. And what I do—because education is a very small programme, especially in TESL, there's like 40 of us and we've been in all the same classes for 3 years . . . So we'll peer edit a lot, sending stuff back and forth . . .

Help from instructors

All students mentioned that help from teachers influenced their information behaviour, although each individual had a different experience. Therefore, patterns related to these experiences could not be discerned in either group. Participants described how teachers' attitudes encouraged or discouraged them during the research and writing processes. For example, showing enthusiasm and interest toward students' papers increased motivation and drove them to produce good papers.

> [C4] . . . This one was pretty good. This was one of, my best research processes . . . that I expressed interest with him, and he reciprocated the enthusiasm. And so, you know, he got very excited about the sources out there. And the fact I was able to read primary sources, that excited me.

> [C7] . . . I usually talk with a prof early on the paper and just kind of bounce ideas back. So I think that when I went to my prof and said what I was thinking of, and you know I am thinking about Jon Stewart. He said "I love the idea." So since he says that, OK I will do that because he really liked it. Then you know, it will be good he'd be glad to read it and stuff . . . . I just really like him. He is very approachable and kind of, you know, comforting.

On the other hand, if teachers failed to show students encouragement inside and outside of the classroom, students lost interest in writing good papers. One student expressed:

> [C1] You don't need to go to a class to write a paper. The term paper was completely free form . . . By the last class I think there were 3 of us there . . . The subject is very interesting, but the teacher was not very animated or interested in listening to others. So he didn't make anything accessible, he was not making anything interesting. So people don't bother.

Many participants wanted to obtain *approval* or *confirmation* from teachers during their research process. A primary reason was that students wanted to ensure that their course of action was correct. In particular, this was very strong at the beginning of the process and when finding a focus. One student said she was very satisfied when the teacher approved her topic. In particular, she thought that approval from him meant that she had chosen a *researchable* topic. Later, she realised that this was not necessarily the case:

> [J4] I thought it was not clear whether my decision [in selecting a topic] was correct. But, since my first impression was very good, I thought I could do it. In addition, when I asked the professor's opinion and he said it was good, and I thought this topic is definitely OK. So, without thinking too hard, I decided to find more information. But it didn't succeed.

In contrast to J4, another student's potential research topic was completely rejected by the teacher when he discussed it with him. However, the student did not complain nor was discouraged, because the discussion led to the selection of an alternative topic. Since the instructor suggested a course of action, he was satisfied with the guidance.

> [C4] Over reading break, I talked to my professor. He basically told me: "Don't do that. That's about to be disproven." And he said if you cannot read Spanish, you won't really get the full story and what this guy's [a scholar] saying is wrong . . . And then he basically just said why don't you do Vietnam [instead of original topic]. And I said OK, and I went away.

Similar to C4, since another student did not have extensive knowledge of the relevant history compared to the instructor, he sought out guidance. The confirmation process helped him not miss important sources.

> [C2] Since I'm just an undergraduate, I just don't have the wealth of background knowledge in the field, especially regarding sources. I don't want to miss sources, and I would also like the professor's opinions on some of my sources, or where I can find a conflicting voice . . . I don't usually miss any really significant sources, but it has helped me find some more specific papers and primary sources in the past.

Confirmation from professors affected a fundamental aspect of the paper writing task: the actual content. Students were particularly concerned about whether what they were doing was appropriate.

> [J5] Before submitting my assignment [in creating a Wikipedia entry], I thought about how different Wikipedia pages are depending on who writes them. So I was not sure how much I should write and what information I should search for. I asked the professor as well . . . I was a bit sceptical about my page, but since he didn't comment on the content I made, I didn't have any problems and I could confirm that I was on the right track.

In addition to affecting students' confidence, assistance from teachers impacted research behaviour, such as their use of online article databases. Although one student attended a generic library orientation workshop, she could not relate the content to her disciplinary requirements. When she learned about searching from a teacher in the context of an assignment, though, she could finally relate database searching to the task of writing a paper in a particular class.

> [J1] No [library instruction was not useful]. Not at all. Well, I don't remember (laugh). When I was told by a professor that I have to do research, she told us you should use databases like this. After that, I finally could understand how to use online databases. Having an assignment in front of me, and the professor's teaching of how to use databases in class, then I understood and could use them.

In addition to discussing how to search, another professor showed the student where to look for certain information because he did not know that different databases existed and that some were more suited to particular purposes.

> [C4] So then he used ProQuest right away [to find a dissertation]. I found out that with ProQuest you can access these things. I wasn't finding them with either Google Scholar or JSTOR.

Another example shows that teachers influence where students find information. One student, for example, explained that he knew that he should not cite Wikipedia, so he avoided reading it altogether without really understanding why.

> [C8] I don't know, that's just how I've always done research. Teachers are always telling you "don't cite Wikipedia" but whenever you Google something, always the first thing that

> comes up is Wikipedia. So that's why I like to stay away from that. Usually the first one is the most relevant and after that it gets more and more obscure. So that's why.

Instructors also had an influence on information use. C4 learned about citation management programmes (i.e., EndNote) from an instructor. Another student had opportunities to learn about what was required in research such as understanding, interpreting, and presenting content via feedback from teachers. She mentioned that this experience was useful to help her understand what to do when she had assignments.

> [J1] . . . In that class, three students were assigned per professor, and the professor presented a topic in his specialisation. A couple of times, we showed him like "this is our progress so far" and he said "you should add here a bit," "you should look at this aspect more," "you said too much on this" . . . we had to select a paper that matches with the topic and needed to expand it by ourselves using outside sources . . . It was more focusing on what to do with the information we found.

Assistance from teachers helped students' research process in many ways as described above. However, if they did not receive feedback, this often caused strong frustration. At the beginning of the research process, for example, one student wanted to have confirmation of whether her topic was appropriate. But since the teacher did not give her feedback, she was not sure what to do next.

> [C3] Our prof hasn't given us back our prospectus yet. I had been waiting for it to start, just to make sure I was on the right track, but I'm forgetting that option now. I'm hoping to start reading my sources tomorrow night after a work meeting and on Thursday. I'm a little upset that we were given the paper assignment so late in the semester and then not even handed back our prospectus, kind of ridiculous.

Another instance shows that a lack of formative feedback opportunities from teachers could discourage students from making efforts to write better papers.

> [J6] . . . This was a final paper so I did not receive feedback even if I wrote it. So I was not motivated. If the teacher gave me assignment tasks little by little, I felt I could write a paper properly because I would see him in the next class. But in this class, I was simply done after writing the paper.

One student had the expectation that his professor could aid the process of finding sources for the assignment, but he was disappointed to find that this was not the case.

> [C2] Unfortunately, this didn't yield anything either, as my professor has more expertise in the twentieth century, and appeared to have forgotten to find anything for me. He also told me I was doing fine, and not to worry. So, not much help at all. Other professors have been very helpful in this regard, such as the paper I am now working on, where he pulled books off his shelves to find one that would help me.

Help from others: miscellaneous

Three students from each group mentioned that their information behaviour was influenced by various other people in addition to peers, professors, and librarians. Some students mentioned teaching assistants in their interviews, but none indicated that people in this role affected the process. Some participants were required to send paper topics to the teaching assistant but did not receive further feedback.

A few students mentioned that personal connections helped them to understand what to do or to obtain feedback. J1 knew a doctoral student who gave him advice on where to find data, the appropriateness of the selected topic, and how to structure the paper. C4 mentioned that he learned how to use the MLA citation style from his brother. Finally, J4 got advice from friends and a former academic supervisor. She had gotten stuck in choosing a topic for her paper, as her initial selection was not current enough to fit with the assignment task, which was related to advertising campaigns. To supplement her missing knowledge and identify an alternative, she called friends and her supervisor in Japan:

> [J4] I came to Canada in the middle of 2009. So I don't know about the latter half of the year. I don't remember any advertisements in July. So I had no idea and was in trouble . . . Finally, I decided to call my friends and supervisors in Japan asking "what is your strongest impression of an advertisement campaign?" Everyone gave me so many suggestions and I took everything down in notes . . .

4.2.3 Past experience

Students' skills were not developed instantaneously. Rather, various layers of experiences in the past influenced how they behaved at the present time.

Library instruction in the past

A few participants from each group answered that they had library instruction in the past, but only two articulated that it was helpful. This was consistent with these two students' actions during their academic writing tasks. It is very interesting that half of the participants answered that they did not have any library instruction in the past. In addition, C4 had independently sought out online tutorials related to research skills. Even though a few students received certain types of library-related training in the past, it did not seem to be a strong factor that influenced students' information behaviour, at least on a conscious level. Indeed, some explicitly mentioned that the instruction was not useful when librarians did not connect students' needs with the content they presented.

> [J1] Probably, there was a library instruction once. I didn't listen. Librarians start explaining how to use the library and borrow books. Since I believed that I wouldn't borrow books, I zoned out and the session finished . . . When I had trouble, I asked professors and learned what to do. But I really don't know why librarians came to the class. I thought "huh?" even if they told me.

> [J8] Librarians came to the highest ESL classes to teach how to search for information. One course, or I should say one hour was for the library session . . . It was basic instruction, like how to use databases and not focusing on each student's major.

In contrast to these examples, when librarians connected their content with students' research needs in library instruction, students understood its importance and developed research skills. A few students benefited from librarians' instructions on resource guides. For example, J8 learned about MEDLINE and AGRICOLA from a subject guide page on the library's website. Another student explained her experience of learning about a Political Science subject guide web page.

> [C5] Actually I took this one class, and the prof had the Poli Sci liaison librarian come in. She directed us to the Poli Sci website, which would be impossible to find on your own because their website is very hard to navigate. So she showed us where that was on the internet. So then you know, it's Political Science and it has a list of the databases . . . Yeah, definitely it was [very useful] . . .

In addition to librarians' visits to specific classes, one student voluntarily took a library workshop because she heard about it during the university's September orientation. She felt it helped her develop an understanding of what would be expected with regard to writing research papers.

> [J5] I didn't do much research in Japan, but I went to a library workshop after coming to here [Canada]. I learned how to use Google and the school's databases . . . Relatively soon after coming here, there were various orientations. I learned that there was this kind of workshop . . . Since I did not use literature much in Japan, it was useful in Canada.

Students' efforts in learning about research skills was not limited to face-to-face instruction. Although it was not particularly helpful in the end, one student sought out online tutorials to supplement his knowledge of library resources and improving research skills.

> [C4] I've taken those 20 minute tutorials the McGill library offers. That offered me no new information except I did not know about Project Muse instead of using JSTOR. Project Muse has newer stuff and that's been helpful. Otherwise I wouldn't have gone straight to it . . . . there was only one I was interested in. I was worried about my research skills being bad and I took 1. And they again told me about Boolean, and then they also explained McGill's facilities. It was like a "welcome to the library" thing.

Past learning and research skills

This category focuses on past learning experiences (other than library-related instruction) in high school and university studies through which students developed research skills. These experiences influenced their current information behaviour to varying degrees.

Conducting research

Within the category of past learning related to research skills, several participants' information behaviour was influenced by previous experiences. In particular, among five Canadian students, they often reported developing their current research behaviour before entering university and continued to use and build on the same basic approaches at the time of this study. Two Japanese students mentioned the relevance of past experience, but

one had developed these skills at an ESL school in North America and another had in a first year university course.

A few Canadian students mentioned developing research skills when they were in high school, which became foundational to their behaviour in university. In particular, they applied skills related to planning out research steps from selecting a topic to writing a final paper. In high schools and CEGEPs, teachers gave them very structured guidance. As the three comments below demonstrate, clear guidelines (i.e., step-by-step procedures) helped them to conceptualise how the research process works and the steps that they should follow for creating written assignments.

> [C1] In high school, in grade 11, there was a teacher that gave us some guidelines on how to do research and stuff.

> [C3] Yeah, I was in a programme, liberal arts [at a CEGEP], and we had to do a final research project to prepare us for university, so that was a *huge* project we had to do. There was a lot of [step-by-step] instructions, due dates, so we had to hand in an outline and then, we had a proposal and then we do a rough draft, and we also had to do an annotated bibliography as well. So we could see our research was actually worthwhile.

Several participants perceived that their teachers assumed that they understand what their assignment tasks entailed and how they could approach them even if this is not always the case.

> [C1] There was not anything in CEGEP, by the time of university, professors expect you to know how to write a paper . . .

> [C4] I guess my anecdote was that I was surprised when a professor was telling us [how to do research]. You know, because I am not used to seeing professors trying to help students. But [research skills] seem natural to me. So I was surprised.

Some students in this study recognised that their learning related to research skills in high school was necessary and indeed expected in order to succeed in university level courses. A few students commented that they followed the information seeking style that they had developed in the past, unless this failed for some reason.

> [C6] Yeah, so I feel like if I look back on my 3 previous years at McGill, it's developed. I feel like I have a set of way of doing things and I do them for all my papers.

> [C8] I mean, if it's a research thing, yes. If it's like a creative writing thing, it's different. This isn't how it goes at all. But I did a lot of those in high school and a few in CEGEP. But for research, I don't know, I tend to just follow the same path and because I mean I am doing OK in school, I'm getting by. So I haven't really felt a major shift. Like I have never like got so horrible a paper that I have to re-think my whole process because that just hasn't happened . . .

For more ambitious students, the past behaviour could be a springboard for more sophisticated development. One student described starting off with the same approach she learned in high school but gradually developed her own research style.

> [C5] . . . Well, I started that way [from what I learned from high school] and then last year, and this first semester, sort of developing my own technique based on that. Especially, since as I get used to resources available through McGill, I adapted to what's already available.

Many Canadian participants learned research skills in high schools, but Japanese participants did not report this experience. A few of them developed skills in ESL schools or entry-level university classes. For example, J8 described her experience.

> [J8] It's embarrassing, but I had not read articles before the assignments [at an ESL school]. So when I was in the upper class in the school, I learned how to write essays, do searches, find articles. And then I wrote a research paper.

Database searching

Past experience with using article databases influenced many participants' research process. Students in both groups had basic knowledge about databases, but it was rare for them to have developed a more sophisticated understanding (e.g., searching techniques and different kinds of databases) before entering university. Four Canadian students had learned of the existence of major databases and how to use them before university. Although they had basic understanding of these in high school and CEGEP, they often did not recognise the importance and utility of these skills until studying at the university level.

> [C2] . . . I was told up that databases existed by a professor in high school. We didn't use them. Just mentioned what you can do. OK, I will see what these databases are about and wondered how you find articles.
>
> [C3] Yes [I learned at CEGEP], I learned how to use them, but I didn't use them that much. Last semester though, . . . I used them so much.
>
> [C4] . . . I learned a bit about Boolean, I'm not very versed in Boolean, but I learned that in high school . . . It was a bit more advanced training, it was a good high school, I guess. I know that a lot of people have to learn that in university, but I didn't take any courses specifically.

Compared to Canadian students, three Japanese students learned database search skills at an ESL school or in entry-level university classes.

> [J1] After all, when I had to finish assignments, a teacher told us that you should use databases in this way. Then, finally I understood how to use databases. There was a task in front of us and the teacher actually taught the procedures during class. And I was able to use them.
>
> [J6] In a Poli Sci class I took at UC Santa Barbara, I was told to use either JSTOR or Lexis-Nexis. JSTOR was personally easier to use. Since then I had the habit to use it.

What they learned in the past was very useful to improve their research skills. However, not every student applied previous knowledge to their current situation. Even though they had knowledge of alternative resources, C8 and J8 relied on particular search tools simply for the sake of convenience. C8 preferred using the library catalogue even though he was exposed to article databases in high school. Simply, his source preference did not change his research behaviour.

> [C8] Well, in high school a few times [I used databases]. They like just brought us to the library: keyword this, how to use different databases, we used ProQuest. Then the librarian showed that a little bit. Once again in CEGEP, it was the same kind of deal . . . But the instruction was not useful to have the experience! I haven't used that many article databases in university as much. Mostly, I either use books or the internet. When I am doing research, I like using books more because they're easier to cite afterwards . . .

Another student, J8, described that she tried to use discipline-specific databases, which learned about in library sessions. However, she found them difficult to use and gave up.

> [J8] Initially, including in ESL school, I tried to use subject-specific databases at the beginning of the semester. But, it took a long time to find the articles I wanted. So I used Google Scholar for this assignment.

Writing papers

Past experience in academic writing influenced most students from each group. Five Japanese students mentioned that they developed an understanding of writing papers in English composition classes in Japanese universities. The classes were useful in certain ways to help them understand the structure of academic writing in English. However, these skills were not adequate to satisfy expectations for university work in Canada. In Japanese schools, English composition classes focus solely on basic mechanics of academic writing, but the skills of making an analytical argument and incorporating outside sources generally are not addressed. Thus, they had not developed a clear understanding of what to do in terms of research.

> [J6] For one semester [in Japan], I had a class in English linguistics. I had to write an English essay, like 5-7 pages. Hum, I don't think that class was very instructive . . . When I came to California, I realised that I should write a paper differently.

> [J7] I didn't learn how to do research, but there was an assignment to write English papers. Ah, in terms of writing, there was a writing class. But wasn't research papers but essays. The class is more about structure . . . . It's very different [between Japanese and Canadian universities.]

Unlike most of the Canadian participants, none of the students who attended high school in Japan had been required to write papers that required use of outside sources.

In contrast, five Canadian students expressed a need to further develop their writing skills in university, too, based on what they learned in high school. Two students shared similar experiences:

> [C2] It sort of just happened. It's an organic kind of thing, because even in high school, in English… We didn't have much of a history thing, it was social studies, and it's really not the same kind of essay writing. But the English writing, which sort of directly transferred, was the same kind of thing. I would come up with this sort of thesis, come up with these ideas, I would start going through whatever book I was researching and write down page numbers, sort of figuring out like where my arguments are coming from . . .

> [C7] . . . I wrote a lot of essays, and I took a lot of English writing classes, so I have pretty good writing skills, but it's just so different the kind of essays you write in high schools and the kind of essays you write here . . . . You have to take English every year in high school, but I also took "writer's craft" . . . So it helped me a lot, like how to write an essay.

Although expectations for writing were different at the university level, past experience served as a foundation for their current behaviours (e.g., structuring their papers, using thesis statements).

Citing sources

All participants mentioned that they had learned *something* about the need to cite outside sources in their assignments before participating in this study, whether in high school, CEGEP, ESL school, or previous university courses. All students expressed a strong awareness of plagiarism, at the very least because of the prominence of statements related to intellectual honesty at their schools. Thus, students tried to be very careful when using outside sources.

> [J1] When I was in CEGEP, I was told about plagiarism. When enrolled in McGill, I was told as well. I received a small handbook. The content of the book is like, if you do this, you will be kicked out from school. I don't remember the details clearly, but I was told.

> [J7] I learned about plagiarism in writing classes. But, when I was in high school, I properly cited and made references . . . because the American high school was very strict about plagiarism.

Although all students were aware of the need to cite sources appropriately, their feelings about dealing with it varied. For example, two students described experiences related to direct quotations. J8 was accustomed to incorporating direct quotations from outside texts when writing in ESL school courses, but she realised that it was not appropriate to use direct quotations too many times in university-level writing. Similarly, C8's teacher told him not to use direct quotations, advice that he followed.

> [J8] When I was in an ESL school, it was acceptable to use direct quotations for my essays. When I could not say it in my own words, I used direct quotations. But after I enrolled in a university programme, I noticed that direct quotations were not good. So I paraphrased and became conscious about plagiarism.

> [C8] Yeah, I don't use direct quotes because I had this teacher in CEGEP who yelled at us continuously about how you should never use direct quotes because it's annoying. It makes correcting the papers more tedious and it's not like you're really saying anything . . . Because I was never really inclined to use direct quotes before that I

> ended up failing that class . . . anyway, he said, “if you put more than two quotes in the paper, then I will fail you.”

Other students learned how to cite information by themselves. With help from his brother, C4 tried to decipher how the Chicago citation style works, which is different from MLA. J1 imitated citation styles from published academic articles.

> [C4] OK, in high school, I only learned MLA, so then I was like, “Chicago, oh that’s a bit different.” I learned by example, I think, most of my MLA. I say like, my first term paper I wrote required MLA. I asked my brother, can you send me a copy of one of your essays? And he says, “yeah, sure.” So I looked at his footnotes, and then, I try to understand, “OK this is basically the logic.”

> [J1] I am using different citation styles, but I don’t know which style. When I started typing citations by myself, I imitated the reference sections of journal articles and kept doing it.

4.2.4 Affective aspects

Participants in the study expressed positive or negative emotional reactions during their assignment tasks. It was found that in most cases, the research tasks influenced students’ emotions. However, in other cases, the students’ emotional state affected their information behaviour.

Feelings of uncertainty

It was common for participants to express feelings of uncertainty. Their feelings varied on an individual level; patterns were not observed according to group membership. Students in both groups expressed uncertainty about the appropriateness of their research behaviour.

Two comments in particular illustrate that they had trouble knowing what kind of steps/procedures were necessary to complete their assignment tasks. These participants expressed that they were at a loss as to how to proceed, one writing a research paper for the first time, and the other writing in an unfamiliar subject area.

> [J4] Most of the assignments are group work. Even papers, I just write an assigned section, and one person looks through it from top to bottom, and we submit. So this is the first time for me to do it from the beginning to end. I don’t know what to do first.

> [C1] No, I hated this! I am not an English major and am not used to writing an English paper so as a starting point, I didn't know what to do . . . I am an Education student and I don't know this English stuff, I don't know how to write an English paper.

Another example showed that one student was not sure whether her research process was appropriate. She felt that something was wrong with her process because she did not use many books to write the paper. However, she could not articulate what was exactly wrong.

> [J3] . . . I had to use theories which I learned in the class. This is a requirement. So I didn't use books much. I used them for background information or for content which was not covered in the class. But, if it's a research paper, I had to do research by myself, didn't I? . . . I guess I'm not good at searching in the library. Probably, my research process is not appropriate. But I don't know why (laugh).

In contrast to the examples above, another participant did not have this feeling of uncertainty because she had clear guidelines provided by the teacher. She particularly understood what to look for and what kind of sources to use.

> [J5] This time, it was easy to complete because there was a clear guideline of what to use and what to look for. But without clear directions [from teachers], I am not sure I can find resources by myself . . . Like deciding topics, if I don't have directions on how to write a paper, I cannot move on. Also, I need guidelines on how I should write and with what kind of sources . . . I am worried without certain guidelines because I think about whether my way of doing it is appropriate.

It is interesting that even though three Canadian students exhibited solid research skills, they were not fully confident in their process. In particular, they seemed to think that they were missing important resources and arguments from their papers.

> [C2] I feel like I [know what to do] . . . It seems fine. So far it's working. I am always worried that I am missing something. But I don't know.

> [C4] I feel like with each paper I write, I have a better knowledge of how to obtain more books and sources. I feel like I am young in the university realm. I think my analysis should be tightened . . . I just know that there's a sea of work out there. I just feel I am still missing a lot and a lot more details . . . I'm conscious of where I'm at. I feel comfortable that I'm doing what my professors want right now, but I know it's a huge scale.

Frustration

All participants described frustrating moments during their research process from finding topics to citing information. Each participant had a different experience in relation

to their emotions. One student experienced frustration because she felt she had failed an initial attempt at selecting a paper topic. Since she did not have much time left, she panicked.

> [J4] My research process was not smooth. When I could not continue with the topic I selected first, I felt "Oh no, what should I do?" I didn't have enough time as well. I thought I can make do with this topic. I even got an OK from the professor and believed this was definitely OK . . .

Searching for information was troubling as well. She did not have success in using library resources, which caused her frustration.

> [J4] I searched the library's database [catalogue], like there is a place to find management books on the library website. So I entered UNIQLO [a company name], but I cannot find anything useful. I briefly looked at it and I thought "it's useless" and gave up on finding more.

Frustration was particularly common when students were searching for very specific information. One participant had difficulties finding a document that a professor had recommended. He knew the title of the document, which included the word *twenty-four*, but when he entered the numeral 24, no results were retrieved.

> [C4] . . . I find all other works except this one. And then it occurs to me, I am writing 24 in numerals all the time. I think, oh god. So I spelled twenty-four and it comes up right away. So that's "silly me."

After finding the document, he had another challenge: writing the paper. His initial plan did not seem right after he had this new source. Although he tried to fix and tweak his paper, it was not working well. Thus, he decided to re-write the paper again.

> [C4] . . . So I pull out a new document and I am kind of like OK fresh start. You know it's not like something is already bad and try to fix it. I get mad at the way something is not working out. So I just write anew. It happened on many occasions.

Finally, a few students were annoyed by certain limitations inherent in the writing assignments. C8 did not like the strict page limit set by teachers because he did not want to cut short his writing. C1 commented that she had become accustomed to using APA

style to format her citations, but when she was required to use MLA, it took extra effort to look up the citation rules.

> [C8] . . . It was a broad enough topic that I could write, you know, a 2500-3000 word paper. You know you can get to 2500. But it wasn't so much that I have to like narrow it down. Because that's what I really hate when it comes to the editing. I have to cut out stuff. I really hate that. I tend to underwrite because I just can add stuff way easier than to take it out . . .

> [C1] . . . It was also that I have to write a paper in MLA. I have only worked with APA so it was just annoying that I have to look everything up again.

Disadvantages in language

Most Japanese participants described difficulties related to language. Since English is not the Japanese students' mother tongue, their frustration originated from limited language abilities, such as when identifying appropriate vocabulary during information seeking and when reading academic articles. Often, frustration originated from the need to take additional effort and time to complete tasks. Many Japanese students commented on this. One example showed that the student had difficulties searching for resources because it was challenging for him to come up with keywords and to read search results quickly.

> [J2] . . . It was fairly hard to search for information in English . . . in Japanese, I can anticipate what kind of results will appear by using certain kinds of keywords. But, [in English] I don't know appropriate expressions. So it's a bit troublesome. I thought it is easier in Japanese . . . I can do skimming more quickly in Japanese as well.

A slow reading speed was also mentioned by some participants. Two students commented that since it took time to read the materials they found, they had to terminate reading and move on to the writing stage.

> [J3] . . . My reading speed was slow. How can I say, there is a low probability that I could find what I wanted to find in the allocated time. Or I should say I cannot find anything . . . Really, it is really hard to find information in each book and there are a lot of books. So everything was done by half.

> [J6] . . . At the end of writing process, I kind of gave up. I didn't read it again, so my paper looked like I was forced to fill out information. Even if I had more time, [I cannot do it

> well] . . . Probably, I cannot write without increasing time for the reading stages. So since I couldn't spend time for reading, I felt this was limiting and decided to start writing.

J2 strategically used simple expressions when writing his paper. This enabled him to overcome his difficulties in English writing because this increased his writing speed and reduced the risk of the instructor potentially misunderstanding the writing. But, generally speaking, the writing process was very challenging for Japanese participants. For example, one student had trouble describing and explaining an advertisement video in English.

> [J4] It takes such a long time. First of all, I don't get used to writing in English. Also, I listed my sources, but it was only 3 pages when I finished writing. So I felt I was in trouble. I re-wrote again and again. It took so long . . . I had to describe and explain the advertisement, and I couldn't. Even in Japanese, it's difficult.

The two Canadian students who had difficulties related to language encountered barriers when trying to access specific information associated with their paper topics (i.e., materials written in languages that they cannot read). A professor advised one participant to change his initial topic selection, the Falkland War, as he lacked Spanish language skills.

> [C4] Well, I mean, I didn't do a bold thing to challenge it, because well, I don't speak Spanish. So no, I accepted my place as an undergraduate who can only speak or read English properly right now.

Another instance showed that even though the participant thought he could find relevant information from databases, he could not read the materials themselves because they were not written in English. Thus, language skills can be a barrier for certain topics.

> [C2] And then, my process itself, I feel, is pretty effective and would be effective for other topics, especially looking through bibliographies and my database searches . . . The problem was I was getting so much German and Polish and those were the recent articles . . . So in that sense, the process worked, and probably I found all the articles I would need, but I can't read them.

Obsession and perfectionism

Tendencies toward obsession and perfectionism in seeking information were only observed among three Canadian students. Two students found it particularly challenging

to stop seeking out more information and taking notes. Although they knew that time was limited, they were so concerned about missing important information that it was emotionally difficult for them to terminate the information gathering stage. For example, participants C3 and C6 expressed a fear of missing something important.

> [C3] . . . Because this part takes long, when you're looking for your sources. Like potential ones. But when you're really researching for your specific topic, you want to make sure you find every possible topic source you can. So really, I don't like to skip over it, and just skim over it. I feel like I am a bit obsessive-compulsive, so I feel I have to go back and check.

> [C6] I just feel like I don't want to miss something that like, yeah, I don't want to miss anything. I want to cover all my bases and make sure I didn't miss something . . . And I think one of the problems is that when you have more sources, you need to look through all of them . . . for this past history paper I had, I had 40 books . . . I added articles, too.

Another participant shared a similar experience with the two examples above. In addition, he described taking a long time to take notes rather than writing the paper itself.

> [C4] Yeah, but I don't think that I need to take it away from the actual research process. Finding information, I don't have a problem with. Taking information out of the sources I found, I spend too much time on, because I'm like, "oh, I have them here," and I also think that I don't want to miss anything. So that process dragged on way too long . . . Definitely, out of the information extraction process, which went on too long and was maybe not organised enough, and that's maybe why it did go on too long.

Another participant described why students in general sometimes feel obsessed with finding information rather than focusing on the writing, which in the end, is the most important task for completing an assignment. According to his own analysis, some students want to demonstrate to teachers their effort in the process of finding materials.

> [C2] My other theory about it is that they do it to show off. Like, it's part of this thing, like "I used a lot of sources therefore I have done the most complete research," but the number of sources shouldn't matter as much as the content that comes out of it. That's the way I look at it . . .

Positive feelings about research

While some participants expressed emotional discomfort during their research tasks, others mentioned positive aspects of the research process. This was only observed among five Canadian students and no Japanese. A few of them mentioned that they feel

comfortable in conducting research because they developed basic frameworks for completing tasks in the past. These functioned as a foundation to craft, change, or add various components into their behaviour pattern when needed. One participant mentioned that her research strategy was developed through experience in high school, which made her comfortable enough to conduct research in university. She described how a solid foundation allowed her to personalise her information behaviour.

> [C5] I think I've got this method down. I worked this out to be a good method for myself . . . I guess in high school, one of my teachers did a section on "how do I do a research paper." What he recommended was doing research, getting a piece of information, and then writing them up. Writing a paper that way. That's where I started from . . .

In addition to what they learned in high schools, for some participants, repetition in the writing experience was also important to the improvement of research skills. For example, C4 expressed:

> [C4] . . . I am thinking in terms of my work, I'm still adjusting to the creative process of writing essays at this level. In high school, it was fun because you know there's less pressure. And I was writing more English papers, and you can play with style more . . . I think, style comes with confidence and the more you write term papers . . .

Feelings of elation were also mentioned by participants. C3 really enjoyed discovering various historical facts during the research process.

> [C3] I like the process of it [research]. Yeah, I guess I kind have to from history. But yeah, I like doing it. It's interesting, sometimes you stumble upon stuff. Like, you don't really need it for your paper, but it's interesting anyways.

Similarly, C4 enjoyed the discovery process. In particular, his positive attitude prompted him to seek out different approaches to improve his research process. His attitude allowed him to improve his research skills by trial and error, which is discussed in the following section (see Section 4.2.5, p. 164). However, it seemed that enjoying research was not necessarily associated with positive feelings about the writing and editing process.

> [C4] As a scholar, I feel it's something you need to be well versed in and take seriously. It is of interest to me. I think I've noticed recently I get a thrill out of finding research. And I'm like, "oh, this is a fun part." I don't really appreciate the long hours of just editing and writing my paper. It's like, getting the research is fun!

Another element related to confidence was understanding when to stop seeking out information, since this is not really the end of the research process. Some students kept looking for information until they ran out of time. However, others terminated this stage because they thought the writing process was more important. Those who had this understanding showed more confidence with their research process.

> [C2] I focus on the paper. I feel like the paper should speak for itself and the bibliography is a formality at that point. So, yeah, both I think are normal at that point . . . So in this one, I only used 5, and that's actually because I did this one the best, I think. It was all based on primary source interpretation, with some . . . well, you include some new scholarship on this other one . . . I guess the best way to do it is not waste as much time on finding books . . .

> [C7] Yeah, that's the thing [finding information is not the end.]. Like, I found that. You can keep reading more and more but at some point, you need to say "I have enough information, OK how would I think about this."

Another student who had confidence in her research process described how she stopped the information gathering stage when she realised she was no longer finding anything new.

> [C3] . . . I go as much as I can until I can't really find anything anymore. Like where it's stuff that's not relevant. No, I had way more than I should have. I always take more, because I know I'll end up taking out stuff. Which I did . . . Yeah, I had 15 books to begin with and 30 newspaper articles and then journal articles like about 30.

4.2.5 Personalisation of Behaviour

Each individual developed different approaches to complete their research tasks. This category highlights what personalised their information behaviour.

<u>Trial and error</u>

Compared to Japanese students, the Canadian participants' behavior was strongly determined by a trial and error approach. Most Canadian students developed their research behavior by themselves based on past success or failure. Throughout past academic experiences, they sought what worked best for them in terms of the entire research process or smaller aspects like how and where to search for information or how

to format citations. Often, students developed their own styles in early academic work, which became a foundation to improve or modify their process at the university level. For example, one student mentioned that she incorporated a new skill, the use of primary sources, into her process while she was completing the assignment examined in this study.

> [C5] Yeah, this format, this process works really well for me. And then every time I go to write a paper, I get better at researching. The other paper I did this month, I used a lot of primary resources. That's new.

Another participant described more detail about the areas in which he developed skills for finding articles and books.

> [C2] It was all sort of figured out based on what professors would say in first year. For, some of the smaller first year courses, they mentioned that you should go look at this database for articles. From there, I started to pick up on what worked best . . . . It was all trial and error basically. I was told that databases existed by a professor in high school, but we didn't actually use them . . . So, "OK, I will see what these database are about. I always wondered how you find articles." So that was that. And then looking through books, again, that's just intuitive to me. Browsing the shelf makes sense. And I mean, I've been using the internet for long enough to know how to find things in terms of searches . . .

Similar to C2, participant C4 discovered the library catalogue's function for browsing by call number on his own. In addition, he tried to apply his basic knowledge of MLA style to another style by analysing the logic (see p. 157).

Participants' positive attitudes were a key to improve their skills. Related to this, students developed their *own* ways throughout years in universities. Thus, their current style was a product of accumulated experience.

> [C3] . . . I mean, I sort of refine this throughout the years that I've been doing essays. I used to not do longer processes like this. Now I started to add more steps which I find longer but it's helpful because I don't have to go back to the beginning.

> [C7] So I think a lot of it has been just kind of figuring it out, yeah, by 4 years, it's like you need to kind of figure out a system for doing it. So I think a lot of it, it's just kind of developed . . . I mean, in high school I knew how to write but you wouldn't have resources . . . [But] you are expected to use [library resources at McGill]. I definitely think my first [paper], I don't know it's like a trial, practice. By the last I kind of feel really confident . . .

Serendipity

A handful of participants mentioned that they discovered search functions by chance, and it was challenging for them to recall how they found them. In general, a few Canadian students reported discovering important search functions and resources (e.g., Boolean operators and library research guides), while one Japanese student discussed finding Google Scholar. One participant found Boolean operators and truncation symbols by himself but did not remember how.

> [C2] So, once I know where these articles come from—databases— it's just a matter of going to find them the minute you can. And then once you get there, it's just another search form. Like trying to search all text, which makes sense to me. I can search with AND, or OR, or NOT. I've never used NOT . . . . that was on a database somewhere. Actually, it was search terms, like, "if you'd like to search for something, just a reminder, asterisk." If you put an asterisk it will search the whole word. So I can't remember which one it was. McGill catalogue, I am not sure.

A few participants found the subject search field in the library catalogue by chance. Participant C6 simply tried to click a link on a results screen, and she discovered that she could find similar books by doing so. Another participant had a similar approach and searched the database's help files to understand how the search works.

> [C3] And then I would click whichever one [related subject in catalogue]. I don't think I noticed them till . . . Well, I knew they were there and that you could use them. But I didn't start using them until maybe last semester, because I realised that "oh, it branches out to different ideas and can give me ideas for other related topics." It was when I did a paper on Vietnam. There were a lot of sub-headings in the topic that I chose. So it led me to focus my topic more. It was very broad and I narrowed it down . . . I just kind of clicked.

Serendipitous discovery was reported with regard to information sources as well as for search functions. Although this participant did not remember clearly, she happened to click a link to Google Scholar and discovered that she could use it to find journal articles.

> [J7] Umm, I am usually using Google, and I don't know. Why Scholar . . . I think [I used] Google from high school . . . Scholar is after getting into university . . . I feel I heard about it from my friends. Or Scholar is recent, isn't it? Maybe I found it by myself. Anyway, after getting into university . . . Google has so many things, doesn't it? Like iGoogle. So I am using iGoogle and I feel often it was changed. I think like, one day, what is this? And click [a link to Scholar].

A subject guide web page prepared by a librarian can be a gateway to resources for specific disciplines. One student found a subject guide by chance when looking for a link to the database JSTOR.

> [C3] I think when I first came here, I was looking for how to access JSTOR through McGill, because at my CEGEP, we could just click the CEGEP page and it would just bring us there, because you need a log-in. And I kind of typed into the search, I think there is a search place at the top somewhere, or there used to be. Oh, yeah here, "find." And then it took a while because it didn't just lead me right there. But I searched through and I found it.

Participant C2 was trying to find databases in history and came across a link on the library's website labelled *databases*, which took him to the library's federated search system. Through this, he discovered that there were various databases recommended for his discipline.

> [C2] That was on the McGill Library, actually. The library page has different databases. And it actually used to be a "find databases" thing . . . So then, it's like "history," go find that . . . So I found Historical Abstracts. Just searching on Google, you often get MUSE articles that pop up that you can't access. So I mean, obviously that's a database that I know exists. And again it was just the time thing that I didn't go for it. Ideally, if I had all the time in the world, I would exhaust everything I could find on EBSCOhost, and then I would go to MUSE and exhaust everything I can find on there.

Previous knowledge

Some participants explicitly explained the desire to make use of previous knowledge to complete their assignment tasks, and they found this to effective for planning their approach to the assignment tasks. They purposefully selected particular paper topics for which they felt they already had a certain degree of understanding. This knowledge served as scaffolding for their approaches to the assignment tasks. This was mainly observed among three Japanese participants. There were various motivations for students' selection of topics that were already familiar. For example, participant J4 saw her initial topic as a good prospect because she thought that she could complete her assignment using her existing knowledge.

> [J4] . . . I think there were so many companies that increased their sales in 2009. There are so many [companies]. While I am selecting this, this, this from the companies, I lost track of which is good. I remember that I saw 1day Acuvue from Johnson & Johnson [television commercial]. It's not like I should definitely pick this company. But, I selected the company because I felt I can actually do it.

Similar to J4, another participant selected a familiar topic because it allowed him to see a clear path to the final product.

> [C2] . . . I pick the one that fits in with stuff I know and am interested in. I never want to pick a topic that I don't have at least some background knowledge in, because I wouldn't know where to start and wouldn't have any kind of background. It would be like trying to learn a course at the same time. So as long as I have some kind of loose idea of what happened, I can go from there.

Another participant seemed keen to have a way to demonstrate his knowledge of the subject area and therefore selected a topic that he had already studied. This was a part of his ambition to show originality in his assignment.

> [J2] I wanted to use econometrics, which I learned in university [in Japan]. So I selected a topic for which I can obtain data and that matches with what the professor is claiming, supports the professor's opinion. In addition, since I am Japanese, if I can write a report which only Japanese can do, I thought I can show originality.

Finally, participant J3 was daunted by the time needed to read and write in a second language and tried to lessen the challenge by writing about a topic that was already familiar.

> [J3] I am planning to write a paper using my previous knowledge and books from the library to supplement what I am missing. I cannot read or write (it takes time to look over grammar) as fast as native speakers, so I thought I should have topics that are at least easier.

<u>Personal interest</u>

Half of the participants reported that personal interest was a factor that set the direction of their papers. Often, they selected topics from their courses that had stimulated their intellectual curiosity. One student was particularly interested in multiculturalism and religious pluralism before taking the course, and so she selected one of the professor's suggested topics related to these areas.

> [J5] The reason why I selected this social group [as a topic for the paper] is that within Canadian multiculturalism and multireligions, I felt the significance of the group which facilitates understanding among different religions.

In another example, a participant explained that she was interested in preventative diplomacy which was briefly discussed in class. She decided to investigate the concept more in-depth.

> [C5] Well, it was supposed to be something that we had discussed in class. The way the class is broken down is strategies of war and strategies of peace. I am more interested in strategies of peace, so I actually went toward that. And one of our class topics was diplomacy and then from there I looked to preventive diplomacy.

In a final example, the participant found a personal connection with the course content. She developed interest into a possible topic and started thinking about it more concretely.

> [C6] . . . I went over the list of topics he suggested and some of them looked fine. But then I wanted to choose something else . . . so I started to think about what I wanted to do. In the introductory classes, he mentioned code switching. So I found something interesting that had a personal connection, too . . .

Source type preference

Each participant explained *why* they preferred certain types of resources during their assignment completion process. Most Canadian participants articulated their preferences for certain types of information resources and determined their information gathering steps accordingly. However, only two Japanese students exhibited this. This is because in comparison with Japanese students, Canadian students demonstrated more knowledge of academic information sources and formats of resources.

These preferences affected where they chose to search for information and what kind of sources they used. For example, one student selected Google over other search engines because of its ease of use and its display of the number of results received unlike other search engines.

> [J4] Google is personally easier to use over Yahoo and other search engines, and I feel Google has more hits. So I use it so often at the beginning of my research process.

Although he used other databases, he described why he preferred JSTOR due to its functionality, including: 1) chaining function to find related articles, 2) document formats, 3) capability of searching footnotes, and 4) layout.

> [C2] JSTOR has several very convenient features, though it won't be the only database I consult. It was the first point of access for the proposal, basically. The features that I like include the "Items citing this article" links for each article accessed, the fact that every one is available in PDF, and the fact that it searches footnotes. I'm not sure if other databases do that as well, but I've noticed it very strongly in JSTOR. Lastly, it's a very clean and attractive layout, which I believe to very important for any web-based application, especially when searching for information.

Others explained that their database selection was based on familiarity. J6 got used to using JSTOR and found it is easier to use compared to other databases. Similarly, C3 was also familiar with it from past experience.

As with their database preferences, several participants explained thoughts related to using library catalogues. Some discussed negative thoughts related to usability and therefore tended to avoid using the tool.

> [C1] . . . I used the library catalogue search, but I am not very good at it. I am not used to looking for books, so I am stuck with what had been given directly to me because I have never had to use books at the library before, in CEGEP or university. So I have been craftily avoiding it for this class.

> [C5] . . . I usually, actually don't go to the catalogue straight. It's just because I find articles a lot of easier. So… That's the next option.

Other participants frequently utilised the catalogue, and they expressed different opinions about what kinds of functions were useful. At the time when the interviews for this study were conducted, the McGill Library was implementing WorldCat Local in addition to its Aleph online catalogue (known as the *classic catalogue*). Therefore, some participants used both tools during the tasks described in this study. A few participants mentioned their preference for WorldCat over Aleph. C2 said that he preferred WorldCat because of the visual appearance. Also, C6 pointed out that she could search for both books and journal articles at the same time.

> [C6] . . . But I think it [WorldCat] is so much better. And the old catalogue, I like how they list the call numbers in your search, whereas in the McGill catalogue, you have to click into the listing in order to find it. But if I were using the old catalogue, it doesn't include journals, it only includes the journal title. It doesn't do searches for journal articles, like full body text. So otherwise, I have to do extra searches with the old catalogue.

However, not every student preferred the new WorldCat interface. One participant emphasised that he was more comfortable with the old catalogue and preferred using it to do *serious* searches. In addition, he did not want to give up the map function for locating books on the shelves that was only available in the Aleph interface.

> [C4] I have been using this one more. I go to like basic because, you know, sometime last year, if I am really searching for something, I do a search on the classic catalogue . . . I also used it for research because it still has a map. And I don't know where the map function is [in WorldCat] . . . But I still, I don't know, I am more comfortable with the classic catalogue.

A few participants expressed a preference related to materials' formats, explaining different reasons for either seeking out or avoiding books. One student said that he preferred using books over articles because he saw them as a symbol of scholarship, and also because he knew how to find book reviews that summarise and critique the original work.

> [C4] I'd feel uncomfortable if I had no books. I don't know why, maybe I feel like naked without my books. And I feel like, then, a book shows a commitment of a scholar to that subject. It also means they're well established in their field. It's a good sign for me. I have confidence that pulling out a book, as long as it's not a terrible book from the 60s or 70s that has been heavily criticised. I do feel more comfortable with books also because I can read reviews on them.

Another student simply selected books over journals because the former were easier for him to cite. In his view, books required recording less bibliographic information.

> [C8] . . . I like using books more because it's easier to cite afterwards. Yeah, you know, publisher, city, year, author. Not like when you use websites and articles, not as much as stuff.

One student described why he preferred digital document formats, such as PDFs, over print. C4 appreciated the searching and highlighting functions in making his research process more effective.

> [C4] . . . On the other hand, I really like PDFs because of ctrl+F. God, makes life fun. Like I've saved my research. Because I was able to go back and was like "I need to quote this sucker. I need to source this somewhere! Otherwise, I'm gonna be plagiarizing. Crap!" . . . I've become more adept with using PDFs and making notes and highlighting PDFs. And then I like the fact that, I'll underline stuff that I find critically important but also I highlight stuff so that when I come back I can say "where is that section." And you know, you can see also the toolbar, and then go down, and like, "where was the relevant section?" This was a 200-page thesis.

4.2.6 Time management

The amount of time students could devote to their assignments was, of course, limited. It was important for them to allocate time effectively to complete them in a timely manner. Students' time management skills influenced how they allocated time for certain steps.

Time allocation

There was variation in how each participant used time for the assignment tasks. Half of the participants mentioned that their time management skills positively or negatively affected the research process. Regardless of group, participants described difficulties in managing their time during certain processes (e.g., finding topics, gathering information, and writing). As a few of them described, there were various reasons for this: obsessive tendencies when seeking information (see p. 161) or, for Japanese participants, slower reading speed due to English proficiency (see p. 160). In addition to these elements, various participants explained how they allocated time for certain processes. One participant expressed that he was spending too much time finding and organising information, but not writing. Even though he acknowledged the need to modify the time allocation, it was very challenging to change his behaviour. He described how much time he spent on his research process:

> [C4] . . . So that was my professor, he was right, he is like, "you spent a lot of time on the research, but you didn't spend much time on writing." No. Not as much. And not as much as I should. He says, "my principle was maybe do 50% research and really 50% writing." But I'm like, "well, that's a lot!" He's like, "well exactly." I spent like 70%, 80% of my time

> on research. He's like "yeah, that means your 20% wasn't that much on writing." I'm like, "right." So it is something I am gonna be more conscious of in the future.

Similarly, C6 articulated that it was challenging for her to stop gathering information and creating research notes. In her opinion, finding sources was the first and very important step for understanding what to write.

> [C6] . . . Yes! [80% of time spending finding and organising information]. I mean, I feel like I can't start writing. There's no point in starting to write something if I don't know what I want to write about, you know. So, and if I am not organised. Outlines, I feel like it can be really intimidating to say I need 15 pages. But, I don't know how to do it. And then there are word restrictions and you have to plan it out.

Other participants also mentioned difficulties in managing time at specific steps. One student mentioned that selecting topics took time and it was not possible to move on to the next step until the topic was selected. Another mentioned that obtaining background knowledge took time.

> [J7] I think selecting a topic was hardest. It took a very long time to select a topic.

> [J8] Since I search for what I don't know, it takes time. Also, I have to create my opinion from it. So I need to understand, I need to claim my opinion after learning about both positive and negative arguments. In that sense, the step of gaining various knowledge takes the most, and it was hard.

When another participant had low motivation toward her assignment task, she postponed her research process and did not spend her time effectively.

> [C1] . . . I figured I'd have to use books, but I figured that I'd be able to find more stuff online. Had I known that I would've almost only used books, I definitely would've started earlier because they are on reserve so I had to be at the library to use them . . . So I could've done it even like a week earlier. That would've made it a lot of easier. I mean, it was good for writing because I had done all my research and everything in so squished of a time frame . . .

A potential reason why participants had trouble managing their time could be explained by a comment from C7. She described that it was not easy to anticipate what the task entailed until starting the actual writing process.

> [C7] . . . I say that ahead of time, but I know that I cannot figure it out until I start writing. So I think the general kind of stages and steps and how I do it, I think that's pretty good. I think I learned to print drafts and I didn't do that probably the first 2 years at McGill, and I absolutely learned that it's the best thing to do. So I think that's a key step. And maybe if I

> had more time . . . And that's it, I'm always handing in a paper that I wish I could do the final kinds of edits, see throughout a page. But I don't have time or I can't look at it anymore. So just like, "OK, done."

Overall, those who had confidence in their research process were better equipped to discern an overview of the tasks (e.g., C2 and C7 on p. 164). For example, they could understand when to terminate gathering information and move to next steps such as writing. Thus, they managed their time for each step more efficiently to complete their tasks. Very few participants demonstrated strategies for managing their time effectively.

4.2.7 Academic expectations

In many cases, professors did not provide detailed step-by-step instructions for assignments. Thus, knowledge of academic expectations helped participants understood what they had to do in order to complete their assignment tasks. More Canadians than Japanese mentioned having an understanding of academic expectations. Some participants mentioned that it was important to understand what students are expected to do in undergraduate level papers. C3 thought that it was acceptable for teachers to assume that students understood expectations in university level education.

> [C3] . . . There's not a lot of like, I find I don't learn how to do research, we are already expected to be able to do it. Which is fine. Like I feel like that's an OK expectation.

Without an understanding of professors' expectations, they had to figure out what to do by themselves.

> [C1] . . . So in CEGEP, I had research papers that I had to produce, but it was really just kind of figuring it out on my own based on the information they asked for. I figured out how to find it. There was no instruction as to how to research though.

Expectations for assignments were clearly not fully understood by some participants, especially Japanese students. One Japanese student reported that he did not realise the importance of using outside sources until another student mentioned this to him.

> [J2] I didn't use outside sources much until now. Like someone says "this is the way to do it." So, I think this is different [from the Japanese university]. In the past, for example, it is the same process to find data by myself and analyse it. Then it is done after writing my own opinion, isn't it? So it is the most troublesome process to bring ideas to support it. I think this is quite different. In addition, I asked other students, and they said that we usually don't have to analyse data.

A few students described what they thought teachers expected from their papers. They assumed that they were expected to interpret information rather than simply summarising outside sources.

> [C7] This is definitely more analytical. I mean, yeah, especially because I am writing for a professor who is familiar. Like I am not gonna sit there and just describe, like a lot of biographical stuff, I am only using it to make an argument. I am saying their biographical stuff is directly linked to their ideas and stuff. So I think this kind of paper is not very descriptive. More analytical I think.

However, interpreting outside sources was not necessarily equated with originality. One participant thought that he did not have space to show extensive analysis in his paper.

> [C2] Um, I think it's both because there wasn't space for a lot of analysis at this point. It had been done. Analysis in this essay didn't happen a lot. It was more like, "I agree with this author. He makes the most sense." Which I mean, again, at the undergraduate level, that's pretty much all professors expect for me, I think. Because we are not gonna be writing anything original. We just don't have that knowledge.

4.2.8 Summary

This section discussed how various factors affected students' information behaviour. The relationship between factors and information behaviour is summarised in Table 9. Some factors (e.g., suggested assignment topics) only affected a single category of information behaviour while others (e.g., past learning and research skills) influenced multiple elements. Table 10 shows differences and similarities between the two populations regarding presence of the factors. Items that are underlined indicate where the difference in the number of occurrences is three or more. Differences between the two groups were observed in the following factors: 1) assignment guidelines (including writing proposals), 2) interaction with peers, 3) previous experience conducting research, 4) disadvantages in language, 5) obsession and perfectionism (including positive feelings

about research), 6) trial and error techniques, 7) source type preference, and 8) academic expectations.

Table 9. Factors and information behaviour

Information behaviour identified in this study			Factors affecting information behaviour
1) Finding a focus	**JPN**	**CAN**	
▪ Brainstorming ideas	6	6	▪ Assignment characteristics (Suggested assignment topics, Assignment guidelines, Disciplinary differences); ▪ Help from others (Instructors); ▪ Past experience (Past learning and research skills); ▪ Affective aspects (Feelings of uncertainty; Disadvantages in language); ▪ Personalisation of behaviour (Previous knowledge, Personal interest); ▪ Time management (Time allocation)
▪ Forming ideas to identify potential information sources	6	6	▪ Assignment characteristics (Assignment guidelines, Disciplinary differences); ▪ Personalisation of behaviour (Trial & error, Previous knowledge)
▪ Checking information availability	3	5	▪ Assignment characteristics (Assignment guideline); Personalisation of behaviour (Trial & error)
▪ Narrowing the focus	4	6	▪ Assignment characteristics (Suggested assignment topics, Assignment guidelines, Disciplinary differences); ▪ Help from others (Instructors); ▪ Past experience (Past learning and research skills); ▪ Personalisation of behaviour (Previous knowledge, Personal interest); ▪ Time management (Time allocation)
▪ Changing the focus	2	1	▪ Help from others (Instructors); ▪ Affective aspects (Frustration);
▪ Writing a proposal	0	2	▪ Assignment characteristics (Assignment guidelines); ▪ Help from others (Instructors); ▪ Past experience (Past learning and research skills); ▪ Time management (Time allocation)
2) Locating information	**JPN**	**CAN**	
▪ Searching the web	8	6	▪ Assignment characteristics (Assignment guidelines); ▪ Help from others (Peers); ▪ Past experience (Past learning and research skills); ▪ Affective aspects (Feelings of uncertainty, Frustration, Positive feelings about research); ▪ Personalisation of behaviour (Trial & error, Serendipity, Source type preference)
▪ Searching in article databases	4	4	▪ Assignment characteristics (Assignment guidelines); ▪ Help from others (Librarians, Instructors); ▪ Past experience (Library instruction in the past, Past learning and research skills); ▪ Affective aspects (Disadvantages in language, Obsession & perfectionism, Positive feelings about research); ▪ Personalisation of behaviour (Trial & error, Serendipity, Source type preference); ▪ Time management (Time allocation)

▪ Searching in the library catalogue	2	6	▪ Assignment characteristics (Assignment guidelines, Disciplinary differences); ▪ Help from others (Peers, Instructors); ▪ Past experience (Past learning and research skills); ▪ Affective aspects (Feelings of uncertainty, Frustration, Obsession & perfectionism, Positive feelings about research); ▪ Personalisation of behaviour (Trial & error, Source type preference); ▪ Time management (Time allocation)
▪ Looking for information in the Wikipedia	1	3	▪ Personalisation of behaviour (Trial & error)
▪ Purposeful selection of search tactics	6	6	▪ Help from others (Librarians, Peers, Instructors); ▪ Past experience (Library instruction in the past, Past learning and research skills); ▪ Affective aspects (Positive feelings about research), ▪ Personalisation of behaviour (Trial & error, Serendipity)
▪ Searching for specific information	3	5	▪ Past experience (Past learning and research skills); ▪ Personalisation of behaviour (Trial & error)
▪ Citation chaining	4	7	▪ Personalisation of behaviour (Trial & error)
▪ Lack of information	2	1	▪ ▪ Assignment characteristics (Disciplinary differences); ▪ Past experience (Past learning and research skills)
3) Information selection	**JPN**	**CAN**	
▪ Utilising book structure	1	6	▪ Past experience (Past learning and research skills); ▪ Personalisation of behaviour (Trial & error)
▪ Looking at abstracts	5	3	▪ Past experience (Past learning and research skills); ▪ Personalisation of behaviour (Trial & error)
▪ Matching sources with various criteria (Individual rather groups)			▪ Past experience (Past learning and research skills); ▪ Personalisation of behaviour (Trial & error)
4) Information extraction & organisation	**JPN**	**CAN**	
▪ Using sticky notes	0	3	▪ Past experience (Past learning and research skills); ▪ Personalisation of behaviour (Trial & error)
▪ Highlighting documents while reading	2	2	▪ Past experience (Past learning and research skills); ▪ Affective aspects (Disadvantages in language); ▪ Personalisation of behaviour (Trial & error)
▪ Making research notes	2	8	▪ Past experience (Past learning and research skills); ▪ Affective aspects (Feelings of uncertainty, Disadvantages in language, Obsession & perfectionism, Positive feelings about research); ▪ Personalisation of behaviour (Trial & error); ▪ Time management (Time allocation)
▪ Creating paper structure	5	7	▪ Assignment characteristics (Assignment guideline); ▪ Past experience (Past learning and research skills); ▪ Personalisation of behaviour (Trial & error)

5) Information analysis	JPN	CAN	▪
▪ Making research notes	2	8	▪ Help from others (Instructors); ▪ Past experience (Past learning and research skills); ▪ Affective aspects (Obsession & perfectionism, Positive feelings about research); ▪ Personalisation of behaviour (Trial & error); ▪ Time management (Time allocation)
▪ Creating a structure for information analysis	5	7	▪ Affective aspects (Positive feelings about research); ▪ Personalisation of behaviour (Trial & error)
▪ Reading deeply	3	0	▪ Affective aspects (Frustration, Disadvantages in language)
▪ Data analysis	1	0	▪ Past experience (Past learning and research skills)
6) Writing & editing	**JPN**	**CAN**	
▪ Filling in information	5	3	▪ Affective aspects (Frustration, Disadvantages in language, Positive feelings about research); ▪ Personalisation of behaviour (Trial & error); ▪ Time management (Time allocation)
▪ Reading and writing at the same time	0	1	▪ Past experience (Past learning and research skills); ▪ Affective aspects (Positive feelings about research); ▪ Personalisation of behaviour (Trial & error); ▪ Time management (Time allocation)
▪ Editing and tweaking	4	5	▪ Help from others (Peers, Instructors); ▪ Past experience (Past learning and research skills); ▪ Affective aspects - Frustration, Disadvantages in language, Positive feelings about research); ▪ Personalisation of behaviour (Trial & error)
▪ Adding supplemental information	0	2	▪ Past experience (Past learning and research skills); ▪ Personalisation of behaviour (Trial & error)
▪ Making an argument	1	4	▪ Past experience (Past learning and research skills); ▪ Affective aspects (Positive feelings about research); ▪ Personalisation of behaviour (Trial & error)
▪ Using simple expressions	1	0	▪ Personalisation of behaviour (Trial & error)
▪ Importance of the introduction	0	1	▪ Past experience (Past learning and research skills)
▪ Writing section by section	3	4	▪ Past experience (Past learning and research skills); ▪ Personalisation of behaviour (Trial & error)
7) Citing sources	**JPN**	**CAN**	▪
▪ Adding bibliographic information into notes	6	6	▪ Past experience (Past learning and research skills); ▪ Personalisation of behaviour (Trial & error)
▪ *Consulting style manuals*	1	5	▪ Assignment characteristics (Assignment guideline); ▪ Help from others (Librarians); Affective aspects (Frustration); ▪ Personalisation of behaviour (Trial & error)
▪ Using technology for formatting citations	3	1	▪ Help from others (Peers)
▪ Citing sources by types	0	1	▪ Personalisation of behaviour (Trial & error)

Table 10. Summary table of factors that influenced information behaviour by group

1) Assignment characteristics	JPN	CAN	2) Help from others	JPN	CAN
▪ Suggested assignment topics	5	3	▪ Librarians	2	2
o Explicit topics	3	1	▪ Peers	8	3
▪ Assignment guidelines	5	2	▪ Instructors	8	8
o Writing proposals	0	3	▪ Others	3	3
▪ Disciplinary differences	0	1			
3) Past experience	**JPN**	**CAN**	**4) Affective aspects**	**JPN**	**CAN**
▪ Library instruction in the past	3	3	▪ Feelings of uncertainty	5	6
▪ Past learning and research skills	8	8	▪ Frustration	8	8
o Conducting research	2	5	▪ Disadvantages in language	5	2
o Database searching	3	4	▪ Obsession & perfectionism	0	3
o Writing papers	5	5	▪ Positive feelings about research	0	5
o Citing sources	8	8			
5) Personalisation of behaviour	**JPN**	**CAN**	**6) Time management**	**JPN**	**CAN**
▪ Trial & error	2	6	▪ Time allocation	3	5
▪ Serendipity	1	3			
▪ Previous knowledge	3	1			
▪ Personal interest	3	5			
▪ Source type preference	2	7			
7) Academic expectations	**JPN**	**CAN**			
▪ Academic expectations	1	5			

4.3 Information Literacy Skills

The following section presents the third research question: what information literacy skills are present in students' information behaviour? Each participant's information literacy skills were assessed using ACRL's information competency standards as shown in Table 11. As described in the methods section, the information literacy competency standards were isolated on the level of individual skills, and when a particular skill was observed for a participant, it was noted. When students fully satisfied the outcomes outlined in the standards, a filled circle symbol (●) appears in the cell in Table 11. If students partially satisfied the outcomes, a circle symbol (○) appears. For example, the fourth outcome of Standard 2.2 is:

> Constructs a search strategy using appropriate commands for the information retrieval system selected (e.g., Boolean operators, truncation, and proximity for search engines; internal organizers such as indexes for books)

When a student only exhibited use of book indexes, the outcome was considered to be partially satisfied. In some cases, outcomes were not applicable or not observable within the scope of the study. In those cases, the cell colour is grey. In addition, Table 12 summarises the relationship between elements of information behaviour in this study and corresponding information literacy standards.

This study analyses the observed presence of information literacy competencies. The absence of a skill can be due to a number of reasons, namely that students simply lacked the skill, the outcome was not relevant to their task, or it was not observable through the study's data collection methods. Therefore, the absence of a skill was coded together regardless of reason. The focus was on actual reported information behaviour and the factors that influenced them.

In presenting the findings in the subsequent sections, the analysis mirrors the order of the outcomes as listed in Table 11.

4.3.1 Standard 1: Information needs

Standard 1.1: The information literate student defines and articulates the need for information

Students in this study were not often observed to ask instructors for guidance in identifying information needs. Some talked with instructors to identify their topics, in particular when they were thinking of own paper topics rather than pre-assigned ones. Others simply sought confirmation from the instructors rather than discussing identification of their needs. More Canadians than Japanese had interactions with instructors.

None of the participants clearly articulated research ideas or posed questions to answer for their tasks. However, as a group, they had basic ideas at the beginning of the process and tried to refine them as they progressed. Therefore, they were assessed as *partially* satisfying the outcomes.

Almost all participants from both groups explored general information sources to increase their familiarity with potential topics, including assigned course readings and results from initial information searches (e.g., web search and Wikipedia).

As associated with the previous outcome, all participants actively modified information needs from vague to focused as the process went forward. Through these refinement steps, all participants were able to revise initial information needs and identify what kind of information would be needed. Often, thesis statements and questions were developed when information needs were modified and defined.

All participants identified key words, ideas, and concepts during the process of narrowing their topics. Their ideas started at a simple level and then moved to become more complex and multi-layered.

Since all participants were undergraduates, generally speaking, they were not expected to produce truly original work. Only one Canadian and two Japanese students explained that they were trying to build on existing information to create new knowledge.

Standard 1.2: The information literate student identifies a variety of types and formats of potential sources for information

The two groups in this study showed a clear difference in achieving these performance indicators. Overall, the Japanese student group did not demonstrate a strong understanding of sources compared to Canadians based on the interviews and observation of their information behaviour. Four Japanese students exhibited some understandings of

how scholarly information was produced, organised, and disseminated while seven Canadian did so.

Related to the previous outcome, almost half of the participants also showed a strong understanding of how information was produced and organised in their discipline, which is a foundational element of information literacy. In addition, four Canadian and two Japanese participants showed a basic level understanding of these concepts.

None of the participants used, for example, general websites or Wikipedia articles as the main sources of information for their tasks (except J4 due to the nature of the assignment). However, not all participants articulated characteristics of specific formats of sources and how these were relevant to their tasks (e.g., books versus journal articles). Most participants expressed the ability to distinguish among different formats of sources. As a group, Canadian participants showed a notably stronger understanding of *scholarly* resources and of differences between primary and secondary sources.

Only one Japanese participant satisfied this outcome because he recognised a potential need to obtain raw data for his analysis. Since this tends not to be required in undergraduate level courses, the other participants were not observed to satisfy this outcome.

Standard 1.3: The information literate student considers the costs and benefits of acquiring the needed information

The area of identifying costs and benefits of information acquisition was not widely observed among participants. At any rate, a few students decided to expand to their information seeking strategies beyond their university library and the (free) web. This decision happened at later stages of the process rather than at the beginning. In addition, one participant from each group sought out video and images. It is important to note,

though, that the ability to seek information outside one's institution is not always necessary. Thus, it cannot be said that participants who satisfy this outcome were not highly information literate.

Students in this study were not required to learn new languages or specialised skills (e.g., statistics) for their projects in this study, so this outcome was coded *not applicable*.

It was very difficult to observe participants' *planning* skills for assignment tasks given the nature of this study, so their skills cannot be definitively assessed. However, some participants did create a timeline to help them complete their tasks in a timely manner.

Standard 1.4: The information literate student re-evaluates the nature and extent of the information need

All participants continuously revised their information needs during the process as they encountered new information, thereby fulfilling relevant outcomes for this standard.

As discussed in relation to outcomes in Standard 1.2, some participants described vague ideas, for example, that they needed to find books or articles for their assignments. However, they did not demonstrate an understanding of specific documents and tools in related to their topic that would need to be found. Many others, though, could articulate criteria for selecting needed information from amongst search results.

4.3.2 Standard 2: Information access

Standard 2.1: The information literate student selects the most appropriate investigative methods or information retrieval systems for accessing the needed information

Many participants identified appropriate methods for their discipline such as finding primary sources for historical analysis, analysis of secondary sources, and case studies for applying and testing theories. Some participants did not articulate what kind of methods

needed to be used. However, they at least recognised that they would have to look for scholarly information. Related to identifying the methods through which they could gather information, students reported considering the benefits and applicability of investigative methods such as relying on scholarly articles and finding primary sources.

Generally speaking, an understanding of the nature of information retrieval systems is necessary for effective decision-making in searching. One way to get this information is via subject guides provided by libraries, which often categorise different kinds of systems and describe the scope and content of various resources. However, only some participants mentioned knowing about the existence of such guides. Moreover, none mentioned using database help files or other vendor descriptions to get information about databases' content.

Canadians demonstrated more various ways of accessing information. From the perspective of the *most* efficient and effective approaches, four Japanese demonstrated this outcome and the other Japanese participants reported having room for improving their skills in this category, namely in identifying sources for finding information (e.g., library catalogues and subject specific databases). Although two Canadians partially satisfied this outcome, they knew about article databases in general, but they did not utilise them in the assignment tasks examined in this study. The other six Canadians fully satisfied this outcome.

Standard 2.2: The information literate student constructs and implements effectively-designed search strategies

It was challenging to observe whether participants *developed* a research plan based on the investigative methods they identified in Standard 2.1. However, it could be reasonably assumed that most of the participants did some sort of mental planning

because their information behaviour was based on their reports of drawing from previous experience and understanding of research.

All students identified keywords for searching in online search tools. However, few used synonyms and related terms to improve the recall or precision of their results. Often, though, they included additional keywords as they identified new, related concepts as they proceeded through the information search stages, which is also related to Standard 2.4.

No participants identified controlled vocabulary before starting their information search. A few of the Canadian students used LC subject headings while they were actually searching as a part of the search strategy outcome.

Many Japanese participants demonstrated some examples of searching skills (e.g., phrase searches), but overall, their abilities are very limited. On the other hand, five Canadians reporting routinely combining two and more search techniques such as Boolean operators, using controlled vocabulary in article databases and library catalogues, truncations, and use of book indexes.

Many students conducted searches in different information retrieval systems during their research process. For example, they might have used a combination of a library catalogue, Google products (i.e., Google Search, Scholar, and Books), databases, and Wikipedia.

Standard 2.3: The information literate student retrieves information online or in person using a variety of methods.

Three Japanese students used different formats of sources (i.e., print and online) for their tasks. This is partially related to the assignment guidelines at hand as well as their

knowledge of resources. Six Canadians used different information systems to obtain information in multiple formats.

Since it was not common for Japanese students to use books, only one Japanese student used call numbers to locate books in the physical library. Other Canadians also simply located books, which have already been identified in an online catalogue using either keywords search or browse by subject. Only two Canadians physically browsed the shelves in search of additional resources.

Only one participant from each group asked librarians for help during their assignment tasks.

Although it was not necessarily required for the assignment, one Japanese participant interviewed other people to obtain primary information about advertisement campaigns, recognizing that this was an appropriate approach to fulfil her information needs.

Standard 2.4: The information literate student refines the search strategy if necessary.

Some participants decided to seek information from alternative information systems because their initial results were unsatisfactory. Slightly more Canadian students did so. In most of the other cases, students seemed satisfied with the information retrieved from their first choice of system or were not aware of alternatives that might supplement these information sources.

Half of the participants identified gaps in what they retrieved and sought different kinds of information. For example, some students first found articles about a concept in general and decided to seek specific examples to supplement the broad idea. In addition, they retraced previous steps to find information that matched with the revised strategies.

Standard 2.5: The information literate student extracts, records, and manages the information and its sources

All participants satisfied the outcomes listed in this standard. In order to extract information, they commonly used techniques such as photocopying, printing, and copying and pasting from digital documents (e.g., web pages and PDFs).

Each individual expressed a preference in methods of organising information. Creating research notes or outlines were very popular approaches. Often, students used Word to manage and organise information. A few of them used Word's notebook function or Excel spreadsheets.

Most participants in both groups understood that different types of sources needed to be cited differently. For example, they demonstrated that citations for books, journal articles, government documents, and websites had different formats. Since two students only used a single type of source, it was not clear if they understood this outcome.

Whenever participants decided to record information for their tasks, they added citation information in their notes so that they could track the sources easily.

4.3.3 Standard 3: Evaluating information

Standard 3.1: The information literate student summarizes the main ideas to be extracted from the information gathered

All participants described identifying main concepts and ideas in the information they found and often annotated documents by highlighting the text and using sticky notes. Some also directly transferred information to research notes in a separate document.

Regardless of group, students reported paraphrasing information in their own words, although some paraphrased during the note-taking stage, while others copied text verbatim first and then paraphrased later when writing the final product. Not all students

used direct quotations in their papers, but in several cases, this was because past or present instructors told them to avoid the practice of directly quoting sources.

Standard 3.2: The information literate student articulates and applies initial criteria for evaluating both the information and its sources

It was very challenging to uncover the extent to which students examined the quality of information that they found. Due to nature of their assignments, a few Japanese students had opportunities to demonstrate skills in analysing contradictory information. A couple of Canadian students discovered different opinions among sources and reported this fact clearly. Others compared different sources, but they did not seem to examine them thoroughly in terms of reliability and validity.

Three participants from each group demonstrated that they recognised how researchers collect and analyse data and make arguments based on it. These students clearly expressed their judgements about source quality in the interviews in this study or in their term papers.

Only one Canadian student explicitly articulated that he detected prejudice in a source, which he noticed immediately when reading it.

Several participants acknowledged the importance of the background context of the information they gathered. For example, these participants recognised how information was created based on context such as types of data collection methods, participants, and historical and social aspects.

Standard 3.3: The information literate student synthesizes main ideas to construct new concepts

Several students sought to understand the relationships among concepts encountered in their research and to integrate them to form new concepts. More

Canadians were judged to have partially or fully satisfied this outcome, but it was challenging to separate this outcome from Standard 3.4 in which students compare new information with previous knowledge. Some students generated new concepts from the information they obtained (deduction), while others took the opposite approach and identified relationships among concepts based on particular theories (induction). The former approach was associated with use of primary documents, as in history, and the latter was associated with application of a conceptual theory to observed phenomenon (e.g., a political theory). Thus, the appearance of information literacy skills was seen to be discipline-specific for this outcome.

One Japanese student utilised a computer programme to analyse raw data, which went beyond the requirements of his assignment. Another Japanese student used a YouTube video and advertisement images to analyse concepts, and one Canadian student found an interview with TV personalities related to her topic. Due to the nature of assignments at the undergraduate level and students' areas of study in this research, use of multimedia was not relevant in many instances.

Standard 3.4: The information literate student compares new knowledge with prior knowledge to determine the value added, contradictions, or other unique characteristics of the information.

To some degree, all participants were able to obtain information to satisfy their information needs. That is, they successfully completed their writing tasks using the information that they found. However, it was difficult in the context of this study to distinguish satisfactory versus excellent abilities. The actual extent of achievement depended on how individuals interpreted the results such as completion of the projects, higher grades, and personal satisfaction with the research experience.

Several students actively sought out information that contradicted or confirmed what they had already found. Overall, most Canadian students tended to display a strong tendency to verify information, while some Japanese students did to a lesser degree.

All students except one Japanese student drew conclusions based on the information they found (but her assignment did not require this).

A few participants tested theories as a part of their research process, and again this was tied to disciplinary difference (i.e., theories in economy and political science versus textual analysis in history).

Related to an outcome in Standard 3.1, several participants tried to assess the accuracy of information by looking at what and how they obtained information. The Canadian students' group, especially history students, demonstrated more sophisticated skills in this outcome.

A few participants' information behaviour implied that they had integrated previous knowledge with new information. It was difficult to verify this outcome, though, without measuring from a baseline of previous knowledge.

All students described selecting information to provide evidence for the topic, which they integrated in the final product.

Standard 3.5: The information literate student determines whether the new knowledge has an impact on the individual's value system and takes steps to reconcile differences

Related to Standards 3.1 and 3.4, several participants sought different viewpoints and decided to support or reject the opinions. Some decided by themselves to look for information from both sides of an argument when they encountered contradictory opinions. Others did so because they were required by their assignment guidelines to

seek alternative viewpoints. In both cases, students then decided which side to take based on what they discovered.

Standard 3.6: The information literate student validates understanding and interpretation of the information through discourse with other individuals, subject-area experts, and/or practitioners

No participants in this study solicited expert opinion to validate their understanding and interpretation of information. However, two Japanese students sought experts' opinions about their topics at the beginning of research process.

Standard 3.7: The information literate student determines whether the initial query should be revised

Since participants' information needs changed during the course of the process, all participants described reviewing their original information needs and deciding whether they needed additional information.

Most participants satisfied this outcome to some degree. Six participants from each group reviewed their search attempts and added concepts to conduct additional queries as they encountered different or new ideas.

Some participants realised the necessity of expanding their information retrieval efforts when the first attempts were not comprehensive. Five Canadians sought out additional information using different information retrieval systems. On the other hand, Japanese participants tended to stick with the same resources, although two expanded the scope of the tools they used. Even though some of them did not use different systems, five Japanese and seven Canadian participants used citation chaining to locate additional materials. When they only used this method, their skills were assessed as *partially satisfied*.

4.3.4 Standard 4: Using information

Standard 4.1: The information literate student applies new and prior information to the planning and creation of a particular product or performance

All participants organised information systematically using their own preferred methods (i.e., outlines, drafts, and research notes), either handwritten or electronic.

Seven Canadian participants' information behaviour was based on past experience in planning and carrying out a research process. On the other hand, four Japanese participants' experience in doing so was very limited, especially in the North American context, so they could not transfer prior research skills.

All participants integrated information using quotations or paraphrasing. A few of them mentioned that they preferred using paraphrases rather than direct quotations.

One Japanese student manipulated raw data and another Japanese student manipulated images. In the first case, this was because the student did not understand the instructor's requirements, while in the latter case, this was part of the assignment. None of Canadian students manipulated data into a new context (which may or may not have been appropriate for the context).

Standard 4.2: The information literate student revises the development process for the product or performance

As described in relation to Standard 4.1, some students used the same approach as in past work, but they did not describe reflecting on past experience in order to alter present approaches. Others were encountering research tasks for the first time and therefore did not have past experiences to reflect upon. Only one Canadian student reported changing her note-taking approach from handwritten note cards to an electronic document to improve efficiency.

Standard 4.3: The information literate student communicates the product or performance effectively to others

Although professors did not provide detailed guidance on writing a term paper, all students appropriately selected an academic writing format.

Only one Japanese student used Excel to create a graph in presenting results, a task that was not applicable to most participants in this study.

Due to the nature of her assignment, one Japanese participant incorporated images in her paper so that she could show what an advertisement looked like. This could be categorised as a part of the design element.

All students communicated clearly with a basic paper structure (e.g., introduction, main, and conclusion) and appropriate citation style, although the degree of success here of course varied.

4.3.5 Standard 5: Ethical issues

Standard 5.1: The information literate student understands many of the ethical, legal and socio-economic issues surrounding information and information technology

Although it was not clearly observed in this study, the collected data implied that some participants were familiar with issues related to accessing free- versus fee-based information. In particular, they recognised that they were accessing library resources such as journal articles that were not available on the open web. Several participants were judged to have partially satisfied this outcome.

Only one case was applicable for the outcome related to use of copyrighted materials. Although this Japanese participant did not give a clear indication that she used copyrighted images nor considered whether she needed permission to use them, she at least noted the source, which partially satisfied the outcome.

Standard 5.2: The information literate student follows laws, regulations, institutional policies, and etiquette related to the access and use of information resources.

All students used campus computers, which required passwords and IDs to log in. This is also associated with their ability to comply with institutional policies for accessing information. They reported legally obtaining information for their tasks (although it is unknown how they would react in a situation in which needed material was available only in *pirated* form). Finally, all students cited their sources including course materials to avoid plagiarism.

Standard 5.3: The information literate student acknowledges the use of information sources in communicating the product or performance

Canadian students demonstrated a strong understanding of citation styles although their final bibliographies had minor errors. Japanese students tried to imitate formatting rules by observing Canadians, but some of them did not grasp the basic logic. Four Japanese and eight Canadian students fully satisfied this outcome.

4.4 Summary

The comparison between Japanese and Canadian students' information literacy skills illustrated that Canadian students tended to perform better in many standards. For example, notable differences between the two groups were observed in Standards 1.2, 2.1, 2.2, 2.3, 4.1, and 5.3. Although Japanese students demonstrated weaker information literacy skills than Canadian in general, they partially satisfied many outcomes of the standards. Thus, it can be said that Japanese students have the potential to improve their existing skills through further experience and education.

The relationships between information behaviour elements and information literacy skills illustrate that behavioural elements that fell into the same overarching category (i.e.,

information needs, seeking, and use) were not necessarily associated with the same standards. In addition, certain information behavioural actions were connected to several information literacy outcomes, while other behaviours were related to only a single outcome (e.g., making research notes in *information extraction & organisation* versus looking at abstracts in *information selection*). Table 15 shows the correspondence between information behaviour and information literacy skills.

Table 11. Information literacy skills assessment (●: Outcome fully satisfied; ○: Partially satisfied; Grey shading: Not applicable or not observable; Blank: Not satisfied)

STANDARD 1: Determines nature and extent of needed information		J1	J2	J3	J4	J5	J6	J7	J8	C1	C2	C3	C4	C5	C6	C7	C8
1.1 The information literate student defines and articulates the need for information.																	
a	Confers with instructors and participates in class discussions, peer workgroups, and electronic discussions to identify a research topic, or other information need			●	●					○	●	○	●		●	●	
b	Develops a thesis statement and formulates questions based on the information need	○	○	○	○		○	○	○		○	○	○	○	○	○	○
c	Explores general information sources to increase familiarity with the topic	●		●	●	●	●	●	●	●	●	●	●	●	●	●	●
d	Defines or modifies the information need to achieve a manageable focus	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
e	Identifies key concepts and terms that describe the information need	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
f	Recognizes that existing information can be combined with original thought, experimentation, and/or analysis to produce new information		●		●											●	
1.2. The information literate student identifies a variety of types and formats of potential sources for information.																	
a	Knows how information is formally and informally produced, organized, and disseminated	●	○	○	○	●	●		●	○	●	●	●	●	●	●	●
b	Recognizes that knowledge can be organized into disciplines that influence the way information is accessed	●		○		●	○		●	○	●	●	●	●	○	○	○
c	Identifies the value and differences of potential resources in a variety of formats (e.g., multimedia, database, website, data set, audio/visual, book)	●	○	○	○	●	●		●		●	●	●	●	●	●	○
d	Identifies the purpose and audience of potential resources (e.g., popular vs. scholarly, current vs. historical)	●		○	○	●	●	○	●	○	●	●	●	●	●	●	●
e	Differentiates between primary and secondary sources, recognizing how their use and importance vary with each discipline	○	○	○	○	○	○	○	●	○	●	●	●	●	○	●	○
f	Realizes that information may need to be constructed with raw data from primary sources																
1.3. The information literate student considers the costs and benefits of acquiring the needed information.																	
a	Determines the availability of needed information and makes decisions on broadening the information seeking process beyond local resources (e.g., interlibrary loan; using resources at other locations; obtaining images, videos, text, or sound)				●								●		●	●	
b	Considers the feasibility of acquiring a new language or skill (e.g., foreign or discipline-based) in order to gather needed information and to understand its context																
c	Defines a realistic overall plan and timeline to acquire the needed information	●				●					●	●					
1.4. The information literate student reevaluates the nature and extent of the information need.																	
a	Reviews the initial information need to clarify, revise, or refine the question	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
b	Describes criteria used to make information decisions and choices	●	○	○	●	●	○	○	●	○	●	●	●	●	●	●	○

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STANDARD 2: Accesses needed information effectively and efficiently		J1	J2	J3	J4	J5	J6	J7	J8	C1	C2	C3	C4	C5	C6	C7	C8
2.1. The information literate student selects the most appropriate investigative methods or information retrieval systems for accessing the needed information.																	
a	Identifies appropriate investigative methods (e.g., laboratory experiment, simulation, fieldwork)	●	○	○	○	●	●	○	●	○	●	●	●	●	●	●	○
b	Investigates benefits and applicability of various investigative methods	●	○	○	○	●	●	○	●	○	●	●	●	●	●	●	○
c	Investigates the scope, content, and organization of information retrieval systems					●			●		●	●	●	●			
D	Selects efficient and effective approaches for accessing the information needed from the investigative method or information retrieval system	●	○	○	○	●	●	○	●	○	●	●	●	●	●	●	○
2.2. The information literate student constructs and implements effectively-designed search strategies.																	
A	Develops a research plan appropriate to the investigative method	●	○	○	○	●	●	○	●	○	●	●	●	●	●	●	○
b	Identifies keywords, synonyms and related terms for the information needed	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
c	Selects controlled vocabulary specific to the discipline or information retrieval source																
d	Constructs a search strategy using appropriate commands for the information retrieval system selected (e.g., Boolean operators, truncation, and proximity for search engines; internal organizers such as indexes for books)	○	○	○		○	○	○	○	○	●	●	○	●	●	●	○
e	Implements the search strategy in various information retrieval systems using different user interfaces and search engines, with different command languages, protocols, and search parameters		●		●	●	●		●		●	●	●	●	●	●	
f	Implements the search using investigative protocols appropriate to the discipline																
2.3. The information literate student retrieves information online or in person using a variety of methods.																	
a	Uses various search systems to retrieve information in a variety of formats		●	○	○	●	○			○	●	●	●	●	●	●	○
b	Uses various classification schemes and other systems (e.g., call number systems or indexes) to locate information resources within the library or to identify specific sites for physical exploration			○						○	○	○	●	○	●	○	○
c	Uses specialized online or in person services available at the institution to retrieve information needed (e.g., interlibrary loan/document delivery, professional associations, institutional research offices, community resources, experts and practitioners)					●					●						
d	Uses surveys, letters, interviews, and other forms of inquiry to retrieve primary information				●												
2.4. The information literate student refines the search strategy if necessary.																	
a	Assesses the quantity, quality, and relevance of the search results to determine whether alternative information retrieval systems or investigative methods should be utilized					●			●		●	●	●			●	
b	Identifies gaps in the information retrieved and determines if the search strategy should be revised	●	●			●			●		●		●	●		●	●
c	Repeats the search using the revised strategy as necessary	●	●			●			●		●		●	●		●	●

2.5. The information literate student extracts, records, and manages the information and its sources.																		
a	Selects among various technologies the most appropriate one for the task of extracting the needed information (e.g., copy/paste software functions, photocopier, scanner, audio/visual equipment, or exploratory instruments)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
b	Creates a system for organizing the information	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
c	Differentiates between the types of sources cited and understands the elements and correct syntax of a citation for a wide range of resources		●	●		●	●	●	●	●	●	●	●	●	●	●	●	
d	Records all pertinent citation information for future reference	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
e	Uses various technologies to manage the information selected and organized	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	

STANDARD 3: Evaluates information and its sources critically, and incorporates selected information into his/her knowledgebase and value system		J1	J2	J3	J4	J5	J6	J7	J8	C1	C2	C3	C4	C5	C6	C7	C8
3.1. The information literate student summarizes the main ideas to be extracted from the information gathered.																	
a	Reads the text and selects main ideas	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
b	Restates textual concepts in his/her own words and selects data accurately	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
c	Identifies verbatim material that can be then appropriately quoted		●	●			●	●		●	●	●	●	●	●	●	
3.2. The information literate student articulates and applies initial criteria for evaluating both the information and its sources.																	
a	Examines and compares information from various sources in order to evaluate reliability, validity, accuracy, authority, timeliness, and point of view or bias	●				○	●		●	○	●	●	●		●	○	○
b	Analyzes the structure and logic of supporting arguments or methods	●	●						●		●				●	●	
c	Recognizes prejudice, deception, or manipulation										●						
d	Recognizes the cultural, physical, or other context within which the information was created and understands the impact of context on interpreting the information	●	●		○	○			●	○	●	●	○		●	●	
3.3. The information literate student synthesizes main ideas to construct new concepts.																	
a	Recognizes interrelationships among concepts and combines them into potentially useful primary statements with supporting evidence	●					●	○	●		●	●	○	○	●	●	○
b	Extends initial synthesis, when possible, at a higher level of abstraction to construct new hypotheses that may require additional information																
c	Utilizes computer and other technologies (e.g. spreadsheets, databases, multimedia, and audio or visual equipment) for studying the interaction of ideas and other phenomena)		●		●											●	

3.4. The information literate student compares new knowledge with prior knowledge to determine the value added, contradictions, or other unique characteristics of the information.																		
a	Determines whether information satisfies the research or other information need	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
b	Uses consciously selected criteria to determine whether the information contradicts or verifies information used from other sources	●		○			●	○	●		●	●	●	○	●		○	
c	Draws conclusions based upon information gathered	●	●	●	●		●	●	●	●	●	●	●	●	●	●	●	●
d	Tests theories with discipline-appropriate techniques (e.g., simulators, experiments)		●	○			●	○						○	●			
e	Determines probable accuracy by questioning the source of the data, the limitations of the information gathering tools or strategies, and the reasonableness of the conclusions	●	●		○	○			●	○	●	●	○		●	●		
f	Integrates new information with previous information or knowledge		●	●							●							
g	Selects information that provides evidence for the topic	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
3.5. The information literate student determines whether the new knowledge has an impact on the individual's value system and takes steps to reconcile differences.																		
a	Investigates differing viewpoints encountered in the literature	●				○	●		●	○	●	●	○		●	●		
b	Determines whether to incorporate or reject viewpoints encountered	●				○	●		●	○	●	●	○		●	●		
3.6. The information literate student validates understanding and interpretation of the information through discourse with other individuals, subject-area experts, and/or practitioners.																		
a	Participates in classroom and other discussions																	
b	Participates in class-sponsored electronic communication forums designed to encourage discourse on the topic (e.g., email, bulletin boards, chat rooms)																	
c	Seeks expert opinion through a variety of mechanisms (e.g., interviews, email, listservs)		○						○									
3.7. The information literate student determines whether the initial query should be revised.																		
a	Determines if original information need has been satisfied or if additional information is needed	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
b	Reviews search strategy and incorporates additional concepts as necessary	●		●		●	●	●	●		●	●	●		●	●	●	
c	Reviews information retrieval sources used and expands to include others as needed	○		●		○	○	○	●	○	●	●	●	●	○	●	○	

STANDARD 4: Uses information effectively to accomplish specific purpose		J1	J2	J3	J4	J5	J6	J7	J8	C1	C2	C3	C4	C5	C6	C7	C8
4.1. The information literate student applies new and prior information to the planning and creation of a particular product or performance.																	
a	Organizes the content in a manner that supports the purposes and format of the product or performance (e.g. outlines, drafts, storyboards)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
b	Articulates knowledge and skills transferred from prior experiences to planning and creating the product or performance	●	○	○	○	●	●	○	●	○	●	●	●	●	●	●	●
c	Integrates the new and prior information, including quotations and paraphrasings, in a manner that supports the purposes of the product or performance	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
d	Manipulates digital text, images, and data, as needed, transferring them from their original locations and formats to a new context		●		●												
4.2. The information literate student revises the development process for the product or performance.																	
a	Maintains a journal or log of activities related to the information seeking, evaluating, and communicating process																
b	Reflects on past successes, failures, and alternative strategies											●					
4.3. The information literate student communicates the product or performance effectively to others.																	
a	Chooses a communication medium and format that best supports the purposes of the product or performance and the intended audience	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
b	Uses a range of information technology applications in creating the product or performance		●														
c	Incorporates principles of design and communication				○												
d	Communicates clearly and with a style that supports the purposes of the intended audience	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

STANDARD 5: Understands many of the economic, legal, and social issues surrounding the use of information and accesses and uses information ethically and legally		J1	J2	J3	J4	J5	J6	J7	J8	C1	C2	C3	C4	C5	C6	C7	C8
5.1. The information literate student understands many of the ethical, legal and socio-economic issues surrounding information and information technology.																	
a	Identifies and discusses issues related to privacy and security in both the print and electronic environments																
b	Identifies and discusses issues related to free vs. fee-based access to information	○				○	○		○		○	○	○	○		○	
c	Identifies and discusses issues related to censorship and freedom of speech																
d	Demonstrates an understanding of intellectual property, copyright, and fair use of copyrighted material					○											
5.2. The information literate student follows laws, regulations, institutional policies, and etiquette related to the access and use of information resources.																	
a	Participates in electronic discussions following accepted practices (e.g. "Netiquette")																
b	Uses approved passwords and other forms of ID for access to information resources	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
c	Complies with institutional policies on access to information resources	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
d	Preserves the integrity of information resources, equipment, systems and facilities	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
e	Legally obtains, stores, and disseminates text, data, images, or sounds	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
f	Demonstrates an understanding of what constitutes plagiarism and does not represent work attributable to others as his/her own	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
g	Demonstrates an understanding of institutional policies related to human subjects research																
5.3. The information literate student acknowledges the use of information sources in communicating the product or performance.																	
a	Selects an appropriate documentation style and uses it consistently to cite sources	●	○	○	○	●	●	○	●	●	●	●	●	●	●	●	●
b	Posts permission granted notices, as needed, for copyrighted material																

Table 12. Elements of information behaviour and information literacy standards

Elements of information behaviour identified in this study			**Corresponding IL standards**
1) Finding a focus	**JPN**	**CAN**	
▪ Brainstorming ideas	6	6	▪ 1.1.a/e/f; 1.2.f ▪ 2.2.b ▪ 3.6.c ▪ 4.1.b
▪ Forming ideas to identify potential information sources	6	6	▪ 1.1.c/e ▪ 2.2.b ▪ 4.1.b
▪ Checking information availability	3	5	▪ 4.1.b ▪ 5.2.b/c
▪ Narrowing the focus	4	6	▪ 1.1.b/d/e; 1.4.a ▪ 2.2.b ▪ 3.4.a, 3.7.a ▪ 4.1.b
▪ Changing the focus	2	1	▪ 1.1.d/e; 1.4.a ▪ 2.2.b; 2.3.d ▪ 3.4.a ▪ 4.1.b
▪ Writing a proposal	0	2	▪ 1.1.b/c/d/e; 1.2.b
2) Locating information	**JPN**	**CAN**	
▪ Searching the web	8	6	▪ 1.2.c/d/e ▪ 2.1.a/b/c/d, 2.2.e/f; 2.3.a/d; 2.4.a/b/c ▪ 5.1.b; 5.2.e
▪ Searching in article databases	4	4	▪ 1.2.b/c/d/e ▪ 2.1.a/b/c/d, 2.2.d/e/f; 2.3.a/c; 2.4.a/b/c ▪ 5.1.b; 5.2.b/c/e
▪ Searching in the library catalogue	2	6	▪ 1.2.b/c/d/e; 1.3.a ▪ 2.1.a/b/c/d, 2.2.d/e/f; 2.3.a/b; 2.4.a/b/c ▪ 5.1.b; 5.2.c/e
▪ Looking for information Wikipedia	1	3	▪ 1.2.c/d; ▪ 2.1.b/c/d ▪ 5.2.e
▪ Purposeful selection of search tactics	6	6	▪ 2.2.d/e; 2.3.b; 2.4.b/c
▪ Searching for specific information	3	5	▪ 2.4.b ▪ 3.7.b/c
▪ Citation chaining	4	7	▪ 3.7.c
▪ Lack of information	2	1	▪ 1.2.a/c ▪ 2.1.c
3) Information selection	**JPN**	**CAN**	
▪ Utilising book structure	1	6	▪ 2.2.d; 3.4.g
▪ Looking at abstracts	5	3	▪ 3.4.g
▪ Matching sources with various criteria (Individual rather groups)			▪ 3.2.a/b; 3.4.b/e/g; 3.5.a/b
4) Information extraction & organisation	**JPN**	**CAN**	
▪ Using sticky notes	0	3	▪ 2.5.a/b/e ▪ 3.1.a; 3.2.b ▪ 4.1.b
▪ Highlighting documents while reading	2	2	▪ 2.5.a/b ▪ 3.1.a; 3.2.b ▪ 4.1.b
▪ Making research notes	2	8	▪ 2.5.a/b/d/e ▪ 3.1.a/b/c; 3.2.a/b/c/d; 3.3.a; 3.4.b/d/e/g; 3.5.a/b 4.1.a/b/c; 4.2.b ▪ 5.2.d/e

▪ Creating paper structure	5	7	▪ 2.5.a/b/d/e ▪ 3.1.a/b/c; 3.2.a/b; 3.4.g, 3.5.b ▪ 4.1.a/b/c ▪ 5.2.d/e
5) Information analysis	**JPN**	**CAN**	
▪ Making research notes	2	8	▪ 2.5.a/b/d/e ▪ 3.1.a/b/c; 3.2.a/b/c/d; 3.3.a; 3.4.b/d/e/g; 3.5.a/b ▪ 4.1.a/b/c; 4.2.b
▪ Creating a structure for information analysis	5	7	▪ 3.2.a/b/d; 3.3.a; 3.4.c/f; 3.5.a ▪ 4.1.a/b
▪ Reading deeply	3	0	▪ 3.1.a; 3.2.b; 3.4.e
▪ Data analysis	1	0	▪ 3.3.c; 3.4.d/e/f ▪ 4.1.d; 4.3.b
6) Writing & editing	**JPN**	**CAN**	
▪ Filling in information	5	3	▪ 3.4.c/g ▪ 4.1.a/b/c; 4.3.a/d
▪ Reading and writing at the same time	0	1	▪ 3.4.b/e/g; 3.7.c ▪ 4.1.a/b/c; 4.3.a/d
▪ Editing and tweaking	4	5	▪ 4.1.b; 4.3.a/d
▪ Adding supplemental information	0	2	▪ 3.3.c; 3.4.g; 3.7.a/c ▪ 4.1.d; 4.3.a/c/d
▪ Making an argument	1	4	▪ 3.3.a; 3.4.d ▪ 4.1.b/c; 4.3.a/d
▪ Using simple expressions	1	0	▪ 4.3.a/d
▪ Importance of the introduction	0	1	▪ 4.3.a/d
▪ Writing section by section	3	4	▪ 3.4.c/g ▪ 4.1.a/b/c; 4.3.a/d
7) Citing sources	**JPN**	**CAN**	
▪ Adding bibliographic information into notes	6	6	▪ 4.1.b ▪ 5.1.d; 5.2.d/e/f
▪ Consulting style manuals	1	5	▪ 4.1.b ▪ 5.3.a/b
▪ Using technology for formatting citations	3	1	▪ 5.3.a
▪ Citing sources by types	0	1	▪ 5.3.a

5 DISCUSSION

The previous sections presented the study results arranged according to the three research questions. First, this section discusses how this study satisfied the criteria of trustworthiness of its results. Then, an overview is given of how information behaviour, intervening factors, and information literacy skills were found to be related. Then, each step of the information behaviour process, along with intervening factors and information literacy skills associated with the behaviour, is discussed.

5.1 Trustworthiness of the study results

Lincoln and Guba (1985) suggested using four criteria to enhance the trustworthiness of qualitative inquiry: *credibility*, (believability of the study results) 2) *transferability*, (applicability of results to other contexts or other participants), *dependability* (consistency of research across participants and time), and 4) *confirmability* (authentic voices from participants free from biases, motivations, and perspectives of researchers). Table 13 illustrates how the results from this study satisfy these four criteria.

Table 13. Trustworthiness of the study results (according to Lincoln and Guba's criteria)

Criteria	How this study satisfy the criteria
Credibility	▪ Rich description of study context, participants, and research design ▪ Triangulation by using multiple data-gathering techniques (portfolio, interviews, and flowchart) ▪ Checked accuracy of translation and interpretation especially from Japanese participants ▪ Spent sufficient time with participants to obtain information needed
Transferability	▪ Rich description of study context, participants, and research design to transfer to other situations
Dependability	▪ Triangulation by using multiple data-gathering techniques (portfolio, interviews, and flowchart) ▪ Rich description of study context, participants, and research design to transfer to other situations
Confirmability	▪ Triangulation by using multiple data-gathering techniques (portfolio, interviews, and flowchart) ▪ Provided clear and rich description of data collection, coding, and data analysis process ▪ Audited trail to document how data were collected, recorded, and analysed

5.2 Overview of Information Behaviour Process, Factors, and Skills

This study aimed to understand Japanese and Canadian students' information behaviour during their research tasks. Again, the research questions were:

RQ1. What is students' information behaviour during academic writing tasks? (i.e., information behaviour)

RQ2. What factors are involved in information behaviour during the academic writing tasks? (i.e., factors affecting behaviour)

RQ3. What information literacy skills are present in students' information behaviour? (i.e., information literacy skills based on their behaviour)

Table 14 shows the relationships among information behaviour, factors, and information literacy based on Table 7 (see p. 135), Table 9 (see p. 177), and Table 12 (see p. 203). It was found that the boundaries of the information behaviour process from the theoretical framework (information needs, seeking, and use) were not distinctly reflected in the information behaviour categories identified. That is, the observed categories were not necessarily associated with only one element (information needs, seeking and use) or information behaviour. Likewise, some factors affected only one observed category of information behaviour while others influenced multiple categories. Finally, information literacy skills were observed to be associated with particular components of information behaviour. Overall, the relationships among these three elements illustrates that they are interrelated and not separable. Thus, it is important to think about the elements' continuity when seeking to understand students' research process.

Items with underlined font in the table indicate substantial differences between the two groups, determined by the prevalence of the factor and the impact on students'

overall information behaviour process. Notable differences between the Japanese and Canadian groups were observed in the *locating information* category. The table indicates that Canadian students' behaviour originated from factors such as *past experience*, *personalisation of behaviour*, and *academic expectations*, while *help from others* is an important factor for Japanese students. These differences then impacted students' information literacy skills in Standards 1.2, 2.1, 2.2, 2.3, and 3.7.

Table 14. Summary table

Information behaviour	Information behaviour categories	Factors (❖ Japanese, † Canadian)	Information literacy
Information needs	Finding a focus	▪ Assignment characteristics ❖ ▪ Help from others ❖ ▪ Past experience † ▪ Affective aspects ▪ Personalisation of behaviour † ▪ Time management	Standard 1.1 1.2 1.3. 1.4 Standard 2.2 2.3 Standard 3.4 3.6 3.7 Standard 4.1 Standard 5.2
Information needs Information seeking	Locating information	▪ Help from others ❖ ▪ Past experience † ▪ Affective aspects ▪ Personalisation of behaviour † ▪ Time management ▪ Academic expectation †	Standard 1.2 1.3 Standard 2.1 2.2 2.3 2.4 Standard 3.7 Standard 5.1 5.2
Information seeking	Information selection	▪ Past experience † ▪ Personalisation of behaviour † ▪ Academic expectation †	Standard 2.2 Standard 3.2 3.4 3.5
Information seeking Information use	Information extraction and organisation	▪ Past experience † ▪ Affective aspects ▪ Personalisation of behaviour † ▪ Time management ▪ Academic expectation †	Standard 2.5 Standard 3.1 3.2 3.3 3.4 3.5 Standard 4.1 4.2 Standard 5.2
Information use	Information analysis	▪ Help from others ❖ ▪ Past experience † ▪ Affective aspects ❖ † ▪ Personalisation of behaviour † ▪ Time management ▪ Academic expectation †	Standard 2.5 Standard 3.1 3.2 3.3 3.4 3.5 Standard 4.1 4.2 4.3
Information seeking Information use	Writing and editing	▪ Help from others ❖ ▪ Affective aspects ❖ † ▪ Personalisation of behaviour † ▪ Time management ▪ Academic expectation †	Standard 3.3 3.4 3.7 Standard 4.1 4.3
Information use	Citing sources	▪ Help from others ❖ ▪ Past experience † ▪ Affective aspects ▪ Personalisation of behaviour † ▪ Academic expectation †	Standard 4.1 Standard 5.1 5.2 5.3

Note. Substantial differences between the two groups are underlined. The symbols ❖ and † indicate a strong tendency among Japanese or Canadian students respectively

In terms of the first research question, this study confirmed that students' information behaviour in completing academic writing tasks fell into the three elements of information needs, seeking, and use. The data empirically supported the notion expressed in Wilson's 1996 model that the relationships among the three elements are important in developing an understanding of undergraduates' information behaviour during their assignments tasks. Also, it supported the relationship among these elements as shown in the conceptual framework of this study (see Figure 2, p. 67). However, the categories of information behaviour identified in this study did not perfectly mesh with Wilson's model and the conceptual framework. This suggests that a clearly defined distinction among the three elements was not found in the participants' information behaviour during the actual tasks. For example, the *locating information* category in this study included both information needs and seeking. Similarly, the *information extraction and organisation* and *writing and editing* categories were related to both information seeking and use elements. These findings prompt a re-assessment of past studies that discussed the three elements of information behaviour individually rather than as a connected entity. This may suggest that a macro-approach is important to investigating and understanding the complexities of information behaviour as a whole.

Although the boundaries among information needs, seeking, and use were not clearly defined, the students in this study were found to exhibit seven behaviours in a relatively linear process, which was similar in nature to Kulthau's ISP (2004). However, it contradicted the cyclical nature of the process in the conceptual framework and Ellis's (1989) pattern of fluid information seeking. An explanation for the linear shape to the process can be explained by the fact that students were pursuing assigned writing tasks. Compared to other types of tasks, the assignment completion process tends to follow

structured and typical steps, which leads to linear behavioural patterns. This finding suggested that teaching students to take a linear approach to their research is still relevant but that the tendency of the conceptual stages to overlap should be addressed.

In response to the second research question, the relationship between various intervening factors and the seven information behaviour steps was identified. Some factors were associated with only a single information behaviour category (e.g., *help from librarians*) while others were broader and therefore associated with several categories (e.g., *past experience*, *personalisation of behaviour*, *time management*, and *academic expectations*). The conceptual framework and past studies (e.g., B. Allen, 1996; M. E. Brown, 1991; Chatman, 2000; R. S. Taylor, 1991) described factors associated with a single element of information behaviour. However, the factors found in this study could affect single or multiple elements of students' information behaviour.

Finally, in relation to the third research question, although each information literacy standard is independent, this study found that the corresponding categories of information behaviour overlap. This somewhat contradicted the conceptual framework of this study, which instead showed individual connections between information behaviour and information literacy. Thus, it can be argued that the information literacy standards' approach of delineating discrete steps can obscure a holistic understanding of students' behaviour and skills. This study confirmed that it is important to conceive of the research process as dynamic on multiple levels

In the following section, each step of the information behaviour process identified in this study is described in terms of the process for each category (information behaviour), the relationships of the steps to intervening factors (factors) and information literacy skills (information literacy).

5.3 Finding a Focus

5.3.1 Information behaviour

In looking at the details of each step, several differences were found between the two student populations (see Table 8, p. 137). Students in both groups brainstormed ideas in the *finding a focus* stage. However, Canadian students tended to shape their information needs in order to satisfy personal interests. Information needs are often associated with the existence of knowledge gaps and a feeling of not being able to make sense of the situation without more information (Dervin & Dewdney, 1986; Dervin & Frenette, 2001; Dervin, 1992), but the gaps could more appropriately be described as *intellectual curiosity* in this study. Students were in the learning stages of their subject matter, so their information needs were focused on acquiring new information.

Students in the Japanese group, on the other hand, did not show a clear tendency for selecting topics based on personal interests versus previous knowledge. Similar to the Canadian group, intellectual curiosity was a characteristic of Japanese students' information needs. Also, for Japanese students, information needs were tied to a need for *leverage*. That is, Japanese students strove to supplement language abilities by leveraging previous knowledge and therefore sought out topics of study where this would be possible. This was consistent with results from a past study with a similar population (Ishimura et al., 2008). Stronger language abilities would perhaps shift their focus from trying to leverage previous knowledge to more pure personal curiosity.

All students had initial information needs (i.e., paper topics), but the needs were not in fixed forms. Rather, the needs were shaped and became more focused throughout the process, especially as they encountered new information. The development process of needs in this study fits with the characteristics identified in Taylor's study in relation to

the pre-negotiation decision process and levels of information needs (R. S. Taylor, 1968). In this study, defining information needs often involved looking for background information to supplement existing knowledge. Since participants' needs were not concrete at the beginning of the task, they continuously sought to clarify the focus of their investigation and required tasks. It is important to note that the shaping of information needs was not necessarily separable from the information seeking process. In some cases, identifying information needs was an on-going process that often involved a fair amount of seeking information in addition to collecting background information.

The nature of students' information needs has other implications. Only a few Canadian students were able to give consideration to stating a thesis or primary argument during the *finding a focus* stage. Considering that a thesis statement was a key element in their final products, this finding indicated that the ability to identify information needs is not only related to preliminary steps but also to the behaviours of planning future steps and envisioning the final form of their products.

The behaviour of checking for information availability likewise had implications for the whole process. Without information, students were not able to complete their tasks. Gauging the existence of pertinent information was a necessary component to information needs. Thus, *anticipation* behaviour should be recognised as an important aspect of students' information needs process.

5.3.2 Factors

This study's findings confirmed that how instructors frame and structure assignment tasks is connected to how students form information needs. This is consistent with past studies that claim that the nature of information needs are influenced by the characteristics of problems (R. S. Taylor, 1991; Vakkari, 1999). Japanese students in this

study preferred structured characteristics while Canadian students did not express facing barriers in carrying out less structured academic tasks. An explanation could be that Canadian students had more experience in the past performing similar tasks and applied previously-used approaches to the current one. Thus, Japanese students were better able to anticipate what to do if professors structured assignments carefully. This finding offers a caveat to past studies that claimed generally that international students tended to have difficulties executing what to do and where to start with their assignment tasks (e.g., Ball & Mahony, 1987). In other words, controlling the *assignment characteristics* factor would have the potential to help Japanese students to become accustomed to North American assignment tasks and make their information needs clearer.

Another element underlying the connection between *assignment characteristics* and *past experience* was students' planning or anticipation behaviour. The behaviour was not explicitly reported by students, but factors affecting other behaviour implied its existence. This hidden behaviour may have taken the form of unarticulated thoughts about research plans to which they automatically reacted. Then, combined with *time management* factors, students were able to anticipate how much time they needed for each step at the beginning of a given stage. This was important for students' abilities to complete their tasks efficiently by the deadlines.

Past studies have emphasised the importance of coaching students during the research process (Head & Eisenberg, 2009, 2010). The present study confirmed that instructor-student interaction particularly allowed students to clarify or confirm their information needs (i.e., for the research path). From this perspective, students' information needs were influenced by the social structure of the academic environment (e.g., B. Allen, 1996). However, more Canadian than Japanese students tended to ask

professors for help at this stage, implying that aspects of the academic social structure mainly influenced Canadian students' information needs. Compared to Canadian students, this may suggest that Japanese students did not see the necessity to confer with instructors or were reluctant to do so because they did not want to *bother* teachers, which would be consistent with the tendency in Japanese schools to keep a certain distance between students and teachers (e.g., Hendricks, 1991).

5.3.3 Information literacy

Overall, many students were able to articulate and narrow down information needs (e.g., key terms and ideas) for their assignment tasks. When associated with the information behaviour of *finding a focus*, it was observed that they satisfied many outcomes in the information literacy standards. However, at the group level, there are a few areas within this category in which information literacy skills were not strong. For example, Japanese students tended to find topics by themselves rather than through discussion with professors, compared to several Canadian students who took this approach. Professors' active engagement may be necessary to modify Japanese students' information behaviour if they are to better achieve Standard 1.1, in which students are meant to seek expert advice. This was consistent with the observation that discussion with instructors was not a strong factor during this stage.

Very few participants exhibited behaviours that satisfied the outcomes of Standard 1.3, which involves planning the overall research process. Since planning behaviour was not explicitly reported, it is understood that students simply planned *in their heads*. However, considering that many participants had difficulties managing their time during tasks that required information behaviour, a stronger ability in planning would have led to a more effective research process in which they would be able to allocate time to

information needs, seeking, and use, and complete their tasks efficiently with a limited time frame. It is interesting that *assignment structure* as a factor did not affect many Canadian participants' ability to demonstrate information literacy skills. However, regardless of group, it is an important responsibility for instructors to structure their assignments so that students can make use of their own time (e.g., by offering more formative feedback opportunities).

Although many students narrowed down their focus as the process went forward, they tended not to develop thesis statements in the early stages (i.e., when identifying information needs). This is an interesting contrast to the information literacy standards which can be interpreted to position the development of a thesis statement in Standard 1.1 in the early stages of the process. This fact may suggest a mismatch (due to the iterative nature of research process) between the ideal timing and students' actual experience of developing information literacy skills and that it may not be appropriate to focus too much on creating strong thesis statements at the earlier stage.

Systematically identifying potential sources in which to seek information was not a commonly observed behaviour during the *finding a focus* stage. In particular, Japanese students tended not to have a strong understanding of how information was used in specific disciplines. A few Canadian students expressed an understanding of what kinds of sources needed to be investigated in their discipline. Regardless of group, knowledge of potential sources was essential to the rest of the process and allowed students to check the availability of relevant information.

5.4 Locating Information

5.4.1 Information behaviour

This study confirmed that regardless of group, students' information seeking patterns followed models that exist in the literature. In terms of locating information, the overall information seeking pattern of both student groups changed as they encountered new information. This finding is consistent with Bates's berry-picking model (Bates, 1989). Based on the information encountered, then, their action paths evolved to subsequent actions. In particular, they were inspired by information encountered, obtained different ideas, and generated new queries. In most cases, they stuck with the same resource to find new information. Thus, Bates's information seeking pattern often took place in the same information search systems. However, some students used different information systems (e.g., catalogue versus article databases) rather than a single system depending on the ideas they identified after interacting with information. Students' selection of systems will be discussed in more detail in the information literacy section (see Section 5.4.3). In addition, students moved from seeking general to more focused information as the process moved forward. This is consistent with Kuhlthau's ISP (Kuhlthau, 2004).

When looking more closely at the details of participants' information seeking behaviour, it was found that one aspect of Marchionini's (1995) six elements affected students' behaviour, namely *search system*, i.e., that the source of information determines the behaviour. In general, Google is a popular tool among undergraduate students to seek *big picture* information (Head & Eisenberg, 2009, 2010). The current study was generally consistent in finding that selection of search systems is related to participants' searching behaviour. However, it is important to distinguish amongst Google's different products.

Google Search was a more commonly used tool for locating academic information among Japanese students compared to Canadian students. However, Google Search was used to obtain a general overview of topics and to increase familiarity, which can be associated with the need to supplement their abilities in English with additional semantic and contextual information. In addition, Japanese students' patterns were more skewed toward using Google Scholar in comparison to other tools for finding books, articles, and data due to their limited knowledge of existing resources. Importantly, most students showed an awareness of the difference between Google Search and Google Scholar.

Compared to Japanese students, Canadian students' behaviour was balanced in terms of using Google Scholar, article databases licensed by their library, and the library catalogue. These findings suggest that Japanese and Canadian students' information seeking behaviour was characterised by different use of search systems. Thus, the analysis of search system use adds another layer to information seeking behaviour. Although the process itself was similar amongst the student groups, the Japanese students' had a skewed selection of information sources. This finding has rich implications for information literacy skills, which will be discussed in relation to the third research question.

In the area of information searching, similar to Vakkari, Pennanen, and Serola's (2003) findings, students overall tended to use a single keyword at the beginning of their search process and added additional related terms as they developed clearer ideas on their topics. The present study also found that students tended to replicate search strategies when they searched across multiple databases. Canadian students tended to identify synonyms more easily than Japanese students, which was consistent with past studies that described international students' difficulties in searching in English (e.g., DiMartino et

al., 1995). It was encouraging that some Japanese students tried to use synonyms or different keywords during their search. However, improving search skills by scaffolding (e.g., using a thesaurus or dictionary tools) would be necessary for Japanese students' to have a more effective search experience as recommended in past studies (e.g., Baron & Strout-Dapaz, 2001).

Regardless of group membership, more advanced search techniques were not widely observed, which is consistent with the Vakkari's study (Vakkari et al., 2003). In particular, it was rare for students to utilise the OR operator and truncation symbols. Citation chaining can be effective to identify relevant sources (Ellis et al., 1993; Ellis & Haugan, 1997; Ellis, 1989), and several Canadian students utilised this technique. Canadian students were much more likely to use subject browsing functions (i.e., related to controlled vocabulary and subject classification), primarily because of a tendency to explore search functions and embrace serendipity based on cues from the search system. Several also expressed an understanding of the concept that documents and books are arranged by subject and used this to find more information. It is surmised that Japanese students were less likely to do this because they did not select resources that use controlled vocabulary (that is, they used Google Scholar) and were too focused on the search task to allow time for exploration. Overall, Canadian students tended to demonstrate more search techniques, illustrating a notable difference between the two groups.

5.4.2 Factors

Past studies have emphasised peers' influence on students' information seeking (e.g., Barrett, 2005; Callinan, 2005; George et al., 2006). In this study, however, while the factor was strongly observed among Japanese participants, it was not among Canadian

students overall. This finding also contradicted a past study that discussed Asian students' reliance on ethnic channels during information seeking (Jeong, 2004). Participants in the present study did not report interactions related to academic tasks within their own national group. This tendency may be explained by the friendship patterns of Japanese students. In examining past literature, Brown (2009) identified five friendship patterns of international students. Japanese students' behaviour can be categorised as bicultural, which means that students maintain their cultural identity while simultaneously learning a new culture in order to be a part of the larger society. Since Japanese students constitute a small population on North American campuses, they need to actively participate in the larger group in order to have a social life in the academic community. To do this, making connections with Canadians is necessary, and the strategy then impacts their information seeking behaviour.

Although interactions with librarians did influence some students' behaviour positively in both groups, very few participants reported this experience. Some previous literature argued that international students were not familiar with librarians' role in providing reference services compared to domestic students (e.g., Goudy & Moushey, 1984), but this study showed equivalent lack of awareness.

Time allocation is an important element for students to terminate seeking information tasks. This factor has not been discussed in previous information behaviour models. In some cases, the combination of the time allocation and perfectionism factors drove a few Canadian students to find as much information as possible, leaving little time for analysing and writing. Thus, with strong skills in time management, students could move their assignment tasks forward so that they could spend more time on other elements of the process such as information use.

The personalisation factor also affected information seeking and search behaviour in this study, in reference to students' efforts to optimise their search process (puzzled out on their own, based on their own judgements). When students had higher motivation, they tended to seek more information and strove to improve their approaches toward information seeking. For example, the use of advanced search techniques in order to *do something different* was spurred by this self-directed action, driven by their own personality. This finding is consistent with Marchionini's (1995) model in which information seekers' personal characteristics (e.g., personal preference and abilities) affected their seeking behaviour and self-efficacy in intervening variables in Wilson's model (1997). Canadian students were more affected by the personalisation factor than Japanese. A possible explanation is that Japanese students may have been limited in their ability to exhibit extra effort in searching for information due to limitations in English skills.

Serendipity was an interesting factor that affected the information seeking and searching of Canadian students particularly. Students' behaviour was shaped *by chance*. In the past studies, serendipity has been discussed in relation to library interfaces and spaces and to information discovered by chance (e.g., Björneborn, 2008; Nutefall & Ryder, 2010). In the present study, serendipity was more associated with how (e.g., advanced search functions) and where (e.g., databases) participants located information. Often, the serendipity element was associated with past experience rather than with random behaviours. Students who already understood what was expected for their assignment tasks sought ways to achieve their goals more effectively. Thus, educational background (i.e., what they learned in the past) was necessary to the opportunity to find information serendipitously, which was observed as important among Canadian students.

As in the case of information needs, students' information seeking behaviour was influenced by instructors' assignment guidelines. Clear assignment guidelines from instructors helped students to recognise what sources to use. However, the importance of guidelines as an intervening factor was only applicable to Japanese participants in this study. Again, the reason for this was that since the Japanese did not have a strong understanding of library resources compared to Canadian students, they tended not to utilise appropriate resources, as is consistent with findings from past studies (e.g., Macdonald & Sarkodie-Mensah, 1988; Song, 2004). The effect of personal preference on information seeking also has been explored in past research (e.g., M. E. Brown, 1991; Marchionini, 1995), the findings of which were found to apply to the Canadian students in this study. They tended to understand what types of materials to use and had developed preferred sources of information from their past experience.

5.4.3 Information literacy

Most behaviours in the *locating information* category were not largely different between the two groups in terms of numbers of observation. However, the information literacy skills associated with the behaviour was very different in each group. In particular, substantial differences were found in knowledge of academic sources and use of searching techniques.

For example, Japanese students tended not have a strong understanding of the types of sources expected for their assignments (e.g., scholarly and secondary sources). A few Japanese students used licensed databases and the library catalogue but they overwhelmingly used Google Scholar as their main tool. Thus, they underperformed in satisfying the outcomes related to identifying potential sources (Standard 1.2), selecting information retrieval systems (Standard 2.1), and developing an appropriate research plan

for their discipline (Standard 2.2). Many past studies have mentioned international students' lack of understanding of library resources (e.g., Macdonald & Sarkodie-Mensah, 1988). It is also clear, however, that it is important to go beyond the basic *library materials* angle and increase students' knowledge of expectations in their discipline and the sources available in order for students to satisfy key outcomes related to locating information. A broader approach to elucidating expectations would help students to identify alternative resources when they cannot find information, a skill outlined in Standard 2.4.

Another difference between the two student groups was found in search tactics. Although equal numbers of students from both groups demonstrated some tactics that went beyond simple keyword searching, Canadian students showed some of the more advanced skills as detailed in Standard 2.2. International students' difficulties with searching have been particularly discussed in DiMartino's study (DiMartino et al., 1995). Similarly, the present study confirmed that Japanese students demonstrated only basic skills and partially satisfied the information literacy standards. Compared to Canadian students, Japanese undergraduates as a group had yet to develop advanced search tactics (e.g., Boolean, truncation, and browsing by call number) and needed more assistance to enhance these skills. Canadian students were often found to have developed skills on their own based on past experience and trial and error, but Japanese students were seen to lack a larger understanding of the research process. This posed a barrier to their abilities to develop skills on their own.

Overall, although Canadian students demonstrated stronger skills in locating information, their approach was based on their own understanding, which may not have represented an ideal conception of the academic research process. This raises an

important point for librarians who interact with students. As has been mentioned, students in this study rarely reported interacting with librarians, thereby not fulfilling an outcome of Standard 2.3. Those who had interactions with librarians tended to develop better information searching skills. In addition, the experience could help students to change their existing information *habits*. Thus, the results from this study justified the importance of librarians' assistance because even though students demonstrated certain information literacy skills, they struggled to recognise possibilities for improving their skills.

5.5 Information Selection

5.5.1 Information behaviour

In the *information selection* stage, only one Japanese student mentioned seeking cues from book features (e.g., table of contents and index), compared to several Canadian students. This difference in behaviour is associated with the sources used in the information seeking stage; Japanese students were less likely to use books at all. It may be possible that Japanese students did not have the skills needed to utilise these features for selecting relevant resources efficiently. Together with increasing knowledge of resources in addition to Google Scholar, it may be effective to include instruction related to information selection, particularly for Japanese students, in information literacy support efforts. The behaviour of using article abstracts to judge relevance, on the other hand, was similar in both groups.

Although the relevance judgement of sources varied by individual, only Japanese participants described the behaviour of matching potential sources with pre-prepared paper outlines. This approach to selecting sources could be interpreted as being related to situation criteria, as discussed in Saracevic (1999). Although topical relevance is a part of every information selection process, the *fit* of information in a predetermined paper

structure was more important to Japanese students. This can also be described as static selection rather than active selection based on what they encountered, which fit with the process of narrowing their focus.

In terms of other criteria used to select information, many students' criteria meshed with the findings in Saracevic's (1999) study, namely: research questions (*cognitive relevance*), assignment guidelines (*situational relevance*), and comprehensiveness and existence of keywords in retrieved documents (*topical relevance*). One participant also used citation count as an additional criterion for relevance judgement in the present study. The present study thus proved that the information selection process of both Japanese and Canadian students is multidimensional.

5.5.2 Factors

For many students, information selection was influenced by past experience and a trial and error approach. Since students were required to complete assignments, they developed *survival skills* to do so. They sought ways to select information so that they could efficiently judge relevance. They certainly considered the relevance of information, but past experience and a trial and error approach affected how they could do so efficiently.

5.5.3 Information literacy

Many Japanese students did not use books as sources of information even if they may have been appropriate for their assignments, so they were not able to demonstrate the information literacy skill of using a book structure (e.g., index and table of contents) to locate information (Standard 2.2). On the other hand, Canadian students demonstrated fairly solid ability in this regard, which suggested that their past experience helped them to develop the skills.

Students used various criteria, often in combination, to select sources. However, from an information literacy skills perspective, neither the Japanese and Canadian students as a group demonstrated skills that satisfied some of the outcomes in Standard 3.4 and 3.5. In particular, abilities to evaluate contradictions, accuracy, and different viewpoints of sources were not reported. This suggested that even though students tried to incorporate certain criteria in their relevance judgements, there was still room for improvement regardless of group. Critical thinking skills are foundational to the development of information literacy and cannot be developed instantaneously. Active collaboration between professors and librarians in this area is necessary to scaffold students' learning in this area across the areas of information seeking and use.

5.6 Information Extraction and Organisation and Information Analysis

5.6.1 Information behaviour

The step of *information extraction and organisation* was closely connected to *information analysis*. Although some Canadian students created a paper structure to help with organising information, some Japanese students tended to make outlining/structuring a primary goal for their assignment tasks. Making a structure beforehand was an approach for Japanese students to organise and prepare for using information. In contrast, Canadian students overwhelmingly described making research notes that functioned to analyse their information sources. This behavioural difference could be explained by the Canadian group's tendency to generate meaning and relationships from the information they found rather than simply filling information into *slots*. Thus, from a cognitive process perspective (e.g., Cole, 1997; Todd, 1999b), some Japanese participants' knowledge structure was more confirmational rather than meant to construct new knowledge. Thus,

this suggested that the focus of some Japanese students' information use behaviour should shift from this *slotting* approach for more advanced paper writing.

5.6.2 Factors

Information extraction and organisation and *information analysis* often simultaneously occurred (see p. 124), and therefore the same factors affected both behavioural steps. Past experience and trial and error were common elements to shape students' behaviour. By accumulating knowledge through past experience, students developed their own ways to organise and analyse information. This is why Canadian students showed a stronger tendency towards making research notes—they had already developed preferred ways of keeping track of their information. This finding implies that information use was context-bound and related to social factors (i.e., expectations in academia) (R. S. Taylor, 1991). Thus, students' understanding of the social context of their information seeking was a key factor in their behaviour related to analysing information in their papers. Japanese students' tendency to focus on their papers' structure rather than argument and analysis was consistent with past studies that discussed academic expectations in different countries (e.g., Macdonald & Sarkodie-Mensah, 1988). Generally speaking, North Americans are taught to value synthesis and creativity, whereas some Asian countries emphasise proper form and structure. It is a key for Japanese students to understand academic expectations so that they can analyse and synthesise information for their papers. This is a fundamental component of information literacy skills, which will be discussed in the following section.

It is notable that psychological aspects and time management skills strongly influenced students' behaviour at this stage, especially among a few Canadian students. When students were overly preoccupied with making research notes and did not have

strong time management skills, they spent too much time on this process. On the other hand, Japanese students were more affected by their language skills. In particular, the processes of information organisation and extraction were slowed down because of their limitations in reading and writing speed.

5.6.3 Information literacy

Most Japanese students did not report taking notes in order to organise and analyse information, while many Canadians saw this as a central part of the assignment completion process. This observation is related to their information literacy skills in Standard 3.2, 3.3, 3.4, and 3.5 in which the outcomes are associated with analysis and evaluating sources. Although Canadian participants also had room to grow in developing their skills areas, Japanese students were seen to lack the behaviour (i.e., note-taking) that would facilitate further learning. To evaluate sources critically, their behaviour pattern should shift from simply creating a structure (*information organisation*) to making research notes (*analysis*).

Overall, in the areas of making research notes or creating a paper structure, some Japanese students showed weaker skills in developing their own way of organising information based on past experience, an ability that is articulated in Standard 4.1. These Japanese students were not familiar with the research process and effective methods of organising information, behaviours that could be taught more explicitly by professors or writing tutors.

5.7 Writing and Editing

5.7.1 Information behaviour

During the writing stage, since Japanese students were aiming toward filling in information or writing section-by-section in a predetermined structure from the previous

stage, they were simply transferring information into the final product based on what they did in previous steps. For Canadian students, the writing and editing process had a different character. They completed their analysis and made potential connections among sources mentally, filling in information based on their own arguments that they wanted to convey in their papers. If students had not thought through their main ideas and arguments, they tended to write section-by-section once they identified connections among sources. It is important to note, then, that different motivations existed behind behaviours that were part of the same categories.

Another difference between the two groups was observed in their approaches to making an argument. Canadian students mentioned the task of needing to elaborate an argument more than Japanese students did. This can be explained by the finding that Canadian students were more aware of the elements required in academic papers.

5.7.2 Factors

Understanding of academic expectations for their level of study helped participants anticipate what kind of papers needed to be written (i.e., analytical versus descriptive). Through trial and error from past experience, Canadian students especially tried to create papers that matched instructors' expectations. Therefore, they drew from accumulated knowledge of academic expectations as discussed in the previous section. On the other hand, this was not strongly observed among Japanese students because their past learning tended to focus on the surface level mechanics of English composition. This was consistent with past studies that found that international students faced difficulties in presenting new ideas and analysis (e.g., Badke, 2002). In addition, Japanese students were slower at writing since their English skills were still being developed. Some Canadian and Japanese participants reported that the quality of their writing was improved by help from

peers. However, the same factor affected the two groups differently according to language ability. Canadian students sought help more with logic and readability while Japanese students focused on grammar and structure. To produce quality papers, it is essential for Japanese students to supplement their less advanced knowledge of writing compared to Canadian students and receive appropriate writing assistance. Since they have at least a basic understanding of English writing, scaffolding their experience to build on past learning is important.

Regardless of group, when students had time management skills and prioritised their steps during their academic tasks, they tended to allocate more time in the writing phase than in information seeking. This was because writing is the most important part to be successful in completing assignments, and professors' assessment is ultimately based on the final products. It is notable that time management skills were an important factor deciding quality of writing, which is connected with academic success overall.

5.7.3 Information literacy

Students in both groups described the behaviour of *filling* information into their papers—that is, copying and pasting quotations and paraphrases from their notes into a predetermined structure. However, as Japanese students tended to start information analysis at this stage (rather than during information seeking like many Canadian students), the behaviour was associated with two outcomes from Standard 3.4. Compared to Canadian students, their analysis at this point was not comprehensive. Canadian students focused more on *presenting* ideas, a skill that is associated with outcomes in Standard 4.1 and 4.3.

The desire to make a cohesive argument was strongly observed among Canadian students. Although Japanese students mentioned taking English composition classes in

Japanese universities, they reported a weak understanding of academic writing practice. Increasing understanding of the core elements of writing would benefit them to structure their work more effectively. On a related issue, writing and editing behaviour was described by many students in both groups, but Japanese students had less past experience in writing, which effectively meant weaker skills related to outcomes in Standard 4.1.b, which deals with transfer of skills to other situations. Therefore, it is suggested that Japanese students be given guidance and opportunities to bridge their writing experience to produce better papers and have a higher quality research process overall.

5.8 Citing Sources

5.8.1 Information behaviour

Finally, both groups of students included bibliographic information in their notes. Past studies have claimed that international students have problems in this area (e.g., Badke, 2002; Baron & Strout-Dapaz, 2001). However, this study did not show any difference in terms of students' understanding of the need for source attribution. In addition, specific citation styles (e.g., Chicago and APA) were applied by using, for example, citation generators. However, consulting a style manual was not a common practice among Japanese students. Japanese students tended not to have knowledge of style manuals; they were simply aware of the need to cite. This process was closely connected to their information literacy skills in citing sources.

5.8.2 Factors

Canadian students tended to understand how to cite information from past learning and had developed skills based on the experience. In other words, they were accustomed to the process of citing sources using a particular citation style because of their understanding of academic expectations. On the other hand, Japanese participants were

largely influenced by peers when it came to citing sources. Japanese students in this study were aware of the importance of citing information, which is different from past studies that describe international students' lack of understanding of plagiarism (e.g., Baron & Strout-Dapaz, 2001; Feldman, 1989; Kumar & Suresh, 2000). However, despite their awareness, they were uncertain about how to actually refer to outside sources in their text and format a bibliography. Thus, since Canadian students, generally speaking, knew more about how to cite information, interactions between Canadian and Japanese students at least helped the latter to understand the task. This suggested that facilitating interaction between the two groups may have the potential to help Japanese students to develop a better understanding of ethical use of information.

5.8.3 Information literacy

Both groups reported that they acknowledged outside sources from which they drew information for use in their papers. All students recorded citation information when they were reading and taking notes. However, fewer Japanese students consulted a style manual, which is a skill mentioned in Standard 5.3a. At least, Japanese students understood the importance of citing information and some made use of technology to format citations. However, their conceptual understanding needed to be strengthened in order to achieve the information literacy standards related to ethical use of information. As discussed in the factors section, peer-teaching could be useful to promote this. Also, professors' and librarians' active engagement is necessary for Japanese students to increase their knowledge and conceptual understanding.

5.9 Summary

In sum, as Table 14 illustrates (see p. 208), information behaviour, factors, and information literacy skills interact. In addition, a close examination of these elements

reveals what makes Japanese and Canadian students' information behaviour different. Intervening factors determined students' information behaviour, which impacted their information literacy skills. The results illustrated that theory and practice are interrelated and not separable. In many cases, information scientists focus on theories, especially creating models of information behaviour. In some cases, they do not discuss implications for practice. On the other hand, practitioners use information literacy standards as if they are only "rules" and tend not to discuss information behaviour models. Through a theoretical lens, though, they would be able to see students' behaviour differently and more clearly. The study results highlighted continuous relationships among information behaviour, factors, and information literacy skills, which will inform approaches to improve students' learning experience.

More specifically, instructors will be able to provide necessary scaffolding, structure assignments, and provide support by considering how and why students behave in certain ways. Also, they can conceptualise how Japanese students, as a sub-group of international students, might perform better by recognising the differences that exist in contrast to domestic students. For librarians, it is important to collaborate with instructors to ensure that information literacy elements are embedded in courses and to target factors related to the research process. Since classrooms are becoming more diverse in terms of students' background, differences between domestic and international students would highlight how both instructors and librarians can navigate differences in needs in different populations.

5.10 Contribution to Research

This study was framed using a conceptual framework based on Wilson's theoretical model of information behaviour (1997). The first research question of this study

investigated information behaviour of undergraduate students (i.e., What is student's information behaviour during an academic writing task?). This study contributed empirical evidence that his model is applicable to a population of undergraduate students. Many past studies of information behaviour have discussed information needs, seeking, and use as separate entities. However, as Wilson's model argued and this study supported, these elements are not separable in understanding an overall picture of students' research process.

An important addition to his model gleaned from this study is that these three elements do not have clear distinctions in relation to steps of the information behaviour process. The study investigated students' *real* information behaviour and uncovered very complicated and often disorganised patterns. Thus, the boundaries among the elements were not distinct, and it is reasonable to expect that this ambiguity could be applicable to larger populations. The nebulous nature of the elements and their relationships could be the topic of further investigation in the information science field.

From the data collected in this study, seven behavioural categories were identified. The information behaviour of Japanese and Canadian undergraduate students was found to be parallel to Kuhlthau's (2004) ISP model, although her terminology did not quite fit the specific behaviours observed in the present study. Also, the nature of the process observed was linear. This similarity is reasonable given that the population of this study and her studies had similar characteristics.

However, it should be noted that even though both groups of students in the present study exhibited the same behavioural categories, the elements that affected their behaviour varied according to group membership. More specifically, this study revealed how the seven factors intervene in information behaviour processes related to the second

research question (i.e., What factors are involved in information behaviour during an academic writing task?). For example, Japanese students mainly used Google Scholar while Canadians used multiple types of information retrieval tools. For Canadian students, intervening factors such as students' *past experience, personalisation of behaviour*, and *understanding of academic expectations* influenced their behaviour, while *help from peers* was more important for Japanese students.

A main focus of previous studies in the library and information science field has been international students' cultural and linguistic differences (e.g., Baron & Strout-Dapaz, 2001; Greenfield et al., 1986; Jackson, 2005). Although the differences identified in these studies are still relevant, the goal of this study was to not solely focus on these differences and instead uncover all kinds of factors that affect information behaviour. In some cases, the same factors affected both Japanese and Canadian students (e.g., *time management*), while others strongly affected only one group (e.g., *help from others* and *personalisation of behaviour*). The present study has shown that focusing solely on linguistic and cultural elements was not sufficient to understand the information behaviour of international students. This knowledge is useful particularly for library practitioners and instructors who have regular contact with international students.

The third research question of this study assessed students' information literacy (i.e., What information literacy skills are present in the student's information behaviour?). Although most students did not ask librarians for help in this study, those who did reported a positive impact on their information behaviour and skills. Also, many of them expressed a strong desire to improve their research skills (e.g., time management and search techniques) to complete their assignment tasks successfully. However, at the same time, they were not sure how to do this. The results from this study offer considerations

for professors and librarians regarding how to improve students' information literacy skills. In library and information studies, scholars often have focused on the process of students' behaviour but have not discussed outcomes of behaviour in relation to best practices. In contrast, practitioners often have crafted information literacy instruction to simply satisfy information literacy outcomes without considering the dynamic nature of the research process. As Table 14 shows (see p. 208), this study illustrated the fundamental connection between information literacy skills and information behaviour processes. Students' research process is dynamic and cannot be fully understood from static frameworks such as information literacy standards. Also, specific behaviours and the factors that affect them are connected to their abilities to satisfy information literacy outcomes. Process, factors, and information literacy skills are not separable. By looking at the three elements holistically, professors and practitioners would be able to provide necessary support to improve students' information literacy skills.

In addition to the three research questions, as an overall objective, this study also identified that differences between Canadian and Japanese groups existed in terms of information behaviour and skills. Changing interventions based on these differences could improve the effectiveness of instruction. For example, Japanese and Canadian students' approaches to seeking information were different because different factors intervened in the process. For example, since peers' influence was very strong for Japanese students, collaboration between Canadian and Japanese students may improve Japanese students' understanding of and abilities in information seeking. Increasing Japanese students' knowledge of academic expectations would also support more *information literate* information behaviour. On the other hand, Canadian students tended to have a foundation from high school in terms of where, what, and how to search. A

scaffolding approach, building on what they had learned in the past, would improve their information literacy skills. Regardless of groups, it is important to have time management skills for efficient seeking information.

In sum, a holistic approach of integrating information behaviour, intervening factors, and information literacy skills leads to a more accurate understanding of students' research process and can be used to support the development of effective methods to improve students' learning experience beyond the static approach of information literacy standards.

5.11 Limitations of the Research

There were a few limitations to this study. The study's data collection methods were closely connected with participants' assignment schedules. All participants had very busy schedules while participating in the study and had higher personal priorities that competed with their abilities to provide complete information to the researcher. Although data triangulation from the three methods of data collection (i.e., portfolio, interviews, and flowchart) was applied to improve validity, there was a possibility of missing information especially from the portfolio portion. In this case, participants' experience was chiefly obtained from interviews and the flowcharts. Related to the first limitation, participation in the study was solely voluntary. Compared to studies which make data collection a part of an assignment requirement, it is assumed that some provided more evidence while others did less. Even though these limitations exist and may impact data analysis, it was important for the study's purpose to investigate participants' behaviour in a natural rather than a controlled environment.

Japanese and Canadian students' academic discipline did not correspond perfectly. The population size of Japanese students in the relevant institutions was small and not

easily accessible to me. Although I could have potentially paired Japanese participants with Canadian students from the same discipline, recruitment of Canadian students was very challenging as well. Also, Canadian and Japanese students were recruited simultaneously. Thus, parallel matching by discipline was not achievable in this study. Contrasting the study results cannot say that they are similar or different according to academic discipline. Future studies, particularly ones following a more quantitative approach, could compare two students groups with the same background to control for this potential variable.

Overall, this was an exploratory study that investigated both information behaviour and information literacy skills in depth using a qualitative approach. Future research will investigate a larger population using a quantitative approach.

The analysis of information literacy skills was on a high level rather than related to a specific assessment framework. Thus, the results of this study were limited only to a "big picture" of students' skills. More detailed analysis of students' development of specific skills in a disciplinary context could be carried out in future studies, ideally in collaboration with faculty members in the relevant subject areas. Also, this study focused on students' subjective experience and did not include objective assessment, for example, from instructors, such as what kind of guidance they actually offered and their evaluation of students' performance.

5.12 Conclusions

This study sought to add understanding of the nature of Japanese students' information behaviour during their research tasks as compared to Canadian students. In particular, this study answered three research questions: 1) What is students' information behaviour during an academic writing task?, 2) What factors are involved in information

behaviour during an academic writing task?, and 3) What information literacy skills are present in students' information behaviour?

With authentic behaviour based on actual assignments as opposed to an artificial setting, students demonstrated the overlapping and dynamic nature of information behaviour. The distinction among information needs, seeking, and use elements was often ambiguous. Depending on the individual, it is not possible to separate each element of the process. Thus, information needs, seeking, and use should be analysed as a whole process to understand students' information behaviour.

Various factors intervened in students' information behaviour. In particular, understanding which factors affected that behaviour shed light on why Japanese and Canadian students behaved differently. In addition, these factors proved that simply focusing on linguistic and cultural differences during information behaviour is not sufficient to understand international students' behaviour. It is important not to be trapped by stereotypes.

Information literacy is conventionally seen as a checklist of skills to be achieved. However, students' process was found not to be static but instead *messy* in terms of information behaviour categories. Also, the behaviour was intervened by various factors that were connected to their information literacy skills. Thus, this study demonstrated that the process, factors, and skills are closely connected to each other. Skill development can be better facilitated by instructional interventions when informed by an understanding of the factors that affect the information behaviour process with particular focus on differences and similarities between Japanese and Canadian students.

Finally, information behaviour and information literacy skills are not separable. Scholars often focus only on information behaviour while practitioners emphasise

information literacy standards. This study demonstrated that it is important to connect these two areas to understand a more complete picture of students' behaviour. The knowledge will lead to the identification of necessary interventions to improve students' learning experience.

5.13 Future Research

The current study focused on Japanese students in Canadian universities. Although the study was a significant first step, it is important to continue the effort to understand international students. Using the same research framework, my future studies will expand to different populations such as students from China, South Korea, India, and Saudi Arabia in order to explore differences or similarities among different international student groups and determine whether it makes sense to consider *international students* as a population that shares information literacy or information behaviour characteristics. This knowledge will be useful for academic institutions to deepen their understanding of the population and consider how to better support students' research process and information literacy skills.

This would be strengthened by a quantitative approach after completion of the qualitative study. This will be taken to understand the international student population and generalise their information behaviour and information literacy skills. The results of the study will be important for North American institutions to make decisions regarding serving the population.

Another future direction is to investigate differences between a particular international student group with a domestic group in a controlled environment. The purpose of the current study was to investigate information behaviour in "real" settings. However, controlling for variables such as assignment characteristics between the two

groups would isolate differences and similarities in information behaviour and information literacy skills and allow the examination of causal relationships among variables. This study could target a specific course (including a newly-created one) which would have both international and Canadian students.

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APPENDIX A: RELATIONSHIPS BETWEEN INFORMATION BEHAVIOUR AND OUTCOMES OF INFORMATION LITERACY

Information behaviour	ACRL information literacy standards	Performance indicators and outcomes
Information needs *the state in which people recognise gaps in their knowledge and want to make sense of experiences.*	1. The information literate student determines the nature and extent of the information needed.	**1. The information literate student defines and articulates the need for information.** a. Confers with instructors and participates in class discussions, peer workgroups, and electronic discussions to identify a research topic, or other information need b. Develops a thesis statement and formulates questions based on the information need c. Explores general information sources to increase familiarity with the topic d. Defines or modifies the information need to achieve a manageable focus e. Identifies key concepts and terms that describe the information need f. Recognizes that existing information can be combined with original thought, experimentation, and/or analysis to produce new information **2. The information literate student identifies a variety of types and formats of potential sources for information.** a. Knows how information is formally and informally produced, organized, and disseminated b. Recognizes that knowledge can be organized into disciplines that influence the way information is accessed c. Identifies the value and differences of potential resources in a variety of formats (e.g., multimedia, database, website, data set, audio/visual, book) d. Identifies the purpose and audience of potential resources (e.g., popular vs. scholarly, current vs. historical) e. Differentiates between primary and secondary sources, recognizing how their use and importance vary with each discipline f. Realizes that information may need to be constructed with raw data from primary sources **3. The information literate student considers the costs and benefits of acquiring the needed information.** a. Determines the availability of needed information and makes decisions on broadening the information seeking process beyond local resources (e.g., interlibrary loan; using resources at other locations; obtaining images, videos, text, or sound) b. Considers the feasibility of acquiring a new

		language or skill (e.g., foreign or discipline-based) in order to gather needed information and to understand its context c. Defines a realistic overall plan and timeline to acquire the needed information **4. The information literate student reevaluates the nature and extent of the information need.** a. Reviews the initial information need to clarify, revise, or refine the question b. Describes criteria used to make information decisions and choices
Information seeking *Information seeking is the purposeful search for information in order to increase their knowledge or understand their experience*	2. The information literate student accesses needed information effectively and efficiently	**1. The information literate student selects the most appropriate investigative methods or information retrieval systems for accessing the needed information.** a. Identifies appropriate investigative methods (e.g., laboratory experiment, simulation, fieldwork) b. Investigates benefits and applicability of various investigative methods c. Investigates the scope, content, and organization of information retrieval systems d. Selects efficient and effective approaches for accessing the information needed from the investigative method or information retrieval system **2. The information literate student constructs and implements effectively-designed search strategies.** a. Develops a research plan appropriate to the investigative method b. Identifies keywords, synonyms and related terms for the information needed c. Selects controlled vocabulary specific to the discipline or information retrieval source d. Constructs a search strategy using appropriate commands for the information retrieval system selected (e.g., Boolean operators, truncation, and proximity for search engines; internal organizers such as indexes for books) e. Implements the search strategy in various information retrieval systems using different user interfaces and search engines, with different command languages, protocols, and search parameters f. Implements the search using investigative protocols appropriate to the discipline **3. The information literate student retrieves information online or in person using a variety of methods.** a. Uses various search systems to retrieve information in a variety of formats

		b. Uses various classification schemes and other systems (e.g., call number systems or indexes) to locate information resources within the library or to identify specific sites for physical exploration c. Uses specialized online or in person services available at the institution to retrieve information needed (e.g., interlibrary loan/document delivery, professional associations, institutional research offices, community resources, experts and practitioners) d. Uses surveys, letters, interviews, and other forms of inquiry to retrieve primary information **4. The information literate student refines the search strategy if necessary.** a. Assesses the quantity, quality, and relevance of the search results to determine whether alternative information retrieval systems or investigative methods should be utilized b. Identifies gaps in the information retrieved and determines if the search strategy should be revised c. Repeats the search using the revised strategy as necessary
Information seeking / Information use *In information use, information is selected and processed to change people's state of knowledge to make sense and develop understanding of an experience*	↑	**5. The information literate student extracts, records, and manages the information and its sources.** a. Selects among various technologies the most appropriate one for the task of extracting the needed information (e.g., copy/paste software functions, photocopier, scanner, audio/visual equipment, or exploratory instruments) b. Creates a system for organizing the information c. Differentiates between the types of sources cited and understands the elements and correct syntax of a citation for a wide range of resources d. Records all pertinent citation information for future reference e. Uses various technologies to manage the information selected and organized
Use	3. The information literate student evaluates information and its sources critically and incorporates selected information into his or her knowledge base and value system.	**1. The information literate student summarizes the main ideas to be extracted from the information gathered.** a. Reads the text and selects main ideas b. Restates textual concepts in his/her own words and selects data accurately c. Identifies verbatim material that can be then appropriately quoted **2. The information literate student articulates and**

		applies initial criteria for evaluating both the information and its sources. a. Examines and compares information from various sources in order to evaluate reliability, validity, accuracy, authority, timeliness, and point of view or bias b. Analyzes the structure and logic of supporting arguments or methods c. Recognizes prejudice, deception, or manipulation d. Recognizes the cultural, physical, or other context within which the information was created and understands the impact of context on interpreting the information **3. The information literate student synthesizes main ideas to construct new concepts.** a. Recognizes interrelationships among concepts and combines them into potentially useful primary statements with supporting evidence b. Extends initial synthesis, when possible, at a higher level of abstraction to construct new hypotheses that may require additional information c. Utilizes computer and other technologies (e.g. spreadsheets, databases, multimedia, and audio or visual equipment) for studying the interaction of ideas and other phenomena **4. The information literate student compares new knowledge with prior knowledge to determine the value added, contradictions, or other unique characteristics of the information.** a. Determines whether information satisfies the research or other information need b. Uses consciously selected criteria to determine whether the information contradicts or verifies information used from other sources c. Draws conclusions based upon information gathered d. Tests theories with discipline-appropriate techniques (e.g., simulators, experiments) e. Determines probable accuracy by questioning the source of the data, the limitations of the information gathering tools or strategies, and the reasonableness of the conclusions f. Integrates new information with previous information or knowledge g. Selects information that provides evidence for the topic **5. The information literate student determines whether the new knowledge has an impact on the individual's value system and takes steps to reconcile differences.** a. Investigates differing viewpoints encountered in the literature

		b. Determines whether to incorporate or reject viewpoints encountered **6. The information literate student validates understanding and interpretation of the information through discourse with other individuals, subject-area experts, and/or practitioners** a. Participates in classroom and other discussions b. Participates in class-sponsored electronic communication forums designed to encourage discourse on the topic (e.g., email, bulletin boards, chat rooms) c. Seeks expert opinion through a variety of mechanisms (e.g., interviews, email, listservs) **7. The information literate student determines whether the initial query should be revised.** a. Determines if original information need has been satisfied or if additional information is needed b. Reviews search strategy and incorporates additional concepts as necessary c. Reviews information retrieval sources used and expands to include others as needed
Use	4. The information literate student, individually or as a member of a group, uses information effectively to accomplish a specific purpose.	**1. The information literate student applies new and prior information to the planning and creation of a particular product or performance.** a. Organizes the content in a manner that supports the purposes and format of the product or performance (e.g. outlines, drafts, storyboards) b. Articulates knowledge and skills transferred from prior experiences to planning and creating the product or performance c. Integrates the new and prior information, including quotations and paraphrasing, in a manner that supports the purposes of the product or performance d. Manipulates digital text, images, and data, as needed, transferring them from their original locations and formats to a new context
Needs/seeking/use	↑	2. **The information literate student revises the development process for the product or performance.** a. Maintains a journal or log of activities related to the information seeking, evaluating, and communicating process b. Reflects on past successes, failures, and alternative strategies

Use	↑	3. **The information literate student communicates the product or performance effectively to others.** a. Chooses a communication medium and format that best supports the purposes of the product or performance and the intended audience b. Uses a range of information technology applications in creating the product or performance c. Incorporates principles of design and communication Communicates clearly and with a style that supports the purposes of the intended audience
Use	5. The information literate student understands many of the economic, legal, and social issues surrounding the use of information and accesses and uses information ethically and legally.	**1. The information literate student understands many of the ethical, legal and socio-economic issues surrounding information and information technology.** a. Identifies and discusses issues related to privacy and security in both the print and electronic environments b. Identifies and discusses issues related to free vs. fee-based access to information c. Identifies and discusses issues related to censorship and freedom of speech d. Demonstrates an understanding of intellectual property, copyright, and fair use of copyrighted material **2. The information literate student follows laws, regulations, institutional policies, and etiquette related to the access and use of information resources.** a. Participates in electronic discussions following accepted practices (e.g. "Netiquette") b. Uses approved passwords and other forms of ID for access to information resources c. Complies with institutional policies on access to information resources d. Preserves the integrity of information resources, equipment, systems and facilities e. Legally obtains, stores, and disseminates text, data, images, or sounds f. Demonstrates an understanding of what constitutes plagiarism and does not represent work attributable to others as his/her own g. Demonstrates an understanding of institutional policies related to human subjects research **3. The information literate student acknowledges the use of information sources in communicating the product or performance.** a. Selects an appropriate documentation style and uses it consistently to cite sources b. Posts permission granted notices, as needed, for copyrighted material

APPENDIX B: RECRUITMENT E-MAIL TO INTERNATIONAL STUDENTS OFFICE AND STUDENTS GROUPS

DD MM, YYYY

Dear Mr. / Ms. Name,

I am completing a Ph.D. programme at the School of Information Studies at McGill University. I'm conducting research to investigate how Japanese students complete their assignments at McGill University and what kind of factors affect their behaviours. Your participation is very valuable because the results of the research will help academic libraries improve their services to international students, especially those who are from culturally and linguistically different backgrounds from Canada.

Students will be asked to describe their experiences of the research process for assignments/projects at McGill University. Participants in the study will be asked to (1) email exchange during research project asking what you have done (about 2-3 weeks), (2) join individual interviews (1 short [about 20 min] and 1 long interviews [about 45 min]), and (3) draw research flowchart. Participation in this study is entirely voluntary. If international students choose to participate, their confidentiality and anonymity will be maintained. Collected data will be used solely for academic purposes, and personal identity information will not be released.

Please send the attached e-mail to Japanese students by DD MM, YYYY. Thank you very much for your cooperation in this study. If you have any questions or concerns, please feel free to contact:

Yusuke Ishimura
Tel: (514) 315-9199
E-mail: yusuke.ishimura@mail.mcgill.ca

Or my thesis supervisor: Dr. Joan Bartlett
Tel: (514) 398-6976
E-mail: joan.bartlett@mcgill.ca

Sincerely,

Yusuke Ishimura

APPENDIX C: RECRUITMENT E-MAIL TO JAPANESE STUDENTS

DD MM, YYYY

Dear Japanese students,

I am a Ph.D. student in the School of Information Studies at McGill University. For my research, I'm looking for participants for my study and your participation would be very valuable.

The purpose of this research:
The purpose is to investigate the research process of international students in McGill University. I believe the results of the study will help academic libraries improve their services to international students.

You can participate if you:
Are a current Japanese student at McGill University
Are an undergraduate student taking 300 or 400 level classes (usually U2 and U3 students)
Have research assignments for your courses (any major)
Have a high school degree from Japan

What you are asked to do:
(1) Email exchange during research project asking what you have done (2-3 weeks)
(2) Join 2 individual interviews (1 short [about 20 min] and 1 long [about 45 min])
(3) Draw a research flowchart during an interview

Compensation:
You will be provided research skills consultations by the researcher based on the portfolios they create after completion of the study.

Research Ethics:
Your participation in this study is entirely voluntary. Your confidentiality and anonymity will be maintained. Collected data will be used solely for academic purposes, and personal identity information will not be released.

If you decide to participate in my study, please reply to yusuke.ishimura@mail.mcgill.ca by DD MM, YYYY.

If you have any questions or concerns, please feel free to contact:

Yusuke Ishimura
Tel: (514) 315-9199
E-mail: yusuke.ishimura@mail.mcgill.ca

Or my thesis supervisor: Dr. Joan Bartlett
Tel: (514) 398-6976
E-mail: joan.bartlett@mcgill.ca

Sincerely,
Yusuke Ishimura

APPENDIX D: RECRUITMENT E-MAIL TO CANADIAN STUDENTS

DD MM YYYY

Dear Canadian students,

I am a Ph.D. student in the School of Information Studies at McGill University. For my research, I'm looking for participants for my study and your participation would be very valuable.

The purpose of this research:
The purpose is to compare the research process of Canadian with international students in McGill University. I believe the results of the study will help academic libraries improve their services to students.

You can participate if you:
Are a current Canadian student at McGill University
Are an undergraduate student taking 300 or 400 level classes (usually U2 and U3 students)
Have research assignments for your courses (any major)
Born and/or educated in Canada

What you are asked to do:
(1) Email exchange during research project asking what you have done (2-3 weeks)
(2) Join 2 individual interviews (1 short [about 20 min] and 1 long [about 45 min])
(3) Draw a research flowchart during an interview

Compensation:
You will be provided research skills consultations by the researcher after the completion of the study based on the portfolios you create.

Research Ethics:
Your participation in this study is entirely voluntary. Your confidentiality and anonymity will be maintained. Collected data will be used solely for academic purposes, and personal identity information will not be released.

If you decide to participate in my study, please reply to yusuke.ishimura@mail.mcgill.ca by DD MM, YYYY.

If you have any questions or concerns, please feel free to contact:

Yusuke Ishimura
Tel: (514) 315-9199
E-mail: yusuke.ishimura@mail.mcgill.ca

Or my thesis supervisor: Dr. Joan Bartlett
Tel: (514) 398-6976
E-mail: joan.bartlett@mcgill.ca

Sincerely,

Yusuke Ishimura

APPENDIX E: INTERVIEW 1 (LIFE HISTORY)

Questions for Japanese

1. Background information
    a. Length of stay in Canada so far
    b. Age group
    c. Programme of study at McGill
    d. Year
    e. With/without library training

2. Tell me about your educational background. What kind of educational degree(s) do you have? What types of education did you receive in Japan (e.g., international school vs. regular school)?

3. Tell about your experience conducting research before coming to Canada in as much detail as possible

4. What was the experience like?

5. Why did you decide to come to Canada to study? How did you select McGill? How did you select your major?

Questions for Canadian

1. Background information
    a. First language
    b. Age group
    c. Programme of study at McGill
    d. Year
    e. With/without library training

2. Tell me about your educational background. What kind of educational degree(s) do you have? What kind of education did you receive in Canada (e.g., English school vs. French immersion)?

3. Tell about your experience conducting research before coming to McGill in as much detail as possible (e.g., school library)

4. What was the experience like?

5. Why did you decide to come to McGill for your degree? How did you select your major?

APPENDIX F: INTERVIEW 2 (CONTEMPORARY EXPERIENCE)

Questions for Japanese

Based on what students have done for their research tasks:

1. Describe your overall research process during the research task.

[Probe] What is your opinion about your process?
[Probe] Compare your research experiences before and after coming to Canada. Is your experience different now (in Canada)? In what way?

Questions for Canadians

Based on what students have done for their research tasks:

1. Describe your overall research process during the research task.

[Probe] What is your opinion about your process?
[Probe] Think about your research experience in the past. Is your research experience the same as it was before this year? When did you change/did not change? In what way?

Both Canadians and Japanese

Information needs:

2. When professors give you research assignments/projects, how do you decide what to do?

[Probe] Were you successful during this stage?
   a. If yes, why do you think you were successful?
   b. If no, what are your difficulties? How did/didn't you overcome them?

Information seeking:

3. How do you look for the information you need?
4. What are your criteria for selecting information sources?

[Probe] Were you successful during this stage?
   a. If yes, why do you think you were successful?
   b. If no, what are your difficulties? How did/didn't you overcome them?

Information use:

5. What makes you decide which information to use?
6. How do you integrate what you found?

[Probe] Were you successful during this stage?
   a. If yes, why do you think you were successful?
   b. If no, what are your difficulties? How did/didn't you overcome them?

APPENDIX G: INTERVIEW 2 (REFLECTION OF EXPERIENCE)

1 What are reflections on what you have reconstructed in these interviews?

2 You mentioned difficulties during research tasks several times. Where did the difficulties come from? What would have helped to overcome them?

3 Have you changed your research behaviour since coming to Canada? In what ways?

[A question for Japanese students]

3. Have you changed your research behaviour since coming to McGill? In what ways?

[A question for Canadian students]

4. If you could change your research behaviour for your future tasks, how would you want to change the behaviour and why?

5. Do you think there are differences between your experience in Canada and in Japan? In what way?

[A question for Japanese students]

APPENDIX H: THE CONSENT FORM

Title of Research: Integrating information behaviour and information literacy during academic tasks: A comparative study of Japanese and Canadian undergraduate students in a Canadian university

Researcher: Yusuke Ishimura, Ph.D. candidate, School of Information Studies
Email: yusuke.ishimura@mail.mcgill.ca Tel: (514) 315-9199
Supervisor: Dr. Joan Bartlett
Email: joan.bartlett@mcgill.ca Tel: (514) 398-6976

Purpose of the Study: This study investigates how Japanese students conduct their research at McGill University and what kind of factors affect their behaviours. It is hoped that the results of this study can help academic libraries provide better assistance for international students to assist their research process.

What is involved in participating: If you agree to participate, you will be asked to select one research project for a course you are currently taking. Then you are asked to (1) keep a research portfolio documenting your research process and final products (2-3 weeks anticipated), (2) join two individual interview sessions discussing how you proceed with research (1 short [about 20 min] and 1 long interviews [about 45 min]), and (3) draw a flowchart during the first interview. All data collection will be at a convenient time and place for you. All data including interviews will be digitally recorded.

Benefit and foreseeable discomfort: The researcher will provide research skills consultations based on what you record and express during your participation in this research. This will benefit you to improve your research skills for your future project. You will not incur any costs as a result of your participation in this study. Participation in this research has minimal risks. However, you may feel emotional discomfort sharing your experience with the researcher and knowing that your research skills will be assessed.

Confidentiality and Anonymity: The researcher will not use real names in the transcriptions. Student names will not be used for any purpose other than selecting participants. All personal data will be stored in the researcher's computer with password encryption. No other person has access to the data. Audio recordings will be destroyed after completion of the research. Your identity will not be connected to your comments. Your participation is voluntary. If at any time during this study you wish to withdraw your participation, you are free to do so without prejudice.

Consent: I agree to be audio recorded YES ☐ NO ☐
I agree that substantial quotes may be used without my personal information YES ☐ NO ☐
I have read the above information and I agree to participate in this study

Participant's name (print) / signature	Date
Researcher's name (print) / signature	Date

APPENDIX I: INFORMATION BEHAVIOUR FLOWCHARTS

Figure 12. Participant J1

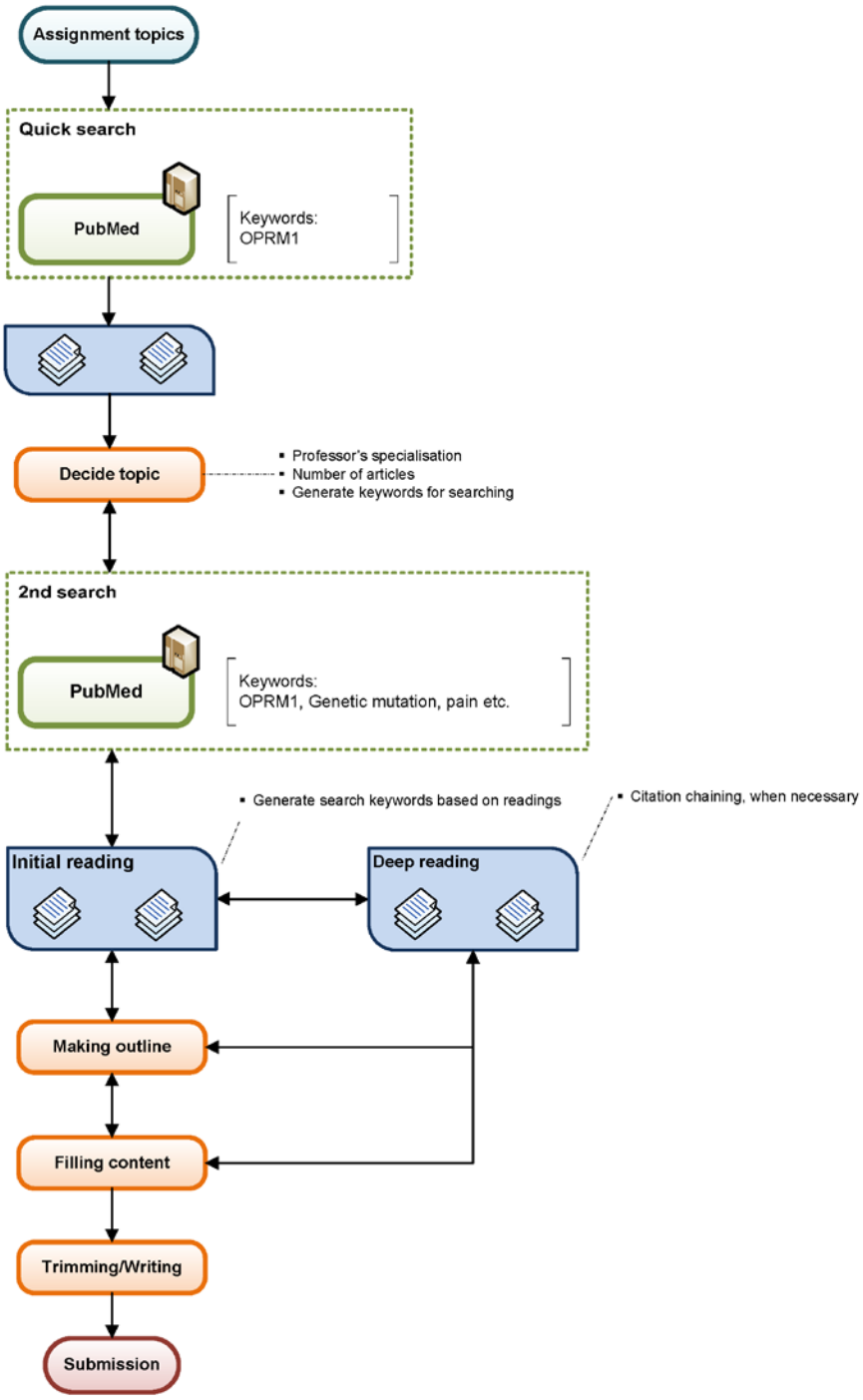


Figure 13. Participant J2

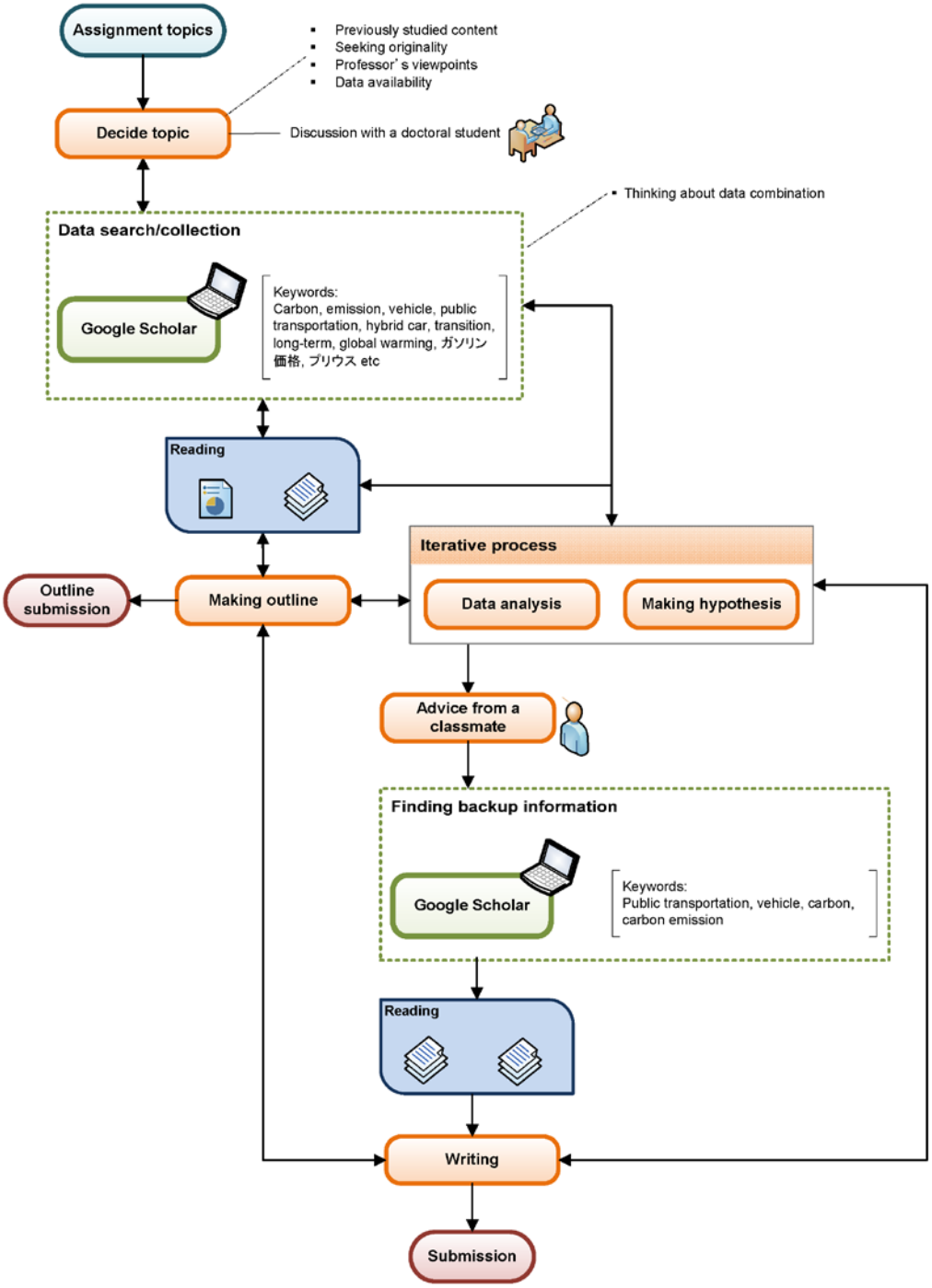


Figure 14. Participant J3

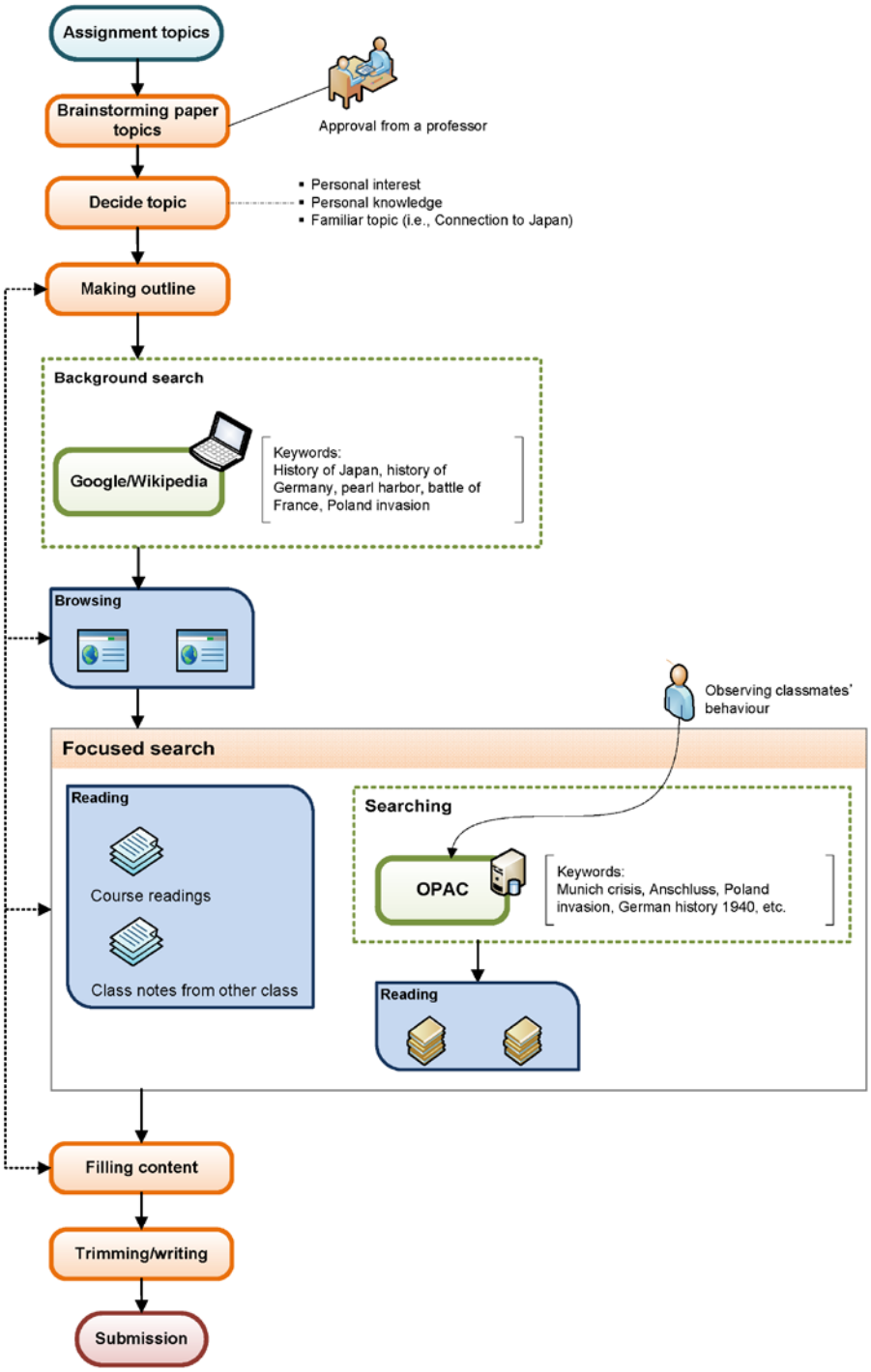
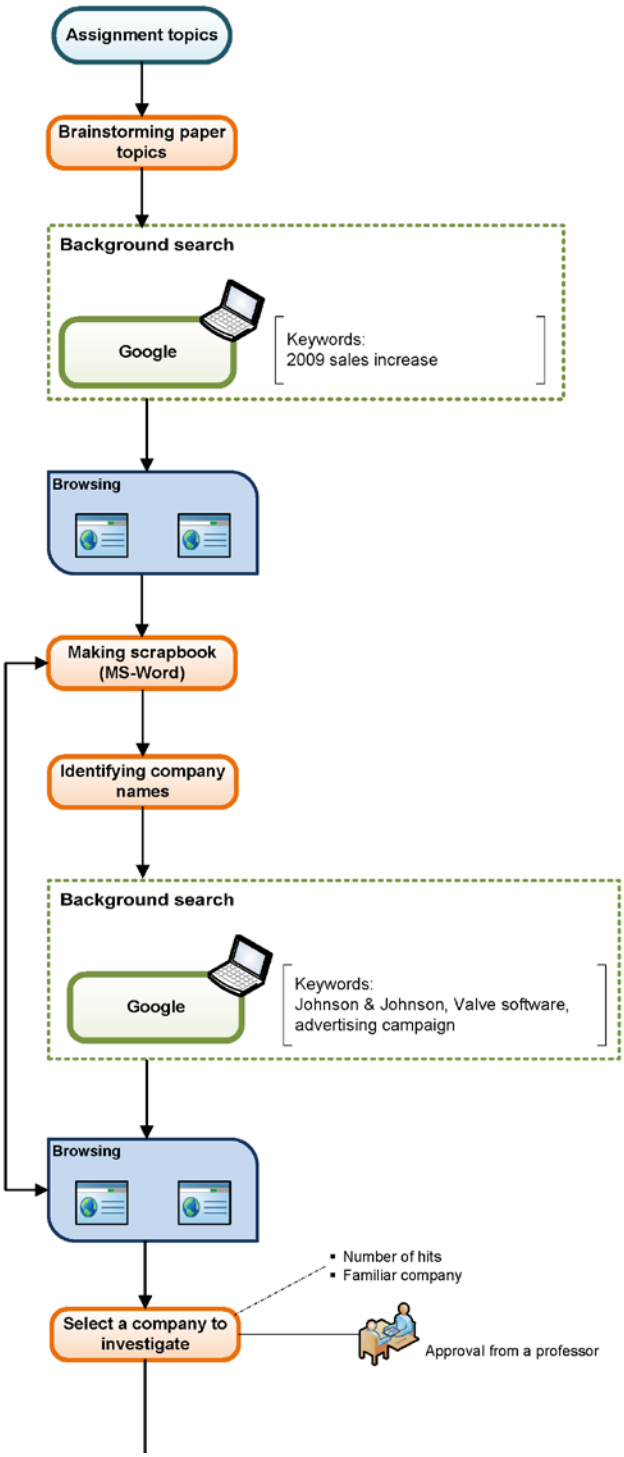
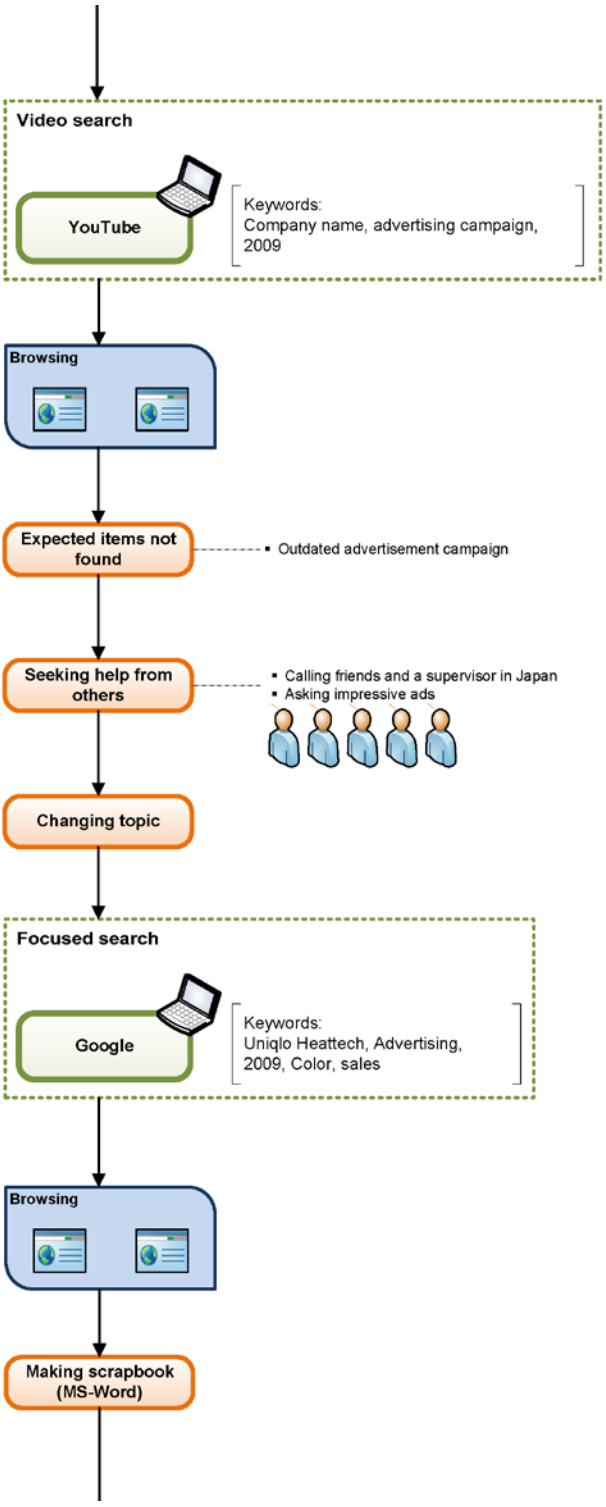


Figure 15. Participant J4

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YouTube
Keywords:
Company name, advertising campaign, 2009
Browsing
Expected items not found
Outdated advertisement campaign
Seeking help from others
Calling friends and a supervisor in Japan
Asking impressive ads
Changing topic
Focused search
Google
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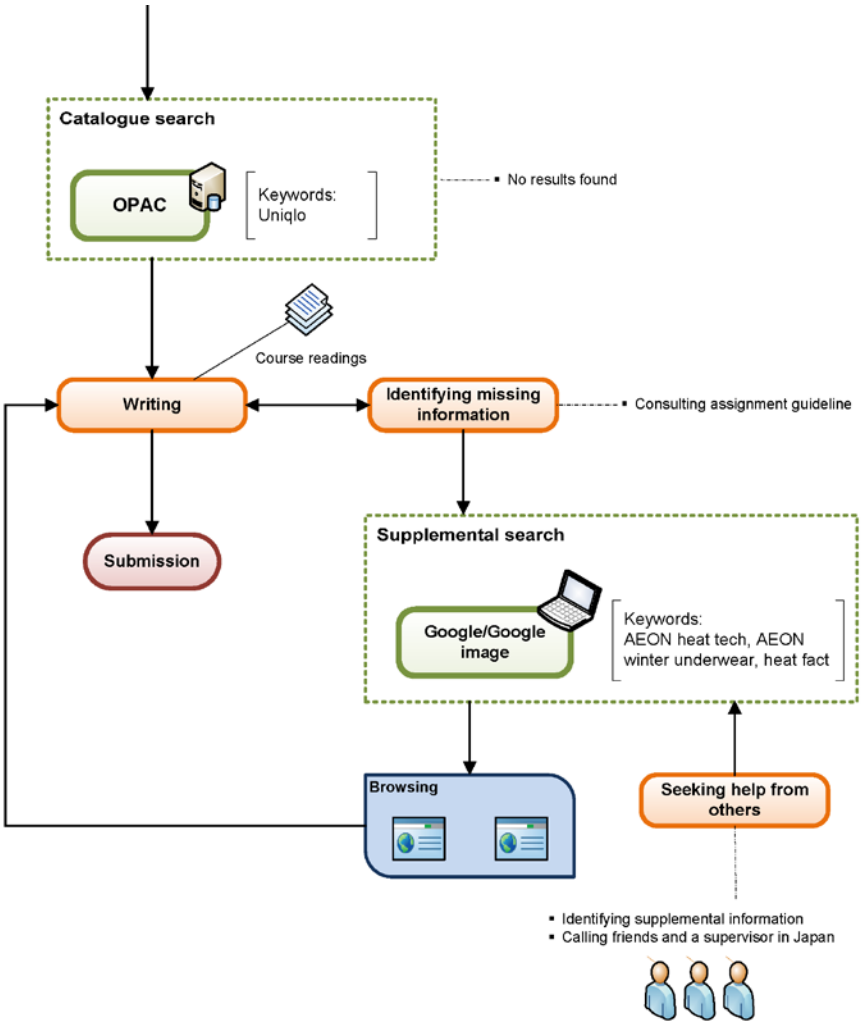
Browsing
Making scrapbook (MS-Word)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OPAC
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Uniqlo
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Writing
Identifying missing information
Consulting assignment guideline
Submission
Supplemental search
Google/Google image
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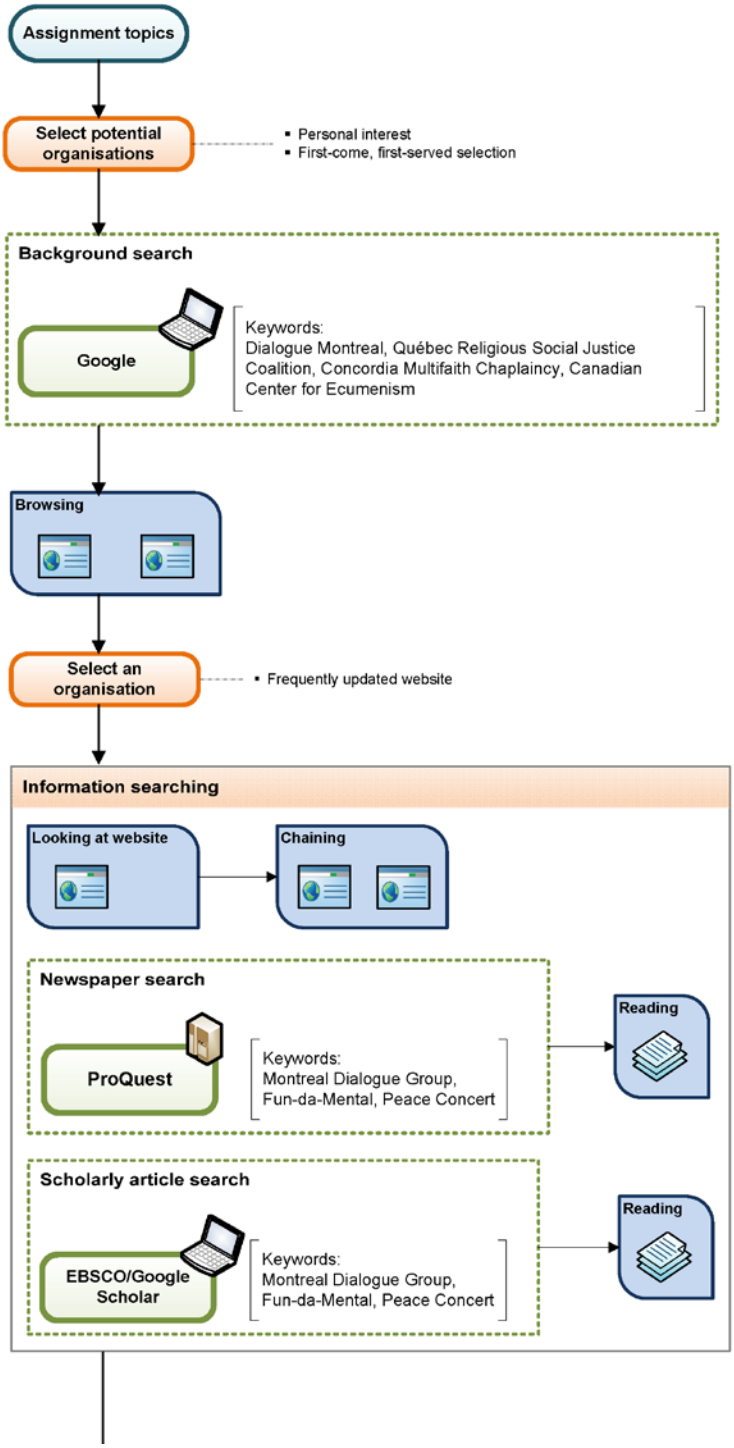
Browsing
Seeking help from others
Identifying supplemental information
Calling friends and a supervisor in Japan

Figure 16. Participant J5



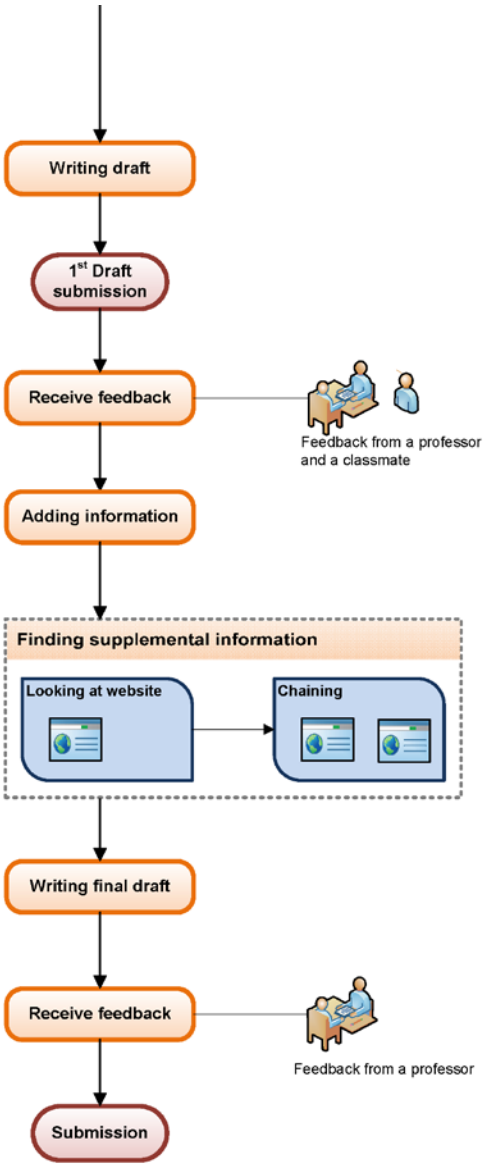
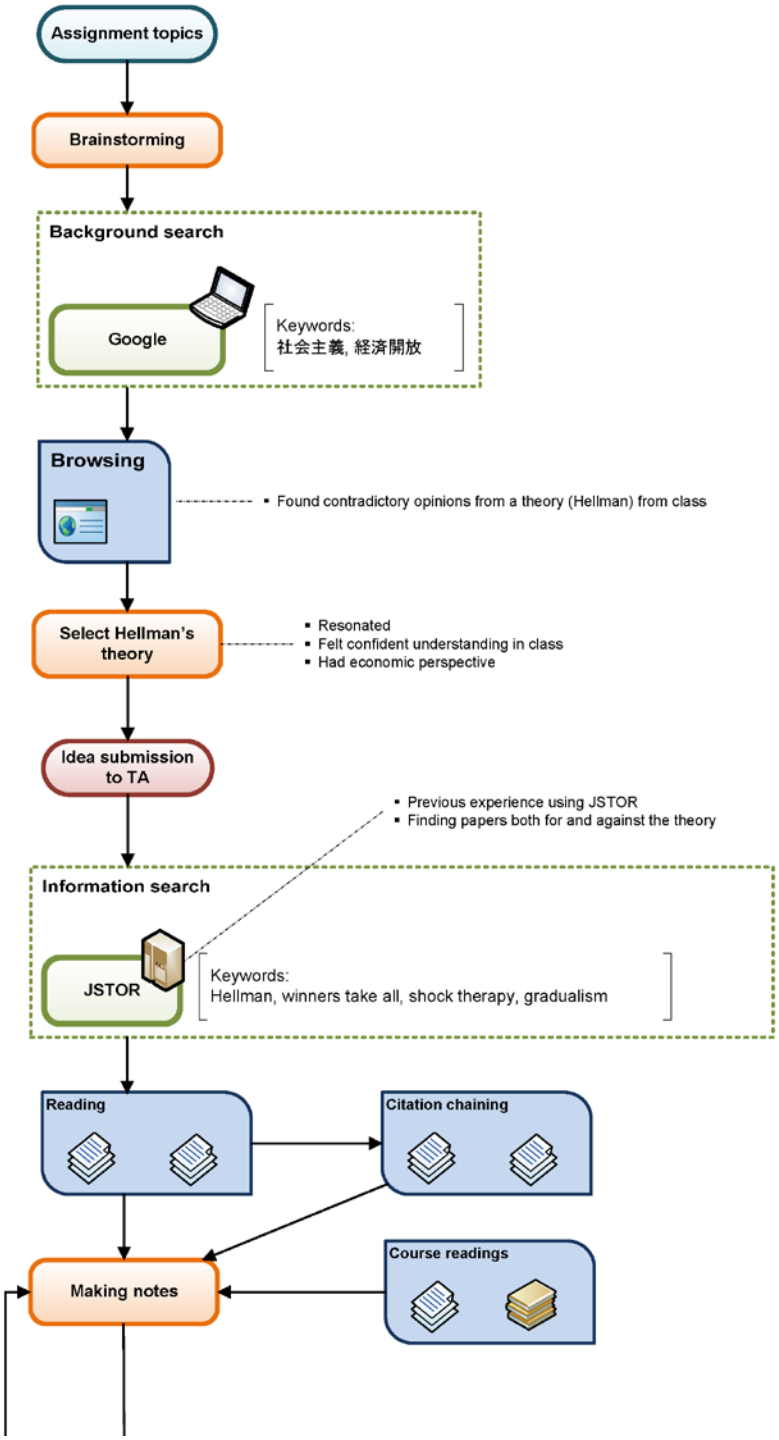

Writing draft
1st Draft submission
Receive feedback
Feedback from a professor and a classmate
Adding information
Finding supplemental information
Looking at website
Chaining
Writing final draft
Receive feedback
Feedback from a professor
Submission

Figure 17. Participant J6



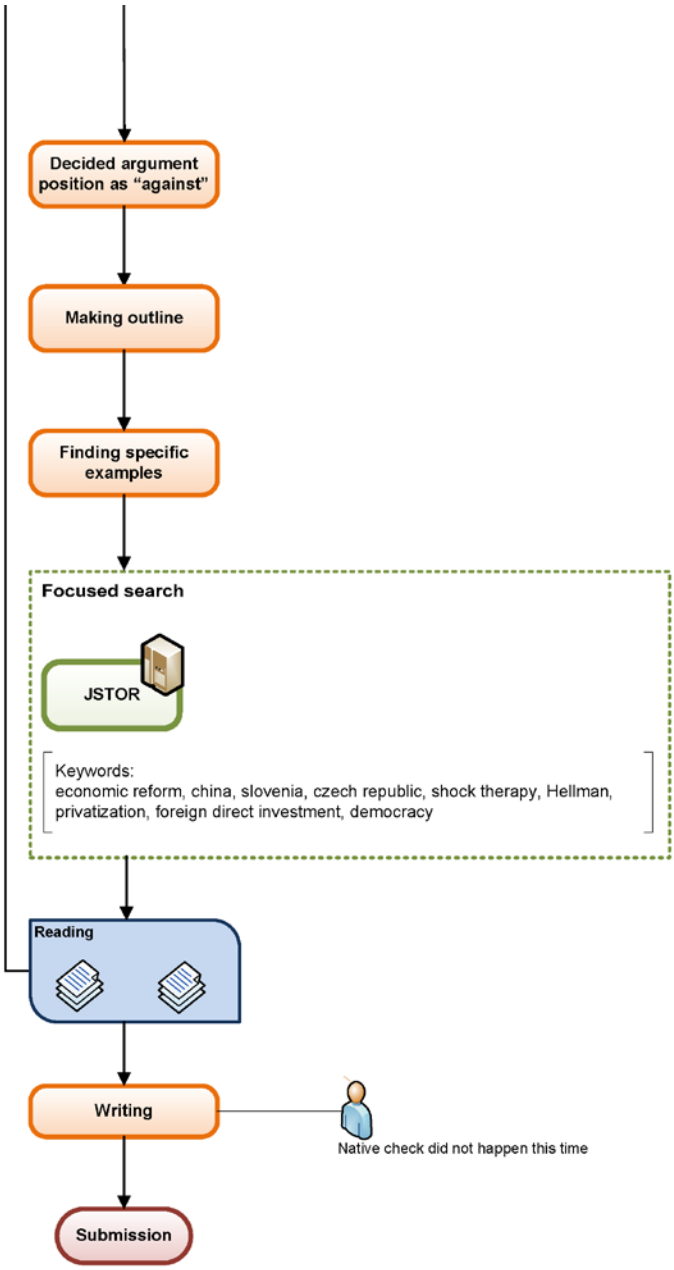
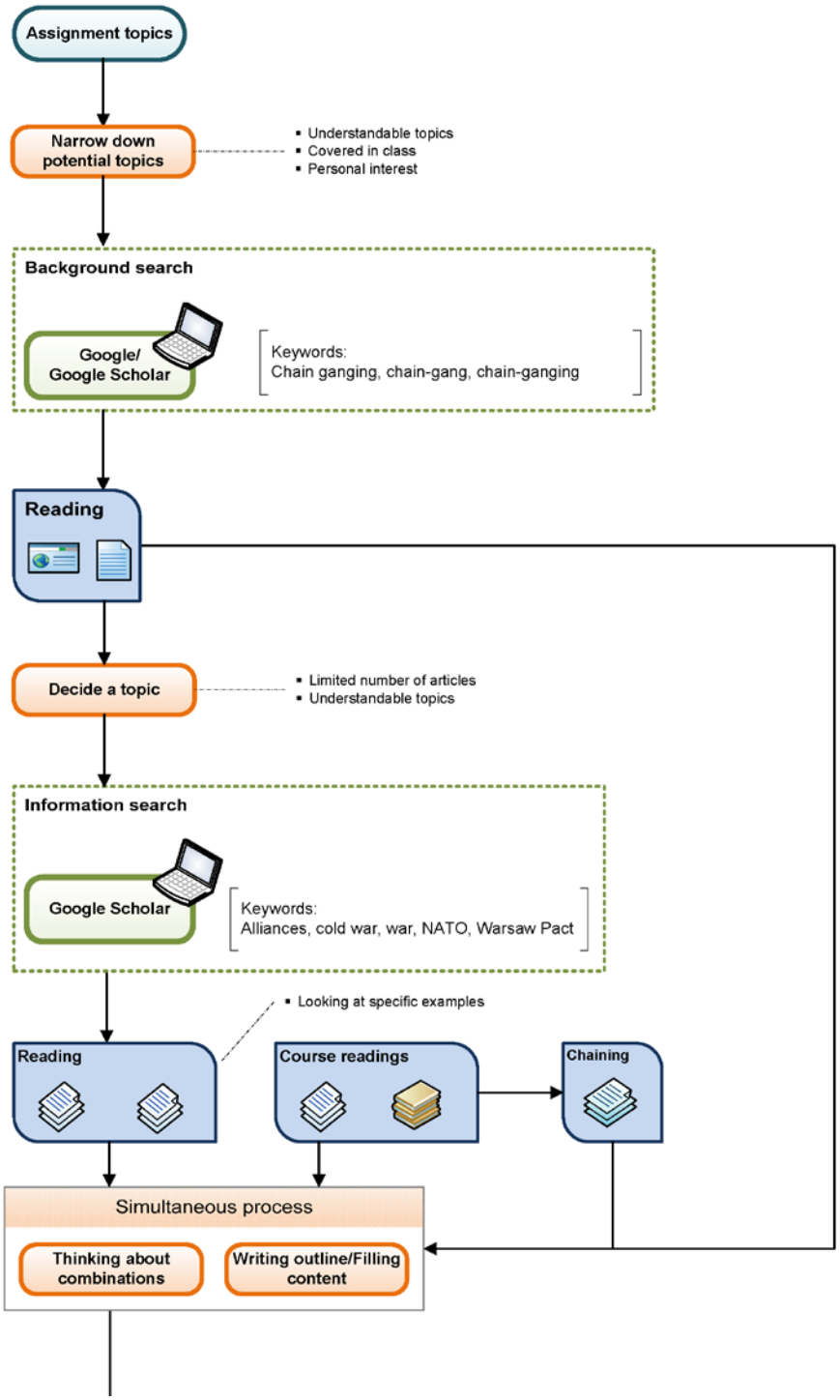

Decided argument position as "against"
Making outline
Finding specific examples
Focused search
JSTOR
Keywords:
economic reform, china, slovenia, czech republic, shock therapy, Hellman, privatization, foreign direct investment, democracy
Reading
Writing
Native check did not happen this time
Submission

Figure 18. Participant J7



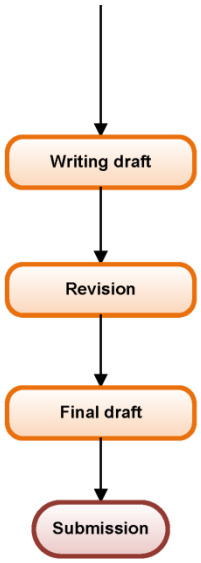
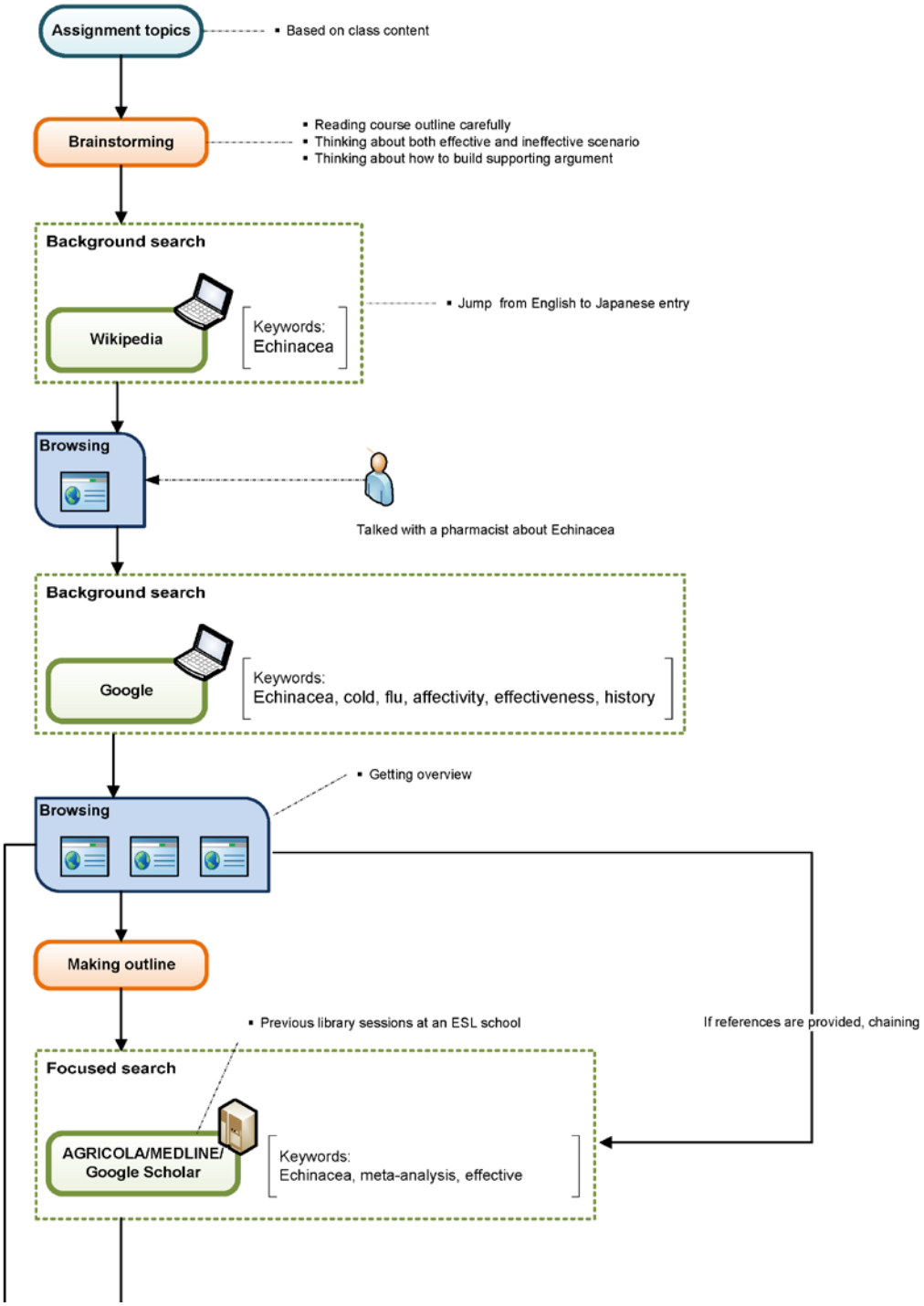

Writing draft
Revision
Final draft
Submission

Figure 19. Participant J8



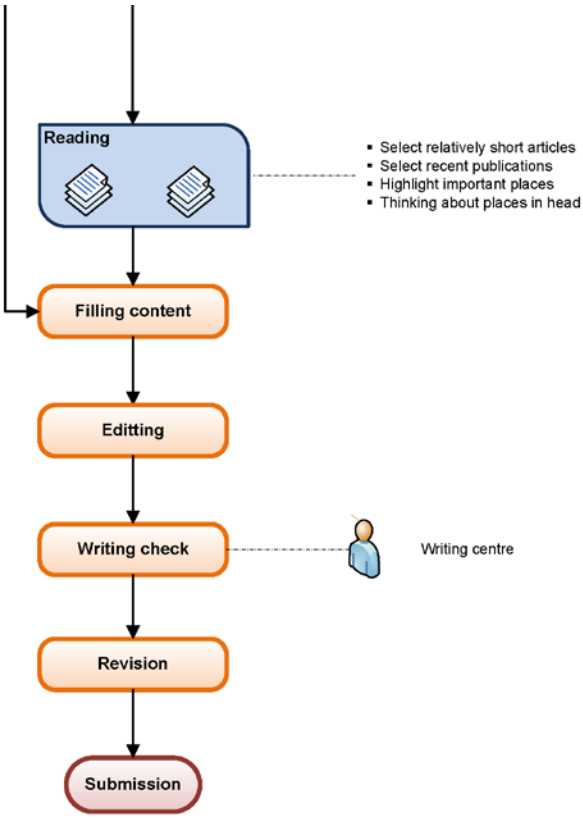

Reading
Select relatively short articles
Select recent publications
Highlight important places
Thinking about places in head
Filling content
Editting
Writing check
Writing centre
Revision
Submission

Figure 20. Participant C1

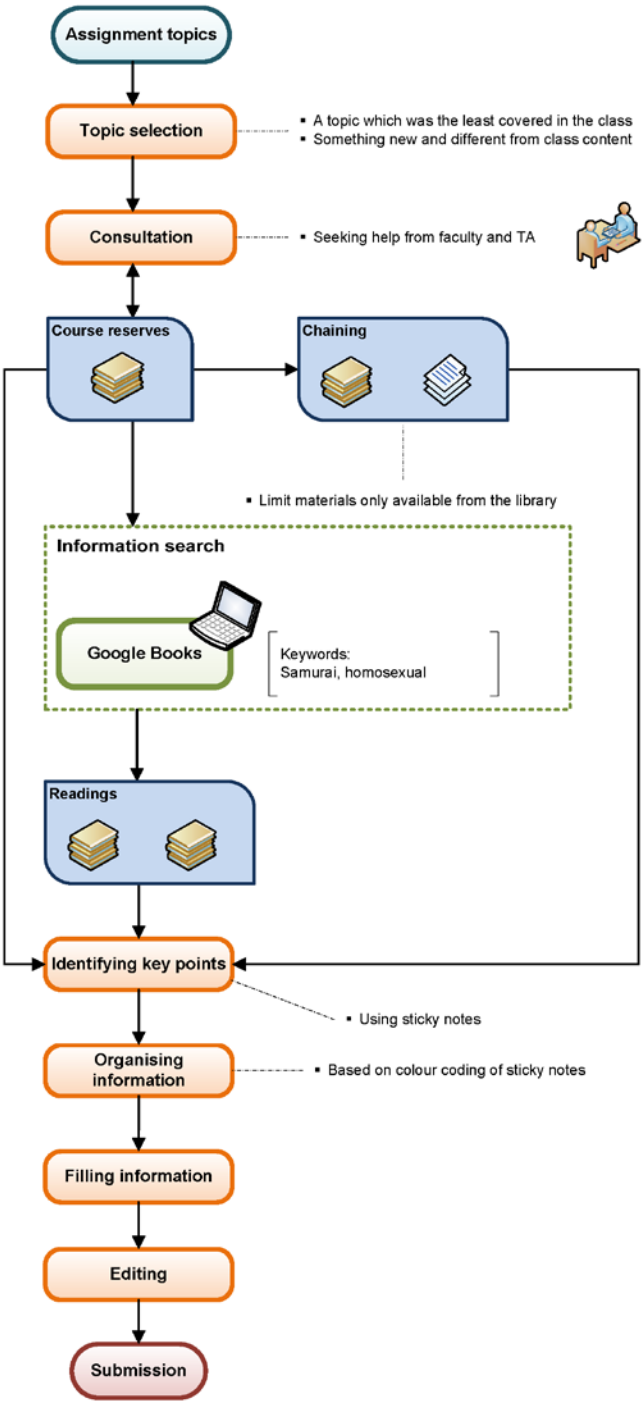
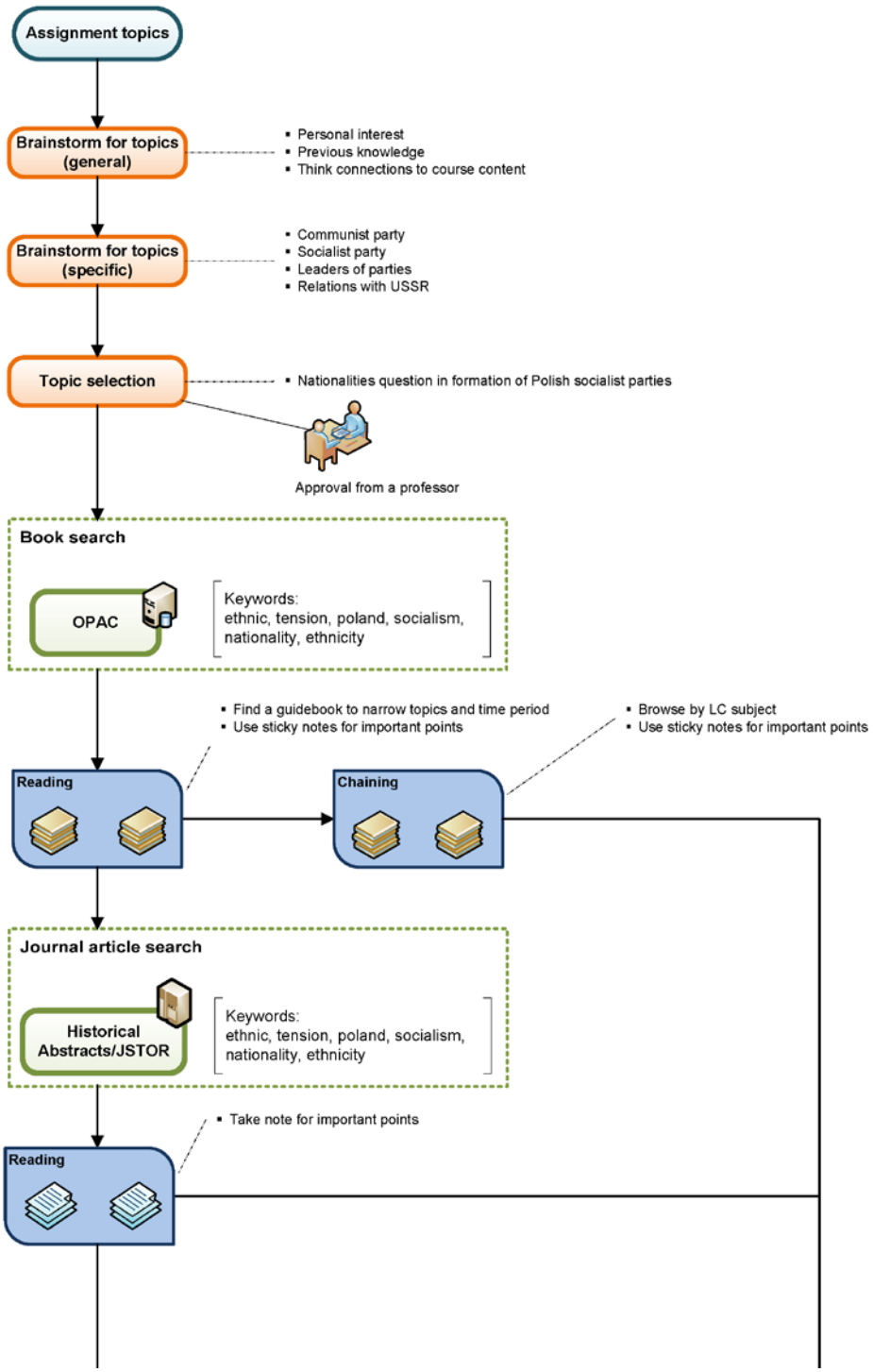
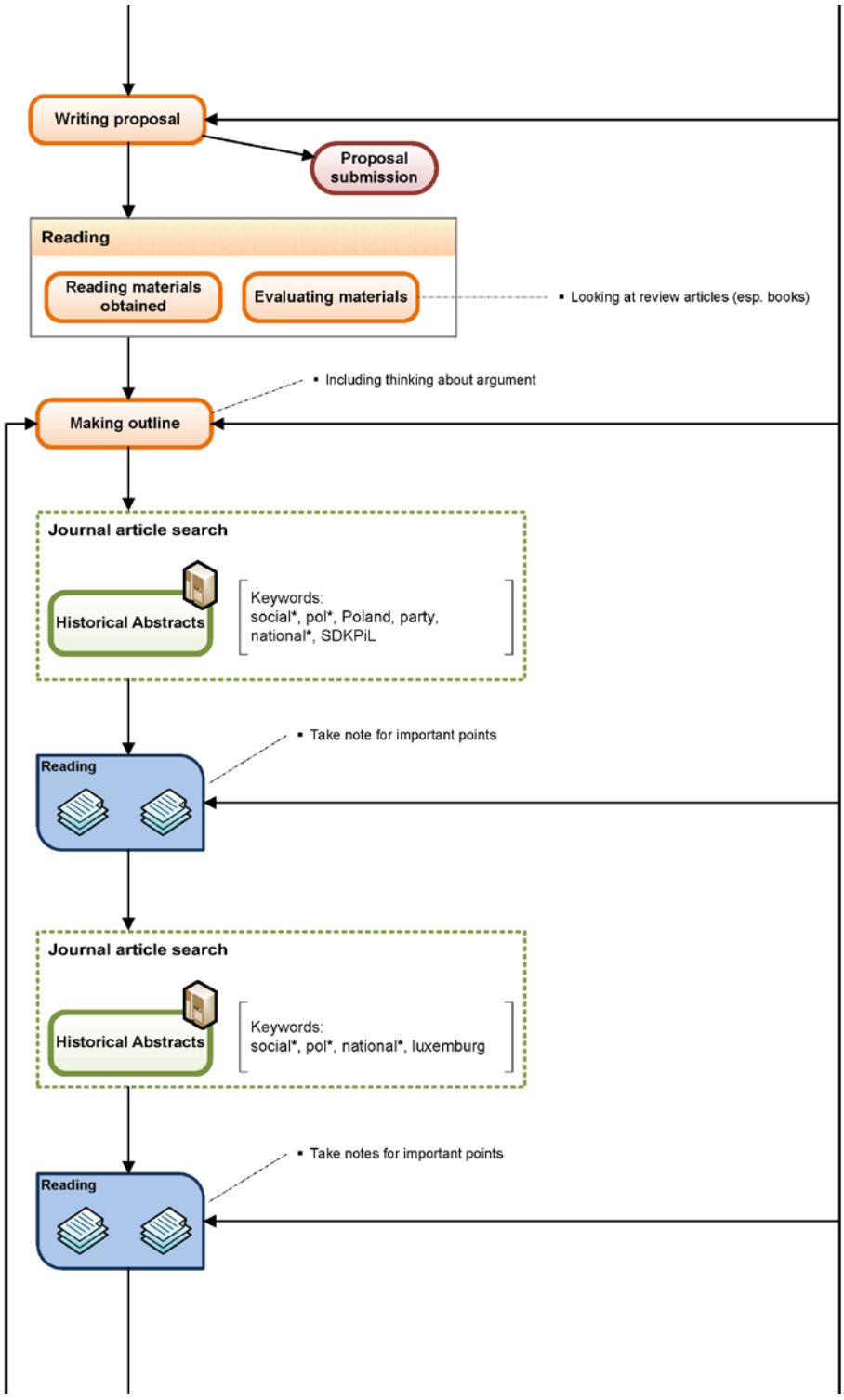


Figure 21. Participant C2




Writing proposal
Proposal submission
Reading
Reading materials obtained
Evaluating materials
▪ Looking at review articles (esp. books)
▪ Including thinking about argument
Making outline
Journal article search
Historical Abstracts
Keywords:
social*, pol*, Poland, party, national*, SDKPiL
▪ Take note for important points
Reading
Journal article search
Historical Abstracts
Keywords:
social*, pol*, national*, luxemburg
▪ Take notes for important points
Reading

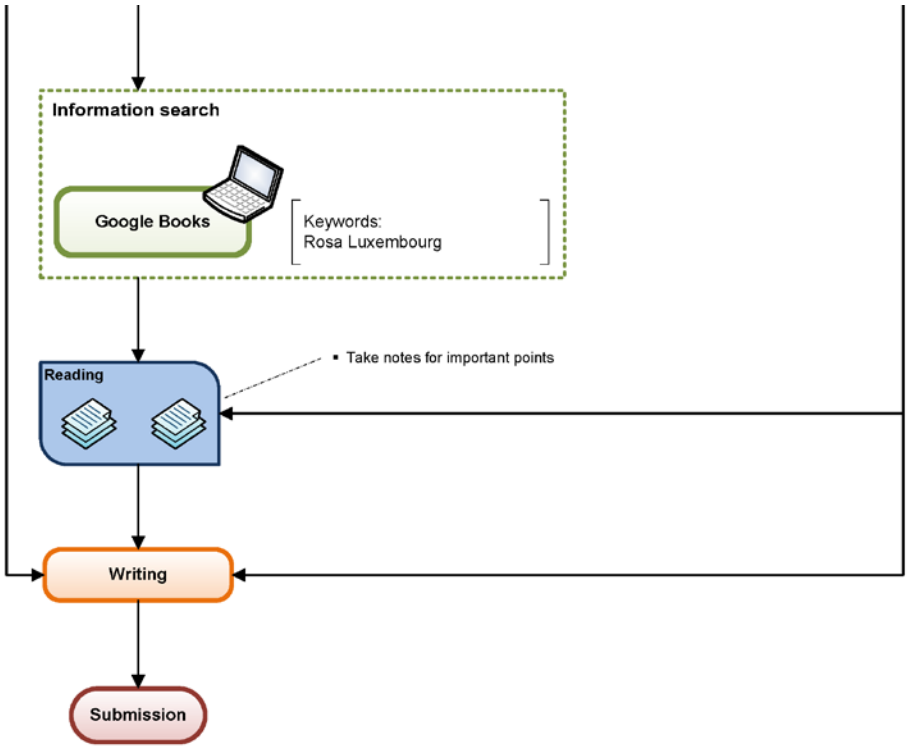
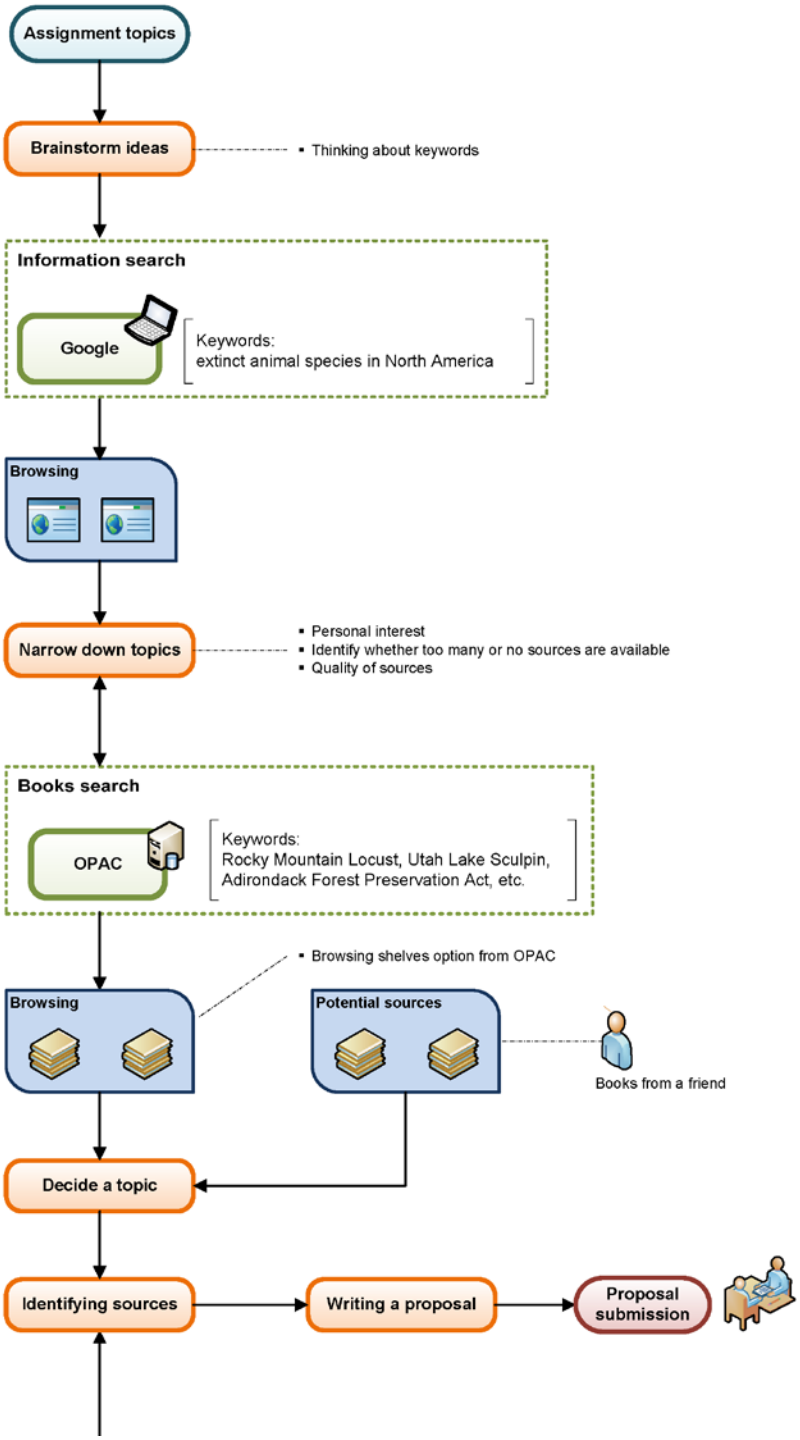

Information search
Google Books
Keywords:
Rosa Luxembourg
Reading
Take notes for important points
Writing
Submission

Figure 22. Participant C3



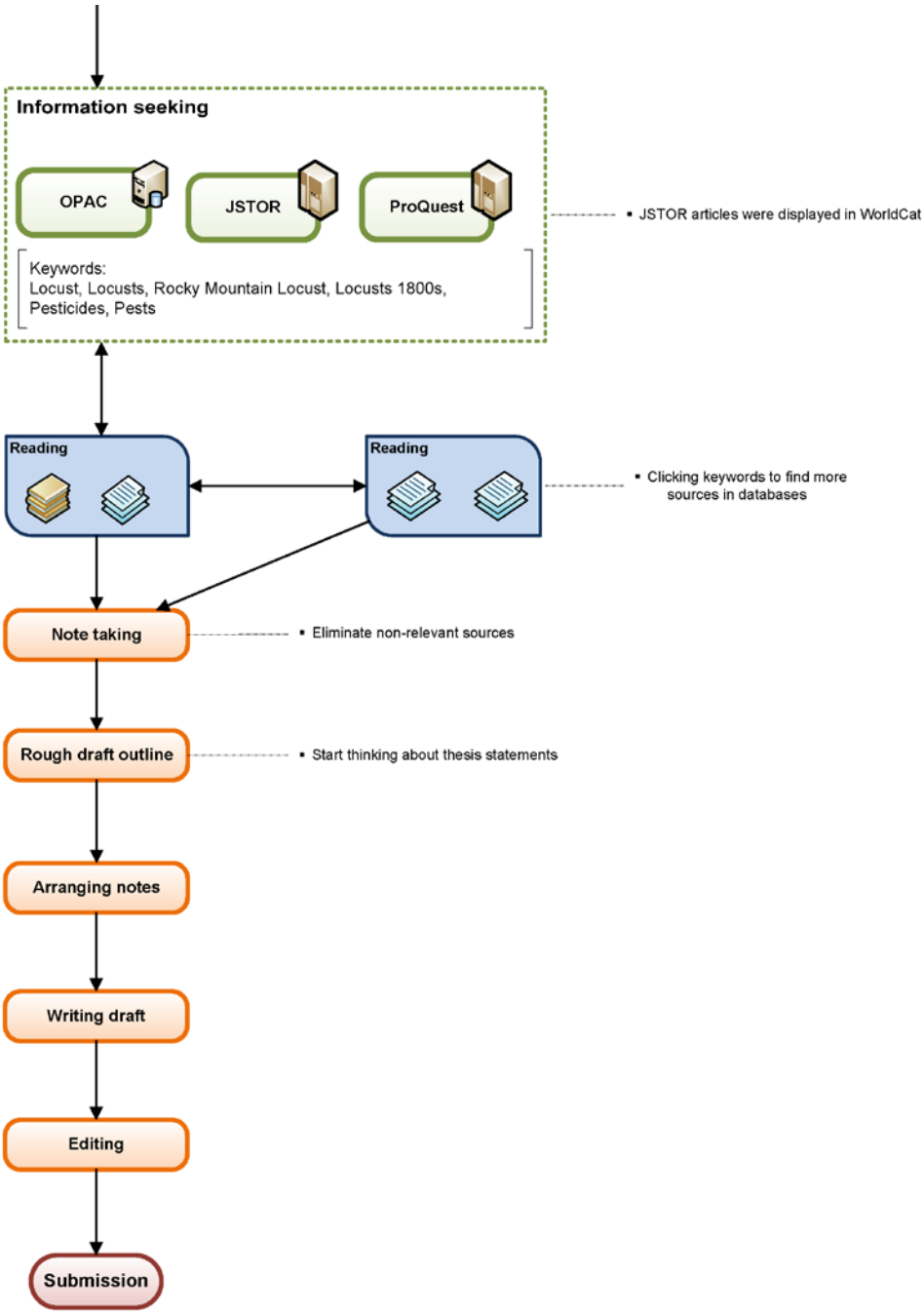
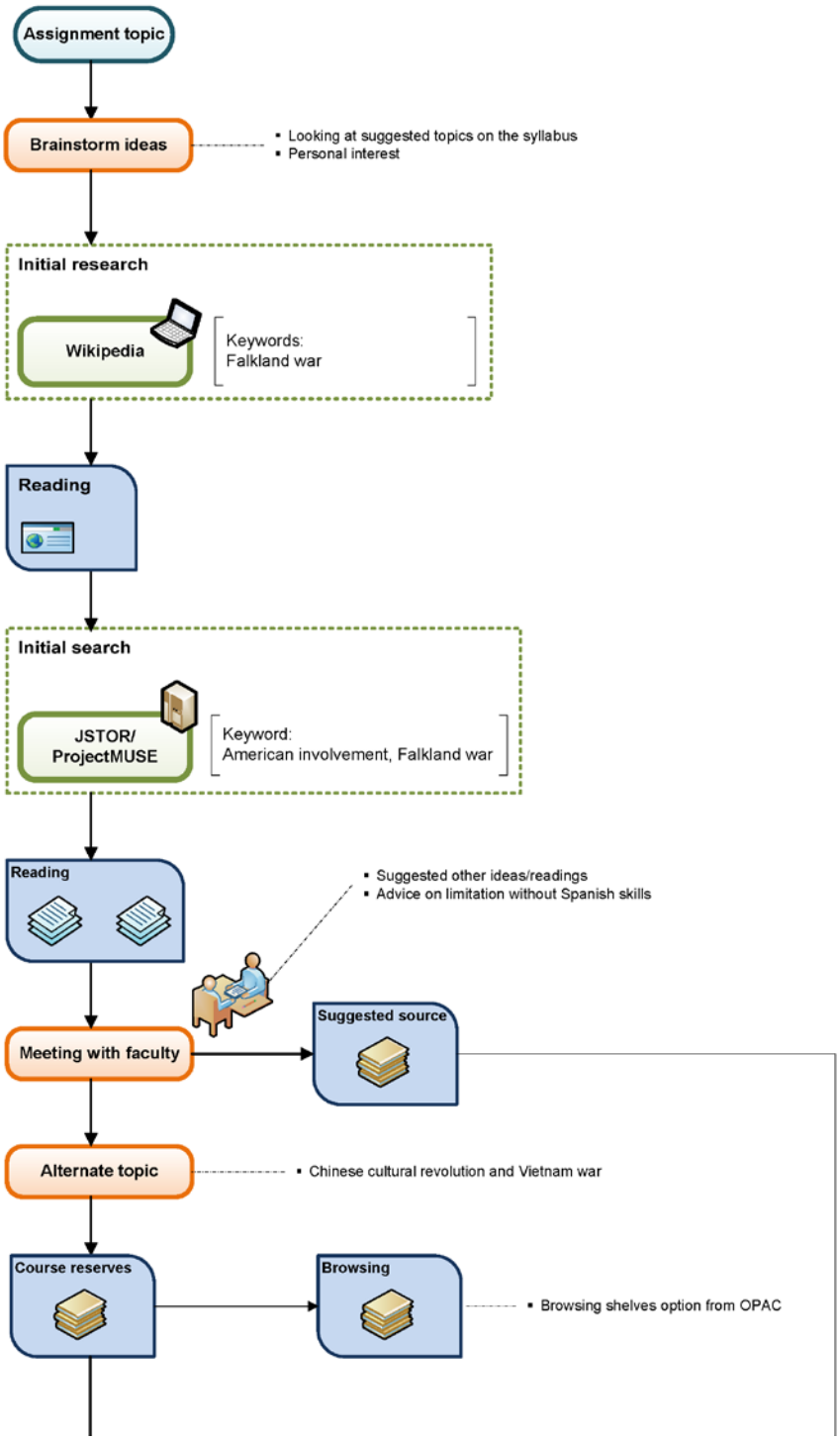
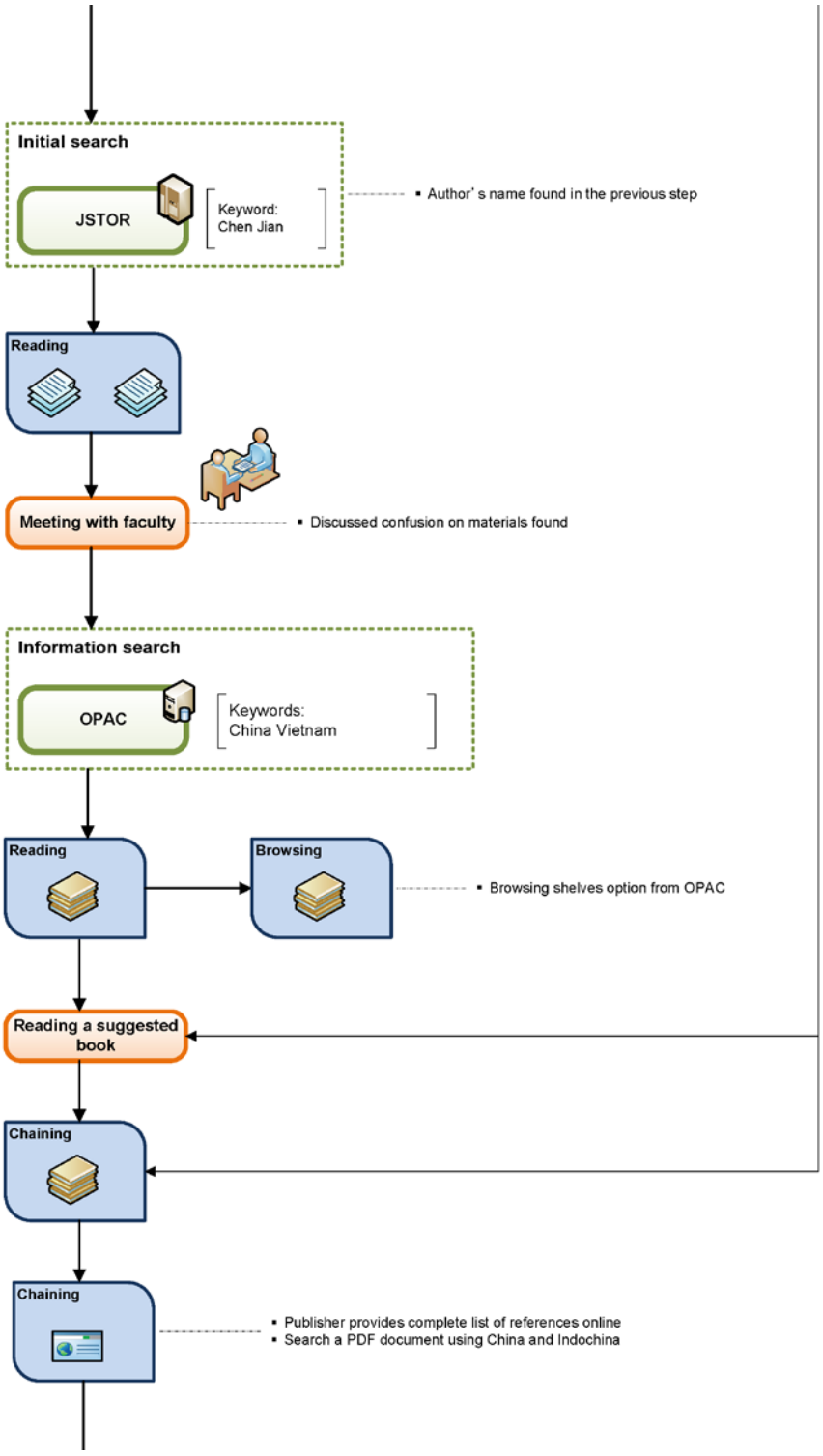

Information seeking
OPAC
JSTOR
ProQuest
JSTOR articles were displayed in WorldCat
Keywords:
Locust, Locusts, Rocky Mountain Locust, Locusts 1800s,
Pesticides, Pests
Reading
Reading
Clicking keywords to find more sources in databases
Note taking
Eliminate non-relevant sources
Rough draft outline
Start thinking about thesis statements
Arranging notes
Writing draft
Editing
Submission

Figure 23. Participant C4




Initial search
JSTOR
Keyword:
Chen Jian
▪ Author' s name found in the previous step
Reading
Meeting with faculty
▪ Discussed confusion on materials found
Information search
OPAC
Keywords:
China Vietnam
Reading
Browsing
▪ Browsing shelves option from OPAC
Reading a suggested book
Chaining
Chaining
▪ Publisher provides complete list of references online
▪ Search a PDF document using China and Indochina

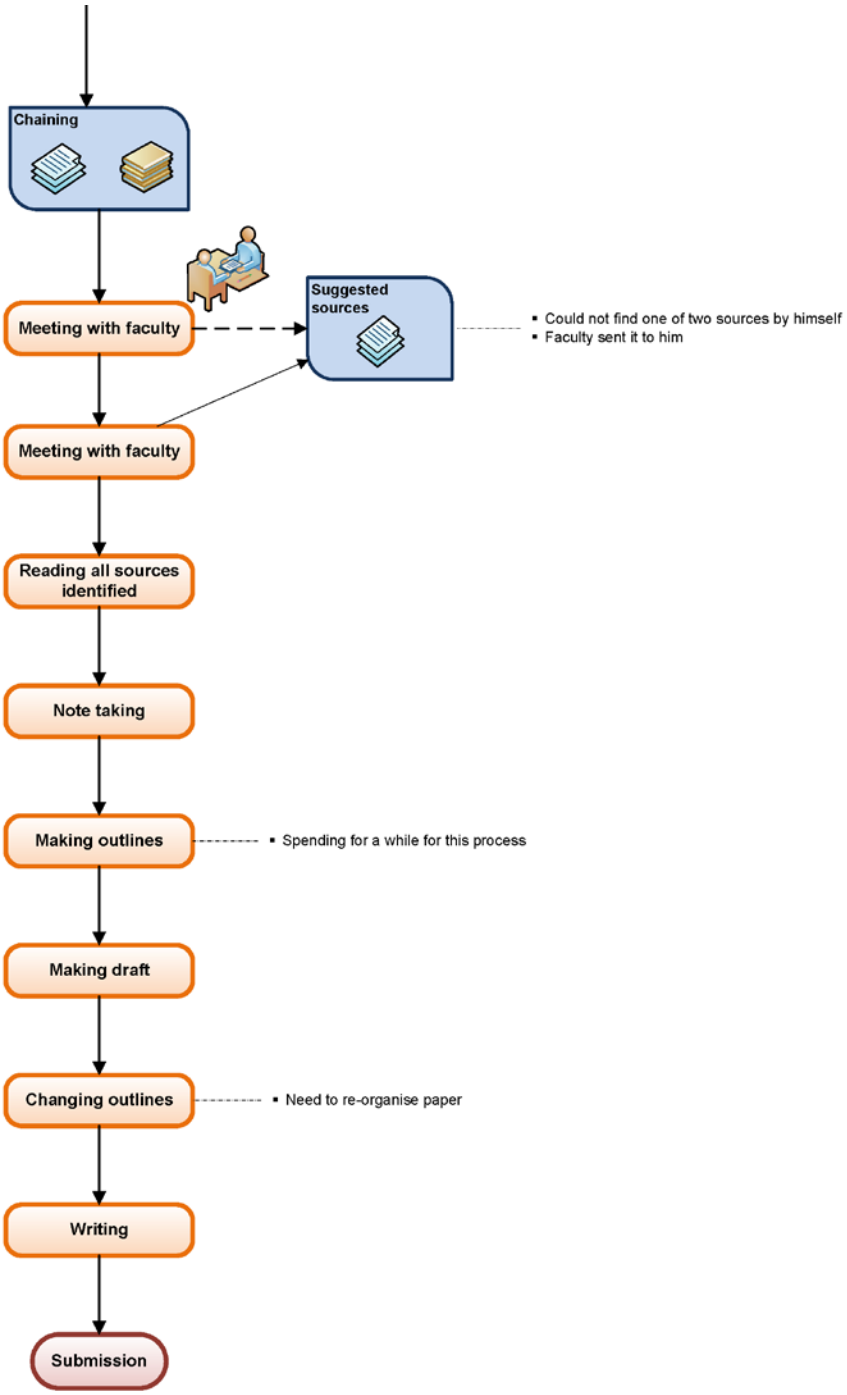
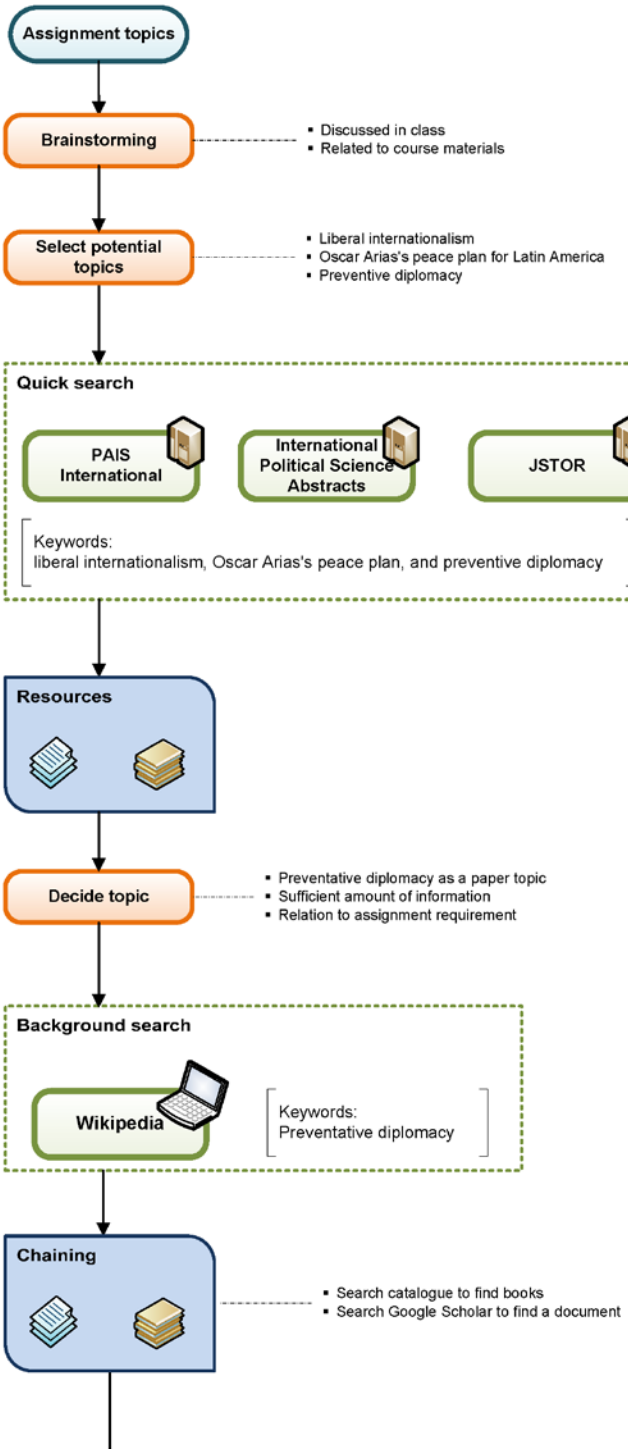

Chaining
Meeting with faculty
Suggested sources
Could not find one of two sources by himself
Faculty sent it to him
Meeting with faculty
Reading all sources identified
Note taking
Making outlines
Spending for a while for this process
Making draft
Changing outlines
Need to re-organise paper
Writing
Submission

Figure 24. Participant C5



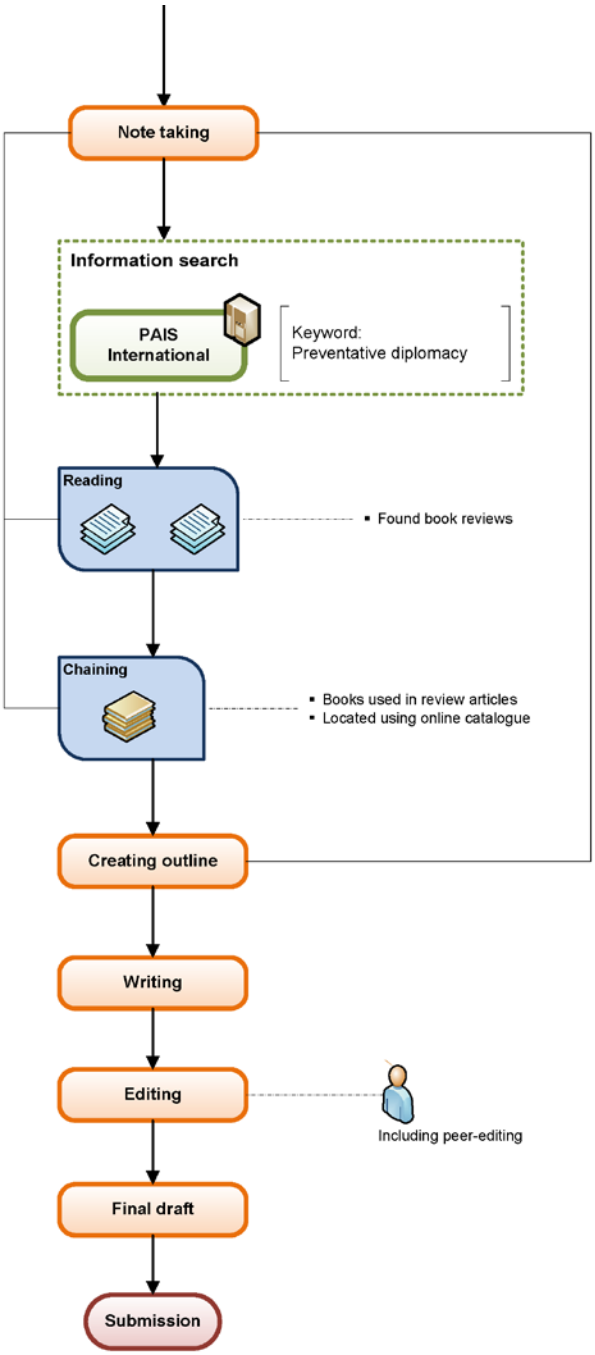
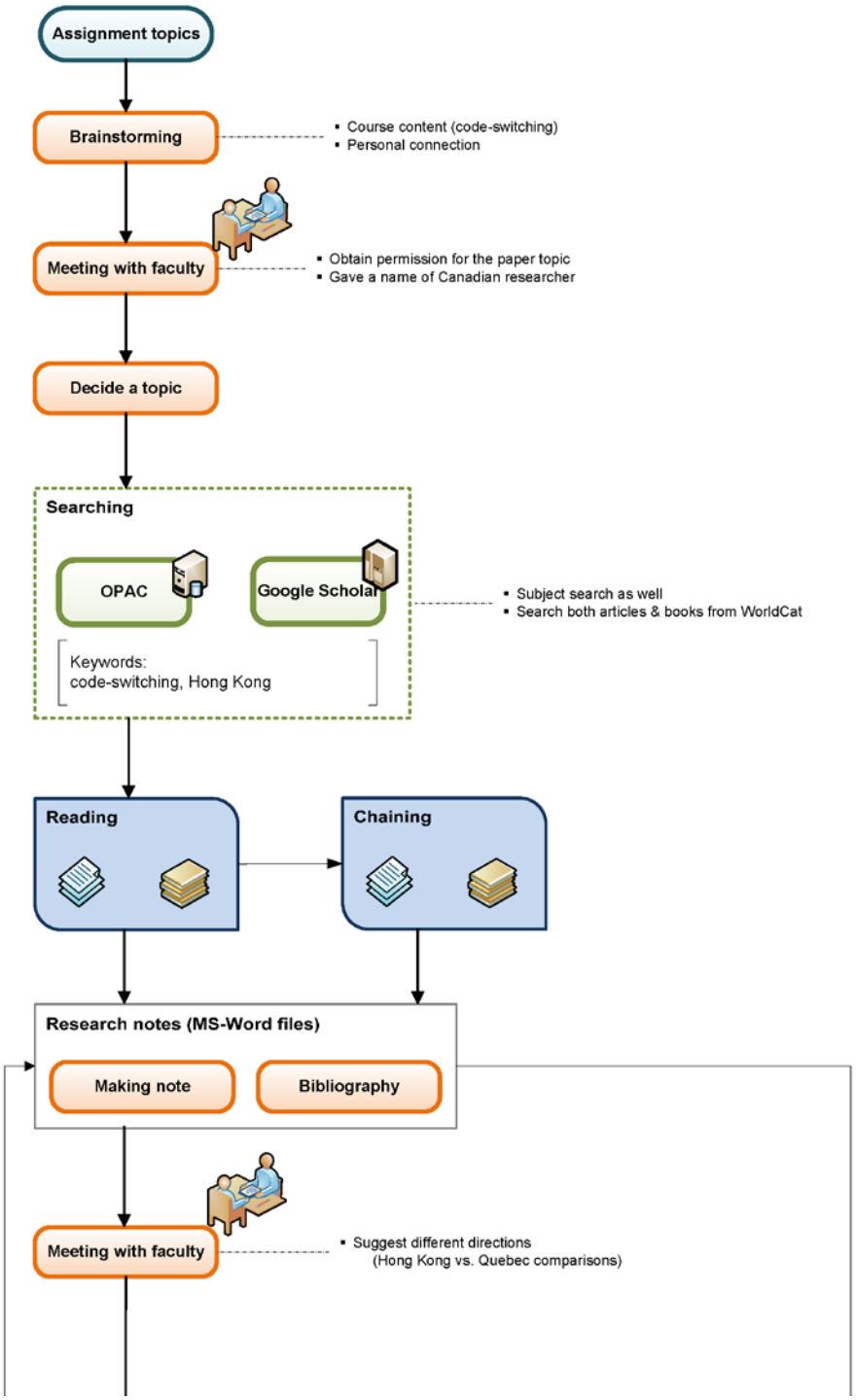
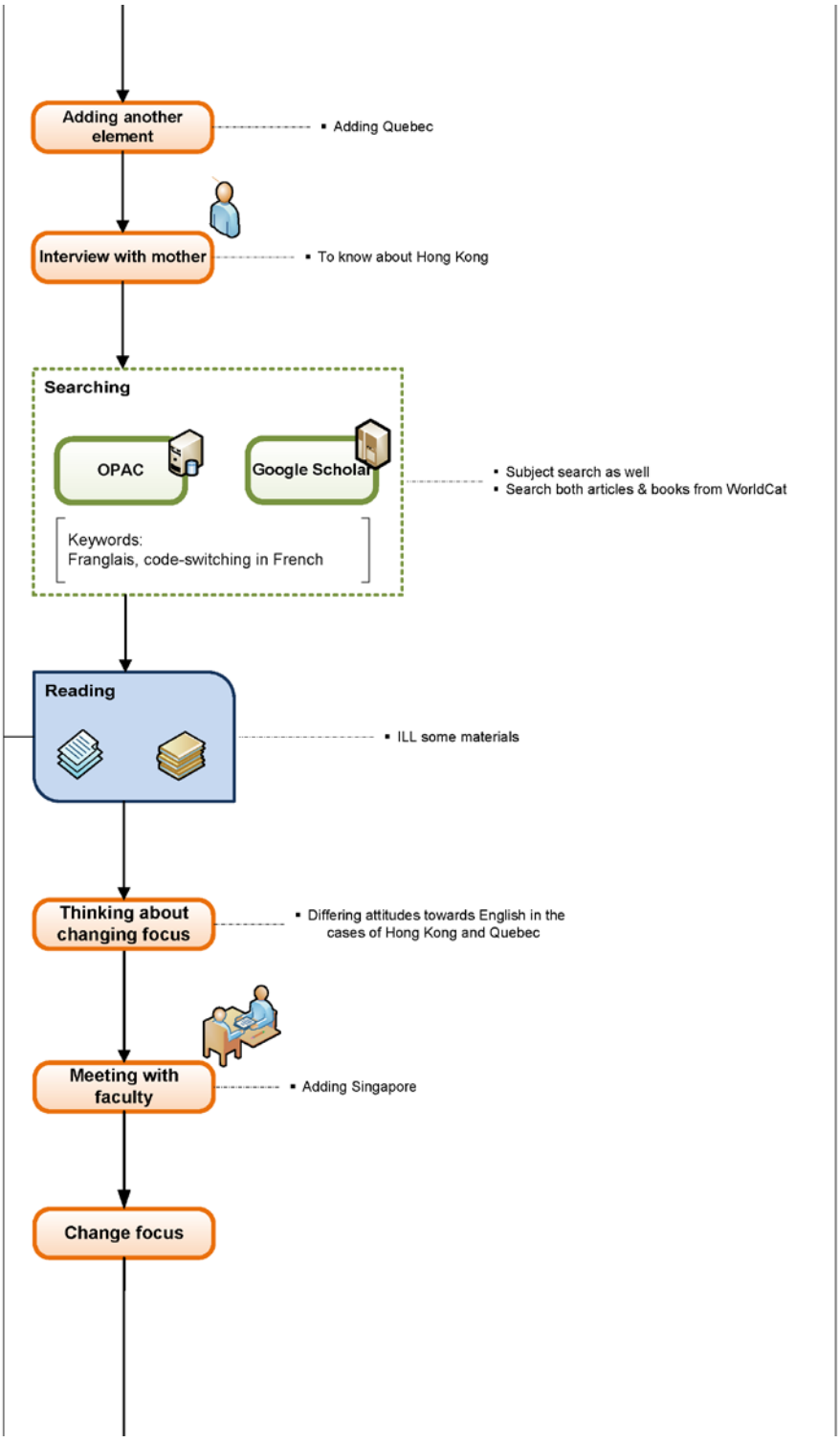

Note taking
Information search
PAIS International
Keyword:
Preventative diplomacy
Reading
Found book reviews
Chaining
Books used in review articles
Located using online catalogue
Creating outline
Writing
Editing
Including peer-editing
Final draft
Submission

Figure 25. Participant C6




Adding another element
▪ Adding Quebec
Interview with mother
▪ To know about Hong Kong
Searching
OPAC
Google Scholar
▪ Subject search as well
▪ Search both articles & books from WorldCat
Keywords:
Franglais, code-switching in French
Reading
▪ ILL some materials
Thinking about changing focus
▪ Differing attitudes towards English in the cases of Hong Kong and Quebec
Meeting with faculty
▪ Adding Singapore
Change focus

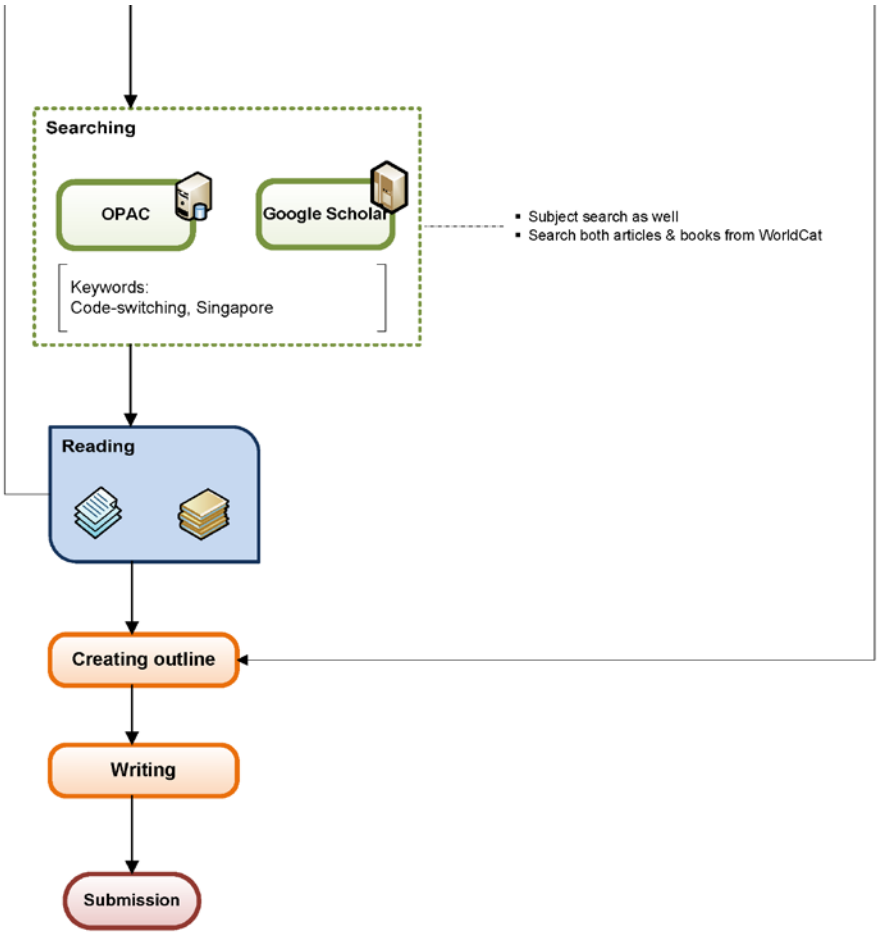
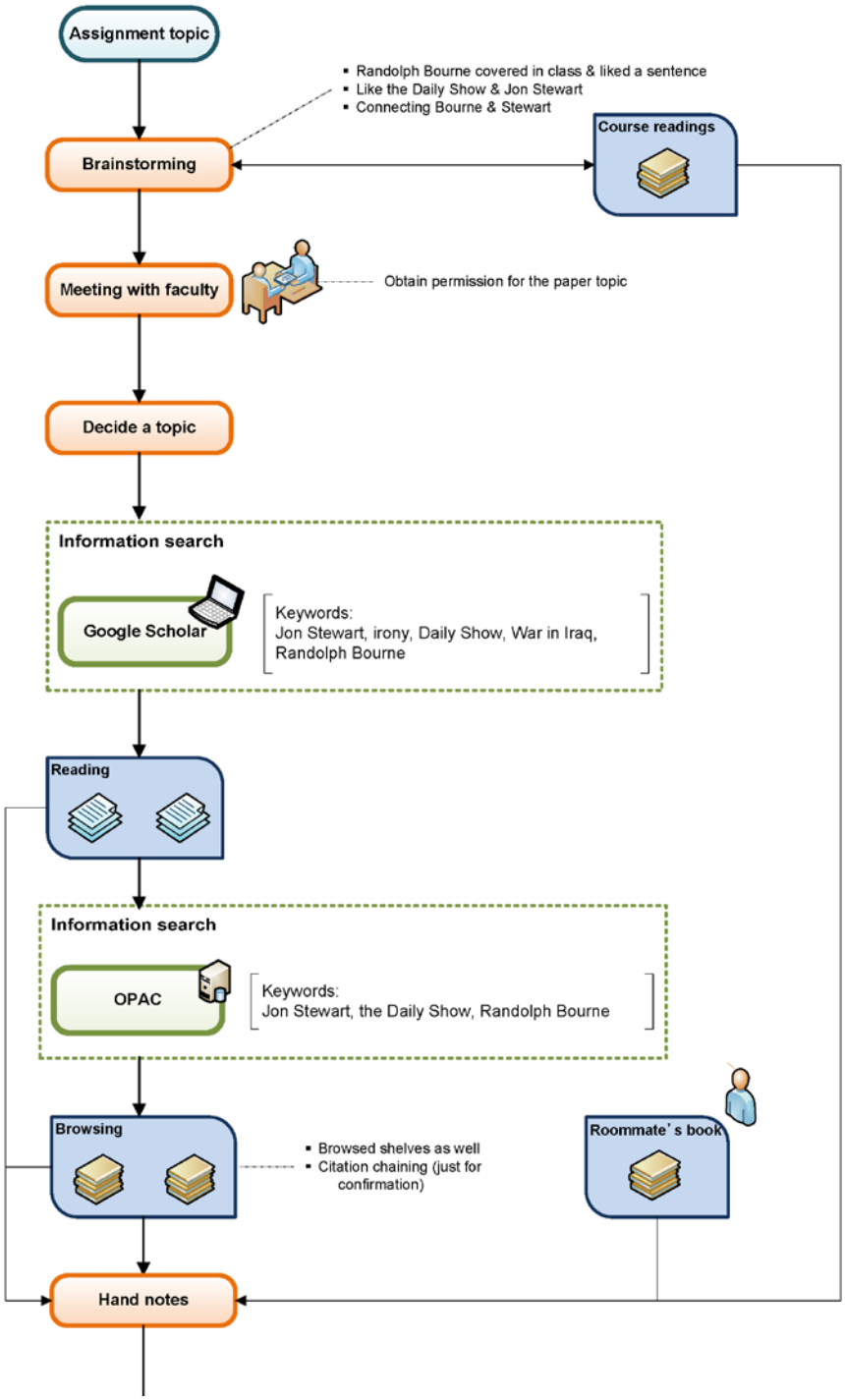

Searching
OPAC
Google Scholar
Subject search as well
Search both articles & books from WorldCat
Keywords:
Code-switching, Singapore
Reading
Creating outline
Writing
Submission

Figure 26. Participant C7



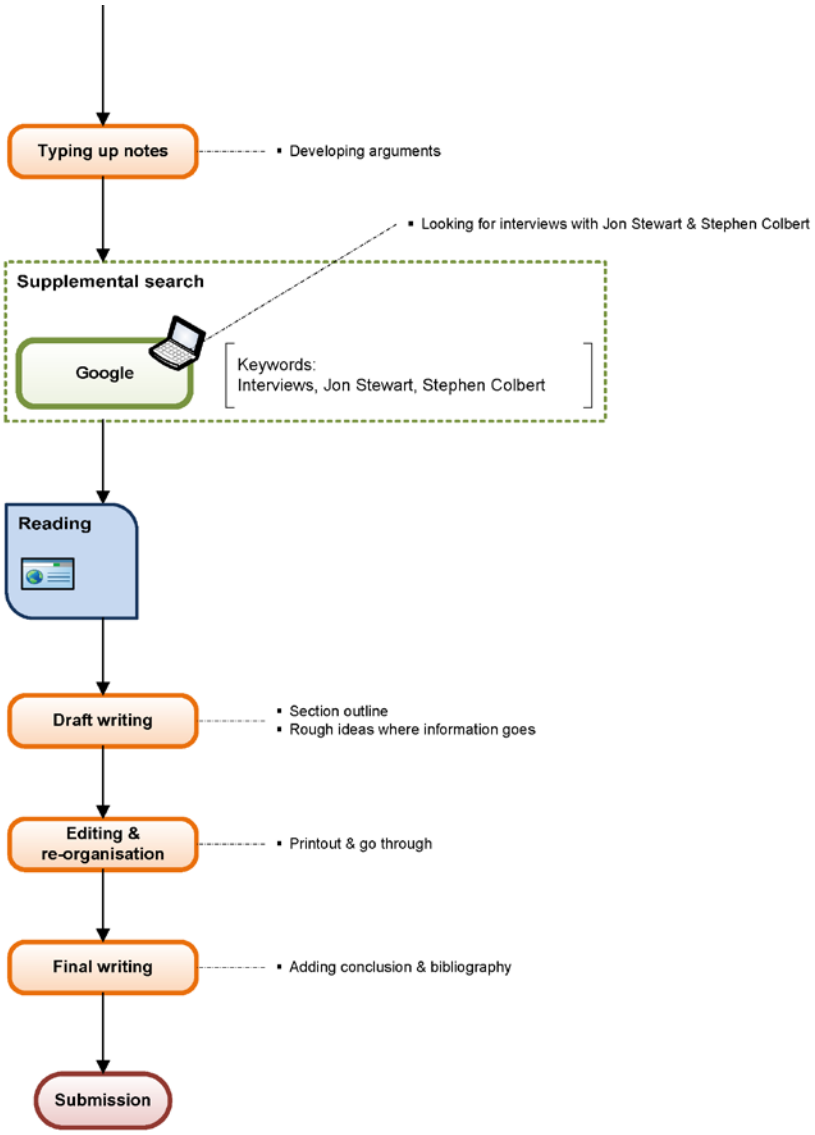
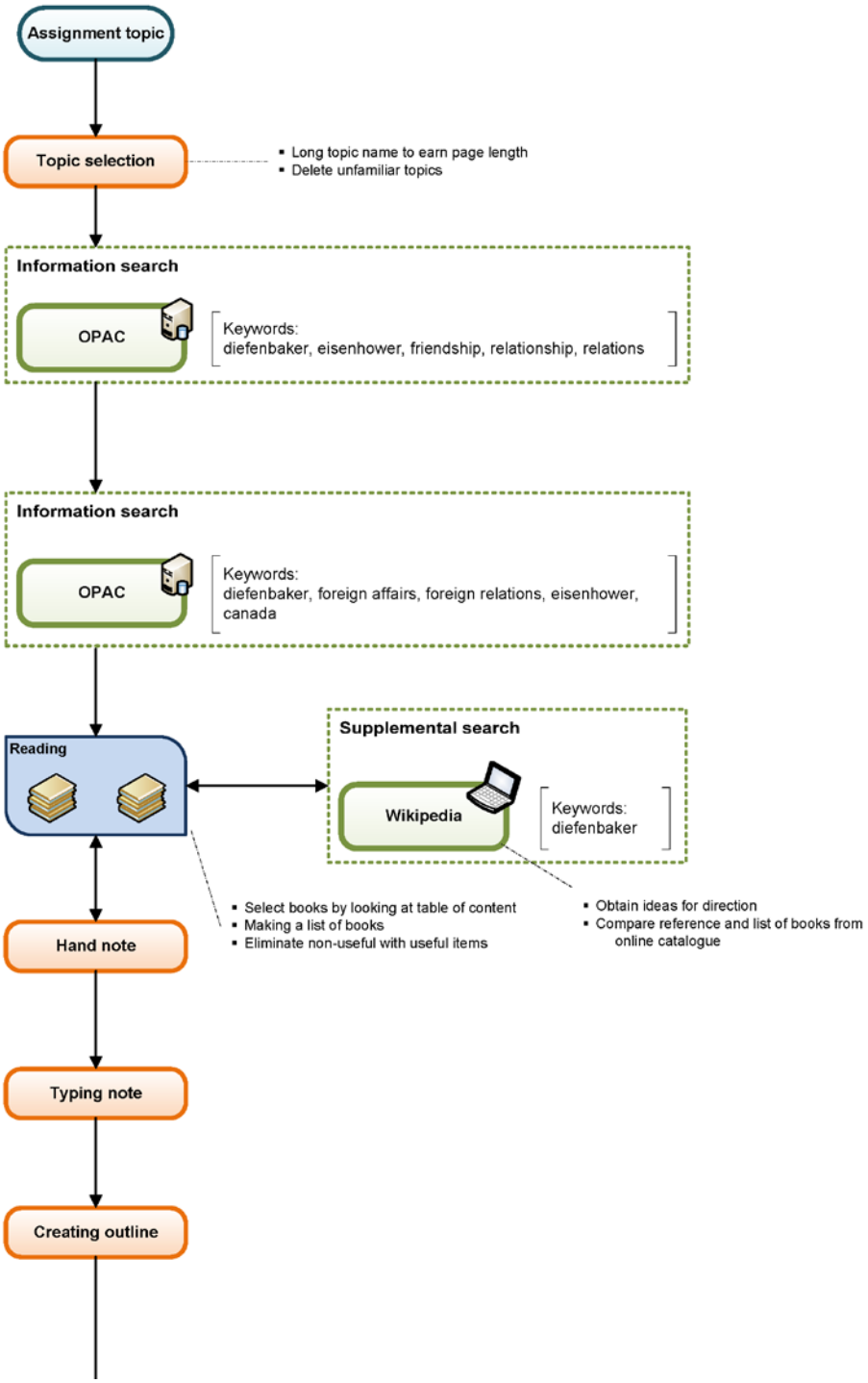
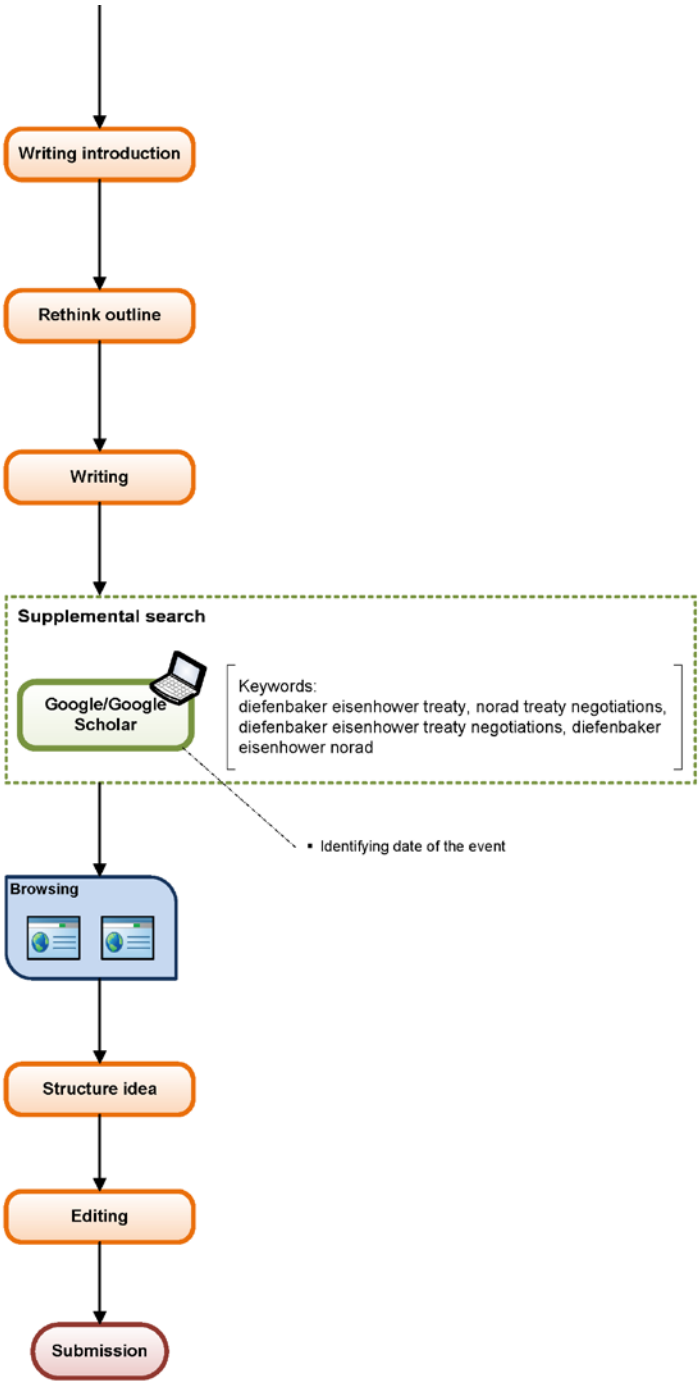

Typing up notes
Developing arguments
Looking for interviews with Jon Stewart & Stephen Colbert
Supplemental search
Google
Keywords:
Interviews, Jon Stewart, Stephen Colbert
Reading
Draft writing
Section outline
Rough ideas where information goes
Editing & re-organisation
Printout & go through
Final writing
Adding conclusion & bibliography
Submission

Figure 27. Participant C8




Writing introduction
Rethink outline
Writing
Supplemental search
Google/Google Scholar
Keywords:
diefenbaker eisenhower treaty, norad treaty negotiations, diefenbaker eisenhower treaty negotiations, diefenbaker eisenhower norad
Identifying date of the event
Browsing
Structure idea
Editing
Submission